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Oral Presentations – Liver

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1 INFLAMMATORY BOWEL DISEASES AND LIVER FUNCTION: FREQUENCY OF SUB CLINICAL SCLEROSING CHOLANGITIS

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Introduction. The strict association between inflammatory bowel diseases and sclerosing cholangitis has been described by several studies. Sclerosing cholangitis is characterised by recurrent episodes of cholangitis with the presence of pANCA. Inflammatory bowel diseases (IBD) are associated in the 10% of cases. The aim of this cross-sectional study was to assess liver function in a group of IBD patients to investigate the possible sub clinical presence of liver involvement.

Method. Seventy-four consecutive patients who were admitted for Crohn’s disease (CD) or ulcerative colitis (UC) surgery between December 2004 and April 2006 were enrolled. Patients who presented a history of liver disease were excluded. Demographic data, disease activity, inflammatory parameters were collected. Each patients had his/her liver function assessed as well as pANCA level. Data were expressed as mean (95% CI) and Fisher’s exact test, Mann-Whitney and Spearman correlation rank tests were used where appropriated.

Result. In patients with IBD total bilirubin was 11,4 (9,4–13,4) mmol/l, AST 25,4 (20,1–30,6) IUL, ALT 25,6 (18,9–32,3) IUL, GGT 31,5 (17,5–45,5), ALP 89,5 (74,8–104,2), Albumin 39,1 (37,5–40,6) mg/l and PT 80,3 (76,4–81,1)%. Twenty-one patients were pANCA positive. Five patients (6.3%) showed an altered liver function with rise of transaminases and cholestatic enzymes. Only one of them had been diagnosed with sclerosing cholangitis but all of them were affected by UC and were pANCA positive (p = 0.02 and p = 0.01, respectively). The presence of pANCA showed a trend to correlation to AST and ALT levels (R = 0.25, p = 0.03). No other differences were observed between UC and CD patients.

Conclusion. In our UC cohort, 14.3% of patients showed an altered liver function even if only one patient had a definite diagnosis of sclerosing cholangitis. The frequency of liver involvement in UC is remarkable therefore pANCA positive patients with UC should be monitored in their liver function for possible sclerosing cholangitis diagnosis.

2 HEPATOCELLULAR CARCINOMA WITH MAJOR PORTAL OR HEPATIC VEIN TUMOR THROMBOSIS: RESULTS OF LIVER RESECTION

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Background. Short- and long-term results after liver resection for hepatocellular carcinoma (HCC) with major vascular invasion.

Study Design. From 1990 to 2005, 222 patients with HCC underwent hepatectomy in our unit. Twenty (9%) had major vascular invasion, including 13 (65%) portal and 7 (35%) hepatic vein thrombosis and they are the subject of this study. Extent of thrombosis was intraoperatively studied by ultrasound for portal vein and by transesophageal echocardiography for hepatic veins. Patients were divided into two groups: patients who had tumor thrombus totally included in the resection specimen (group 1) and those who required vascular procedures to remove thrombus outside the site of the resection (group 2). Short- and long-term results were studied according to the extent of thrombosis.

Results. Nineteen patients (95%) underwent major hepatectomy. Compared to resected patients of our series without major vascular invasion, hepatectomy in these 20 patients was associated with significantly higher rates of total vascular exclusion (35% vs. 10.4%; p < 0.05) and of blood transfusions (50% vs. 13.4%; p < 0.001). Mortality and morbidity rates were 15%. Combined risk of intraoperative blood transfusions and postoperative mortality was significantly higher in group 2 (respectively 63.6% and 27.3% vs. 33.3% and 0; p = 0.02). Median survival was 16 months. The 3- and 5-year overall and disease free survival rates were 25%. Alpha-fetoprotein level < 1,000 ng/mL and minimal fibrosis were associated with a 5-year survival rate higher than 40% poor tumoral histologic differentiation and invaded surgical margins were associated with no 5-year survival. The 5-year overall and disease-free survival rates in group 1 were not significantly different than that in group 2 (respectively 25% vs. 26%; p = ns).

Conclusions. Liver resection for HCC with macroscopic vascular invasion is associated with significantly higher operative risk but long-term survival may be achieved in these patients and should be recommended when curative hepatectomy can be prooperatively anticipated.

3 EARLY EXPERIENCE OF LIVER RESECTION FOLLOWING DOWNSTAGING CHEMOTHERAPY OF INITIALLY UNRESECTABLE COLORECTAL LIVER METASTASES

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Introduction. Published data suggests that 5 year survival of up to 35% is achievable following resection of initially unresectable colorectal liver metastases downstaged by neoadjuvant chemotherapy. In the United Kingdom, the use of oxaliplatin and 5-fluorouracil for downstaging patients with inoperable liver metastases but no extra-hepatic disease was sanctioned in 2002.

Methods. We have prospectively audited all patients in whom downstaging of unresectable liver metastases has been attempted. Following chemotherapy patients underwent restaging with both CT and MRI imaging, and the feasibility of liver resection was assessed.

Results. 70 patients had attempted downstaging chemotherapy. A median of 8 cycles of chemotherapy were given (range 4–14), and 28 patients (40%) were deemed suitable for liver resection following restaging. 25 underwent hepatic resection and 3 were found to be inoperable at laparotomy. 17 underwent R0 resection and 8 patients had an R1 resection. Operative mortality was nil, with 13 patients remaining disease free at a median of 12 months post surgery (range 4–36). 7 patients are alive with recurrent disease and 5 have died. Those who developed recurrent disease did so in a median time of 6 (3–18) months after surgery. The median survival after commencing treatment is currently 27 months in the group having a liver resection compared to 17 months in the group not undergoing liver surgery.

Discussion. Our R1 resection and early recurrence rates are slightly higher than some published data. It is therefore possible that we are being too aggressive in the selection of patients for liver surgery. However, the increased median survival in the group undergoing liver surgery indicates that liver resection may alter the natural history of this disease, even in patients who develop recurrent disease.

*We would happily present this as a poster if not acceptable for oral presentation.

4 TREATMENT STRATEGY FOR PRIMITIVE OR SECONDARY LIVER MALIGNANCIES IN UNFIT ELDERLY PATIENTS

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Surgical resection of HCC in patients not suitable for liver transplantation and surgical resection of colorectal cancer hepatic metastases, still provides the best opportunity for long term, disease-free and overall survival. The advanced age cannot be considered by itself a factor precluding hepatic resection. However elderly patients with significant co-morbidities tend to have lower life expectancy, postoperative complications that may be at high risk for an unfavourable post-operative outcome. Age decreases organ functional reserve. The functional reserve represents a safety margin that may be needed to meet increased demands for cardiac output, carbon dioxide excretion, protein synthesis, immune responsiveness, etc. Therefore age places the elderly population at risk for morbidity and mortality. Patients with coexistent morbidity who are not suitable for surgery are often able to undergo radiofrequency ablation (RFA).

In general, RFA represents an effective technique for minimally invasive tissue destruction for tumor 3 cm or smaller in diameter. From March 2004 to June 2006, a team of hepatobiliary surgeons and interventional radiologists at the Surgical Department “P. Valfonzi” of the University of Rome “La Sapienza” Medical School, performed an
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Intraoperative RFA in 32 patients aged 65 to 81 years. Among them, 22 patients were treated for hepatocellular carcinoma and 10 for liver metastases from primary tumors. All RFA were performed with a standard protocol by using a cool-tip RF system. A minor hepatic resection was also performed in 12 patients. Patients with an ASA Score of III not suitable for major hepatectomies and patients not suitable for percutaneous ablation approach, with esophageal or paraesophageal or sub-glissonian lesions were included into this protocol. A total of 67 lesions were treated. Intraoperative ultrasonography allowed detection of 15 nodules missed at CT. Forty-nine lesions were ablated with RF and 18 resected.

All patients were not managed postoperative in the ICU and discharged after 9–15 days from the hospital. There was no mortality at 30 days after the operation and as well there was no major medical complication. There was modest pleural effusion in the 18.75% of the cases and in two patients (6.25%) a partial portal vein thrombosis was observed for 3–6 months. An overall complete ablation rate was achieved.

All patients are alive without recurrence. The median follow-up is 14.1 months (range 3–27 months). The combined use of intraoperative RF with major hepatectomy can be considered, a good treatment strategy for primary and secondary liver malignancies.

5 LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA (HCC): OUR EXPERIENCE

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Background. Liver resection represents the treatment of choice for hepatocellular carcinoma, and provides only that proves improvement in survival. We retrospectively analysed our personal experience in liver resection for HCC.

Methods. From September 1989 to January 2007, 122 patients underwent liver resection for HCC at our department. Their age ranged from 36 to 82 years (mean age 63 years) and the large part of them were men (94 male vs 28 female, M:F = 3.4:1). In 84 patients (69%) there was one single lesion and in 38 patients (31%) there were multiple nodules (up to five lesions). The size of the nodules ranged 1-18 cm, in 50 cases (41%) they were smaller than 5 cm and in 72 cases (59%) they were equal or larger than 5 cm. Limited resections, single segmentectomies and bisegmentectomies were performed in 98 cases and major hepatectomies were performed in 24 cases.

Results. Postoperative mortality and morbidity rates were 6% and 47% respectively. The mean survival rate recorded was 32 months and the 1-, 3-, 5- and 7-years survival rate were 76%, 41%, 22% and 4% respectively. Number of lesions, tumor size, Pringle manoeuvre lenght and Child-Pugh class were not proved to influence significantly survival rates. Recurrence was observed in 27% of the cases during the follow up.

Conclusions. Liver resection is an effective treatment for hepatocellular carcinoma but further trials are necessary to detect and analyze all the possible variables that could affect mortality, morbidity, survival and recurrence, in order to define clearly the patients eligible for resection.

6 THE PROGNOSTIC PREDICTIVE VALUE OF HEPATIC AGOBIOPSY IN A GROUP OF PATIENTS UNDERGOING HEPATIC RESECTION FOR HEPATOCELLULAR CARCINOMA

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Introduction. Hepatocellular carcinoma represents 80–90% of liver neoplasms, with an incidence growing together with age, reaching the maximum rates were considered. We matched the grade given through the agobiopsy technique, characteristics of the neoplasm, serum parameters and mortality rates were considered. We matched the grade given through the agobiopsy and that given through a post surgical complete study, to understand whether this technique is predictive or not.

Results. About the grading, our results were as follows: Agobiopsy Post surgery

G1 0 0
G2 26 (86.7%) 12 (39.9%) 1 (3.3%)
G3 4 (13.3%) 17 (56.8%) 4 (13.3%)
G4 0 1 (3.3%) 3 (10%)

We found no marked correlation between agobiopsy grading and post surgical one (significance of the correlation: 0.348), nor between agobiopsy grading and the other sub-glissianic prognostic factors.

Discussion. It is impossible to confirm the hypothesis according to which agobiopsy is predictive of the grading of hepatocellular carcinoma. This is due to many reasons. The first is the typical characteristic of this neoplasm to express different grades in different places into the same nodule: the fine needle agobiopsy takes just a small piece of it, and is not able to give the surgeon a real image of the tumour. The second are the criteria of Edmonson and Steiner grading classification, which is just morphological and subjective. In this way, different pathologists-as demonstrated by many authors-may give different grades to the same specimen, which contributes to confusion and misunderstandings. It has been demonstrated that it is very difficult to find differences between G1 hepatocellular carcinomas and benign liver diseases, and between G4 carcinomas and other injuries, like metastases or mesenchymal components, which mainly occur in the first years of life.

The vast majority of hepatocellular carcinoma (HCCs) develop in cirrhotic livers and are frequently virus related; nevertheless, a small percentage of liver tumors include a wide range of histotypes: hepatocarcinoma (HCC), hepatoblastomas, fibrolamellar carcinoma, adenoma and multiple adenomatosis, cholangiocellular adenoma and carcinoma and mixed hepa-tocholangiocarcinoma.

Hepatoblastoma (HB) is an embryonic tumor usually consisting of epithelial and mesenchymal components, which mainly occurs in the first years of life. The typical growth of hepatoblastoma (HBs) develop in cirrhotic livers and are frequently virus related; nevertheless, a small percentage of liver tumors include a wide range of histotypes: hepatocarcinoma (HCC), hepatoblastomas, fibrolamellar carcinoma, adenoma and multiple adenomatosis, cholangiocellular adenoma and carcinoma and mixed hepa-tocholangiocarcinoma.

In our experience RFA is a relatively easy to perform, replicable and well tolerated procedure. On the other hand our study shows preliminary results: the limited number of cases and the short extension of the follow-up make difficult to clearly establish the role of RFA in the treatment of liver tumors.

8 DISRUPTION OF THE WNT 1 PATHWAY (APC-BETA-CATENIN) AND MICROSATELLITE INSTABILITY IN LIVER TUMORS

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Liver tumors include a wide range of histotypes: hepatocarcinoma (HCC), hepatoblastomas (HB), fibrolamellar carcinoma, adenoma and multiple adenomatosis, cholangiocellular adenoma and carcinoma and mixed hepa-tocholangiocarcinoma. Hepatoblastoma (HB) is an embryonic tumor usually consisting of epithelial and mesenchymal components, which mainly occur in the first years of life. The vast majority of hepatocellular carcinoma (HCCs) develop in cirrhotic livers and are frequently virus related; nevertheless, a small percentage of liver tumors include a wide range of histotypes: hepatocarcinoma (HCC), hepatoblastomas, fibrolamellar carcinoma, adenoma and multiple adenomatosis, cholangiocellular adenoma and carcinoma and mixed hepa-tocholangiocarcinoma. Hepatoblastoma (HB) is an embryonic tumor usually consisting of epithelial and mesenchymal components, which mainly occur in the first years of life. The typical growth of hepatoblastoma (HBs) develop in cirrhotic livers and are frequently virus related; nevertheless, a small percentage of liver tumors include a wide range of histotypes: hepatocarcinoma (HCC), hepatoblastomas, fibrolamellar carcinoma, adenoma and multiple adenomatosis, cholangiocellular adenoma and carcinoma and mixed hepa-tocholangiocarcinoma. Hepatoblastoma (HB) is an embryonic tumor usually consisting of epithelial and mesenchymal components, which mainly occur in the first years of life.
these tumors occurs in the absence of HBV/HCV infection and cirrhosis. APC and beta-Catenin are part of the WNT-Wingless pathway. Beta-Catenin mutation and its nuclear overexpression seems to be involved in tumorigenesis and cell differentiation. We report a multicentric study including 20 sporadic HBs and 11 non virus-related HCCs. In the HB group the mean age was 1 year and 7 months, whereas in the HCC group all the patients were less than 40 years-old and the tumor had developed in the absence of cirrhosis. Mutational analysis of a part of the exon 3 (from nucleotide 214 to nucleotide 364) of the beta-Catenin gene, as well as the research of microsatellite instability were performed in all HBs and HCCs. SSCP analysis and sequencing of genomic DNA showed a mutation of the beta-Catenin gene in 2 HBs (10%) and 2 HCCs (18%). A missense mutation in the codons 32 and 38 was discovered in 2 HBs, while a nonsense mutation in the codon 27 and a missense mutation in the codon 32 were found in 2 HCCs. Microsatellite instability was also found in 11 HBs. Present data confirm the results of the literature involved in beta-Catenin in liver tumors.

Interestingly, hepatoblastomas (HBs) showed a high percentage (55%) of microsatellite instability. This could suggest a possible role for both deregulation of the WNT 1-Beta-Catenin signaling and microsatellite instability in the occurrence of liver tumors, even if in different types of tumors.

9 RESULTS OF YTTRIUM-90 MICROSPHERE TREATMENT IN THE MANAGEMENT OF UNRESECTABLE LIVER CANCER
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Introduction. Selective internal radiation therapy (SIRT) is emerging as a new therapeutic modality in recent years for management of non-resectable hepatic metastases. Our initial experience in clinical application of this treatment is reported here.

Methods. From November 2004, patients whose liver tumour was no longer amenable for any conventional treatment with either chemotherapy or radiotherapy were considered for yttrium-microspheres microsphere therapy. We report on our experience of 19 patients undergoing yttrium-microsphere therapy in our unit with SIRT, the discussion of our multidisciplinary meeting. None of the patients had pre-existing disease. A pre-treatment planning was carried out with visceral angiography and technetium-99m macroaggregated albumin (MAA) for assessment of both tumour volume and extrahepatic shunting in addition to a baseline PET and CT scan respectively. Two weeks later, a second visceral angiography was performed to deliver the calculated dosage of microsphere into the arterial system supplying the tumour. Patients were then followed up with repeat PET and CT scans of abdomen at 6 weeks, and 3 months thereafter.

Results. A total of 19 patients with a mean age of 59 years received yttrium-microspheres treatment, consisting of cholangiocarcinoma (n = 3) and liver metastases from colorectal carcinoma (n = 10), pancreas (n = 2), GIST (n = 1), breast (n = 1), squamous cell carcinoma of anus (n = 1) and adenocarcinoma of an unknown primary (n = 1) respectively. The average dosage of microspheres delivered was 1.9 ±0.3 GBq. Injection of microspheres had no immediate effect on either clinical haematology or liver function tests. At follow up, 17% of patients showed a radiological response in size of the tumour. Interestingly, microsatellite instability was also found in 11 HBs. Present data confirm the results of the literature involved in beta-Catenin in liver tumors.

Conclusions. Microsphere treatment should be considered as a last option for patients with liver cancer. Its use should be balanced against its cost/effectiveness.

10 A PROSPECTIVE STUDY TO BETTER DEFINE CURABILITY OF LIVER RESECTION FOR COLORECTAL METASTASES BY PERIOPERATIVE CARCINOEMBRYONIC ANTIGEN (CEA) MEASUREMENTS
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Background. Despite a curative liver resection for colorectal metastases the need for a new definition of radicality after liver resection.

Objective. The aim of this study was to assess the utility of the LiMon system in the prediction and early detection of liver failure post-lobectomy.

Methods. Indocyanine green elimination, using the LiMon system, serum liver function tests and Child-Pugh score were assessed in 21 patients with colorectal liver metastases (n = 17) and in 4 patients with extrahepatic liver metastases (n = 4). The median R15 for Child A, B and C patients were 7.4, 7.6 and 17.5, respectively, ANOVA p < 0.001. The LiMon ICG elimination by pulse spectrophotometry is a Conclusions. The LiMon ICG elimination by pulse spectrophotometry is a non-invasive and reliable method by the test in patients undergoing liver resection that aids in the early identification of post-hepatectomy liver failure.

11 PERIOPERATIVE USE OF THE LI-MON METHOD OF INDOCYANINE GREEN ELIMINATION MEASUREMENT TO DETECT POST-HEPATECTOMY LIVER FAILURE
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Introduction. There are few practical and reliable tests for the estimation of hepatic functional reserve in patients being assessed for hepatic resection. Recently, a non-invasive liver function monitoring system, the LiMON (Pulsion Medical Systems, Munich, Germany), has been developed that measures indocyanine green (ICG) elimination by pulse spectrophotometry. The aim of this study was to assess the utility of the LiMon system in the prediction and early detection of liver failure post-hepatectomy.

Methods. Indocyanine green elimination, using the LiMon system, serum liver function tests and Child-Pugh score were assessed in 21 patients with colorectal liver metastases (n = 17) and in 4 patients with extrahepatic liver metastases (n = 4). The median R15 for Child A, B and C patients were 7.4, 7.6 and 19.5, respectively, ANOVA p < 0.001.

Results. There were 16 men and 5 women with a median age of 68 years (range 37-84) and 10 had a history of smoking (9-76), all of whom were Child score A preoperatively. On days -1, + 1, + 5 and + 10, the median ICG 15-min retention rates (R15) were 1.9, 2.8, 3.0 and 4.3 in those who remained child A postoperatively (Group A) and 7.6, 17.5, 11.5 and 7.8 in those who became Child B or C post-operatively (Group B), p = 0.4, 0.04, 0.02, and 0.03 respectively. Mann-Whitney U test on day + 1, median R15 for Child A, B and C patients were 7.4, 7.6 and 19.5, respectively, ANOVA p < 0.001.

Conclusions. LiMON ICG elimination by pulse spectrophotometry is a sensitive, non-invasive and reliable method by the test in patients undergoing liver resection that aids in the early identification of post-hepatectomy liver failure.

12 THE ROLE OF IMMUNOGLOBULIN M, C-REACTIVE PROTEIN AND COMPLEMENT IN LIVER ISCHEMIA-REPERFUSION INJURY
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Introduction. A role for C-reactive protein (CRP) and Immunoglobulin M (IgM) in the initiation of I/R injury via complement activation has been established in various I/R models. Both CRP and IgM can bind to neoantigens in the damaged cell membranes leading to the activation of complement. However, the role of IgM and CRP actively complement in liver I/R remains unknown.

Aim. The aim of this study was to assess the relationship in time of IgM and CRP binding in comparison to complement activation in a hepatic I/R rat model.

Method. Male Wistar rats (n = 60) were divided into eleven groups: 60 minutes of partial ischemia (70%) followed by 0, 3, 6, 12 or 24 hours of
reperfusion (each n = 6). Partial ischemia was induced via clamping of the afferent vessels and bile duct to median and left lateral lobes. Sham laparotomy groups with corresponding reperfusion times were included, as well as a control group sacrificed before ischemia (each n = 5). Hepatocellular injury (plasma aminotransferases and histopathology), inflammatory response (neutrophil influx), prothrombin time (PT), rat IgM content in isoelectric hepatic tissue homogenates and immunohistochemical depositions of CRP, IgM and C3 on frozen tissue sections were assessed during each reperfusion time. The Mann-Whitney test and the Spearman rank-correlation test were used for statistical analysis.

**Results.** Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) significantly increased after 3 hours, peaking at 6 hours (5300±1000 and 3100±800 U/L, respectively) and remained elevated up to 24 hours (p < 0.01 versus sham). Hepatic neutrophil influx significantly increased from 3 to 6 hours of reperfusion (p < 0.01), reaching at 12 hours (1.1±0.2 U/mg protein). A progressive increase in prothrombin time (PT) was observed throughout reperfusion (p < 0.05 versus sham). Histopathological injury increased from 3 to 12 hours of reperfusion (p < 0.01) and remained elevated thereafter (p < 0.01 versus sham). Rat IgM content in isoelectric tissue homogenates demonstrated a progressive increase throughout reperfusion up to 24 hours. Immunohistochemical analysis showed a similar staining pattern of IgM and CRP, in which depositions increased from 0 to 3 hours of reperfusion, peaked at 12 hours and decreased thereafter until 24 hours (p < 0.05 vs sham). C3 depositions followed the IgM and CRP staining pattern, demonstrating a considerable increase from 3 to 6 hours, peaking at 12 hours of reperfusion and significantly decreasing from 12 until 24 hours (p < 0.01). Positive correlations existed between the staining of CRP and C3 (Spearman rank-correlation test r(6) = 0.87, p < 0.01) and IgM and C3 (Spearman rank-correlation test r(6) = 0.80, p < 0.01).

**Conclusion.** These data show a parallel binding pattern in time of IgM and CRP to ischemic liver tissue which precedes the activation of C3. Hence, this study suggests CRP and IgM to be mediators of hepatic I/R-induced complement activation in rats.

13 THE USE OF VASCULAR CLAMPING IN HEPATIC SURGERY: THE LESSON LEARNED FROM 1260 LIVER RESECTIONS

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**Objective.** To minimize intraoperative bleeding several techniques have been introduced. Ischemia-reperfusion injuries and intestinal congestion are the main drawbacks of vascular clamping. We evaluated the possible negative effects on early postoperative outcome of different type of vascular clamping during liver resections and how attitudes have changed in the last 20 years.

**Patients and Methods.** The study group included 1260 consecutive liver resections, 338 (26.8%) of them in cirrhotic patients. Postoperative complications and mortality were analyzed in relation to the use of vascular clamping, blood transfusion, liver diseas and type of liver resection.

**Results.** Vascular clamping was applied in 594 (47.1%) cases. Operative mortality was 3.2% in the vascular clamping group and 2.0% in the non-clamped group (p = n.s.). At multivariate analysis, blood transfusion, major hepatectomies and presence of cirrhosis were significantly related to postoperative complications. There was a significantly reduced use of vascular clamping during the last 20 years as well as of blood transfusion, in the whole group and among cirrhotic patients. The lowest incidence of severe complications was in the case of continuous or hemi-hepatic vascular occlusion. Among the 338 cirrhotic patients, 155 (45.1%) received some type of vascular control. Morbidity and mortality rates were similar between the 2 groups. At multivariate analysis, only blood transfusion was significantly related to postoperative morbidity. Postoperative complications were significantly reduced in the group receiving intermittent compared to continuous clamping.

**Discussion.** Vascular clamping can be applied without additional risk during partial hepatectomy. Intermittent or hemihepatic vascular occlusion is preferable in cirrhotic patients.

14 THE ROLE OF PARTIAL HEPATECTOMY FOR LIVER METASTASES FROM BREAST CARCINOMA

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**Background.** To evaluate the role of liver resection for hepatic metastases from breast carcinoma, early and long term results were retrospectively reviewed in 38 resected patients.

**Methods.** Among 528 liver resection for metastases, 38 (7.2%) were performed for metastases from breast cancer; 381 (72.2%) were performed for colorectal liver metastases. Mean age was 56.1 ± 10.8 years old (varying from 37 to 76 year old). Mean number of metastases was 1.4 (varying from 1 to 4); single metastases was present in 21 (55.3%) patients. Mean diameter of the nodules was 4.7 cm (varying from 2 to 11 cm). Only one patient had 5 or more metastases and in 90% of patients primary tumor was ductal carcinoma. All patients received adjuvant chemotherapy after resection of primary tumor.

**Results.** Major hepatectomies were performed in 18 (47.4%) patients, while resections were performed in the remaining 20 (52.6%) cases. Operative mortality was 0. Postoperative morbidity was 18.4%. Median postoperative stay was 11.8±15.9 days (varying from 3 to 91). The 1, 3 and 5-year actuarial survival rate was 88%, 61% and 31%, respectively. Tumor diameter and number of metastases did not affect long term survival. The 1, 3 and 5-year survival among the 381 colorectal liver metastases were 89%, 53% and 37%, respectively. No statistical significant difference was found in survival curve between the 2 groups. Five patients (13.1%) survived longer than 5 years.

**Conclusions.** Liver resection is an effective treatment for metastases from breast cancer; satisfactory long term survival, similar to hepatectomy for colorectal metastases, can be obtained with an acceptable operative risk. Patients’ selection is the key point to achieve encouraging results.

15 HEPATIC RESECTION FOR METASTASES FROM NON-COLORECTAL NON-ENDOCRINE TUMORS: EXPERIENCE OF A SINGLE INSTITUTION

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**Backgrounds.** The significance of surgical therapy for hepatic metastases originating from primary non-colorectal non-neuroendocrine (NCNE) tumors is yet to be completely clarified. We want to evaluate the role of liver resection for NCNE metastases from our experience in our institution.

**Materials and Methods.** Between 1989 and 2006 56 patients with NCNE hepatic metastases underwent liver resection at Surgical Department of the University of Udine. 28 were female and 28 male, with a mean age of 60.2 years (range 37–79) at the time of surgery. In 22 patients (39.3%), the metastases were synchronous.

**Results.** In most cases (80.3%), were performed minor resections. In 8 cases (14.3%), the main procedure was complemented by a wedge resection, and in other 7 cases (12.5%) by alcohol or radiofrequency ablation of one or more deep lesions The median survival rate for the entire group was 20 months, while actuarial survival at 5 years was 28.9%. Survival was better for non-gastrointestinal tumors (p = 0.003), and for patients affected by metachronous metastases with a disease-free interval longer than 24 months (p = 0.01).

**Conclusions.** Hepatic resection for NCNE metastases may be considered as a viable therapeutic modality such, as showed in this study, in the cases of metastases originating from non-gastrointestinal tumors, such as sarcoma, renal and breast cancer.

16 SURGICAL TREATMENT OF LIVER METASTASES OF COLORECTAL CANCER

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**Introduction.** Surgery is currently the only available treatment option which offers the potential for cure for patients with liver metastases from colorectal cancer: hepatic resection may offer long-term survival.

**Materials and Methods.** One hundred and forty-four patients, who underwent hepatectomy for colorectal cancer metastases at Surgical Department of the University of Udine, from 1989 to 2000, were retrospectively studied. In 105 (72.9%) cases metastases originated from colon cancer and in 39 (27.1%) from rectal cancer. 101 (72.9%) were male and 43 (29.9%) female, with a mean age of 61.4 years (range 23 – 82) at the time of surgery. In 56 patient (38.9%), the metastases were synchronous.

**Results.** The median survival rate for the entire group was 30 months, while the overall 5-year survival rate was 28.7%; 5-year survival rate of hepatic resections performed until 1999 was 20.8% (78 cases) and 46.2% from 2000 (66 cases) (p = 0.003). There was no significant 5-year survival rate difference between patients with colon cancer (26.2%) and rectal cancer (36.3%). Hospital death was 1.4% (2 cases) and morbidity was 24.3% (35 cases). The survival rates for synchronous and metachronous metastases, portal infection and hemobilia, single and multiple metastases, monolobar and bilobar metastases, surgical margins <0 mm or >10mm, metastases diameter <5cm or >5cm were not statistically significant.

**Conclusions.** These results show that hepatectomy may offer long survival, even in patients with multiple or bilobar metastases. Neither the operative procedure nor the size of the surgical margin had any influence on survival.
after hepatectomy. This study suggest that liver resection should be indicated in patients with expanded indications.

17 BILIARY DRAINAGE AND INFECTIOUS COMPLICATIONS AFTER HEPATECTOMY FOR PROXIMAL BILE DUCT TUMOR OBSTRUCTION

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**Background.** The role of preoperative biliary drainage before liver resection in jaundiced patients remains controversial.

**Aim.** To compare perioperative outcome of liver resection for carcinoma involving proximal bile duct in jaundiced patients with and without preoperative biliary drainage.

**Patients and Methods.** Seventy-four consecutive jaundiced patients under- went hepatectomy for carcinoma involving proximal bile duct from January 1990 to December 2006. All of them had McCauley’s score of 3 or higher. Patients underwent biliary drainage before portal vein embolization because of small remnant liver and were excluded from the study. Thirty patients underwent preoperative biliary drainage and thirty seven underwent liver resection without preoperative biliary drainage. All patients underwent resection of extrhepatic bile tree. Obstruction was due to hilar cholangiocarcinoma (44 patients), gallbladder cancer (9), intrahepatic cholangiocarcinoma (3), hepatocellular carcinoma (2), colorectal metastasis (1) and bile duct polyposis (1).

**Results.** Group were equivalent for age, sex ratio, cause of jaundice, type of hepatectomy and number of resected hepatic segments. Preoperative bilirubin level was lower in preoperative drainage group (3.1 vs 13.3 mg/dL, p < 0.0001). Liver function tests were similar in postoperative day 3 and 7, while bilirubin level became similar after postoperative day 10. Overall operative mortality and morbidity rates were similar in the two groups (3.3% vs 16%, p = 0.612 and 70% vs 63.3%, p = 0.583, respectively). Patients with preoperative biliary drainage had significantly increased rates of infectious complications (40% vs 16%, p = 0.044). Considering both drainage related and operative complications, infectious complication rates were higher in the drainage group (53.3% vs 16.6%, p = 0.008). Multivariate analysis identified the presence of biliary drainage as the only independent risk factor for the onset of infectious complication in the postoperative course (RR 4.41, CI95% 1.216-16.002, p = 0.024). The incidence of non-infectious complications was similar in the two groups. There was no difference in hospital stay between the two groups.

**Conclusions.** Overall mortality and morbidity after liver resection are not improved by preoperative biliary drainage in jaundiced patients. Prehepatectomy biliary drainage increases the incidence of infectious complications.

18 SALVAGE SURGERY AFTER NEOADJUVANT CHEMOTHERAPY WITH BEVACIZUMAB IN UNSELECTED PATIENTS WITH ADVANCED COLORECTAL CANCER AND UNRESECTABLE SYSTEMIC METASTASIS. RESECTABILITY RATE AND POST-OPTERATIVE OUTCOME

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**Background.** Surgical resection of liver metastases (LM) from colorectal cancer (CRC) remains the only therapy with potential for cure. However, only 15–20% of patients are candidates for surgery. Neoadjuvant chemotherapy has been reported to be effective for initially unresectable liver metastases.

**Objectives.** The primary objective was to determine the rate of salvage surgery after neoadjuvant chemotherapy with Bevacizumab in unselected patients with advanced CRC and unresectable systemic metastasis. The secondary objective addressed the post-operative outcome (particularly the development of complications), the frequency of reoperations (owing to bleeding or biliary leakage) and the postoperative mortality.

**Patients and Methods.** Study design: Retrospective. However in operated patients, the data collection was prospective. Period of inclusion: January-2005 / February-2007. Inclusion Criteria: Biopsy proved CRC. Stage IV disease or unresectable LM and/or other associated systemic metastases. Fifty eight patients received neoadjuvant chemotherapy with Bevacizumab as a first treatment due to LM in 47 cases (80%), lung metastasis in 18 (31%), peritoneal carcinomatosis in 14 (24%), pedicular lymph nodes in 8 (14%) and hepatic metastasis due in 13 (22%). Thirty four patients (95%) presented LM with simultaneous extrhepatic depositions. Extrhepatic disease was in multiple sites in 13 patients (22%).

**Results.** There were 42 males (72%) and 16 females (28%). Mean age was 59.4 (± 10 years) (range 40-77). Median (range) Ca19.9 levels before chemotherapy were 39.4 (0.6–4728) ng/mL, and after chemotherapy 15.6 (0.6–5800) ng/mL (p = 0.004). Fourteen patients have not completed chemotherapy, so there are 43 patients for evaluation. The rate of resection was 56% (24/43). Two patients have been operated two times due to recurrence. Five patients underwent simultaneous surgery of the primary and LM. CAE levels before surgery were 8.2±11 (0.9–40) ng/mL, and Ca 19.9 levels before surgery were 22.8±10 (0.6–92) ng/mL. Outcome measures were: Left extended hepatectomy, left or right hepatectomy with contralateral metastasis resection (n = 4), right hepatectomy (n = 2), left hepatectomy (n = 2), bile duct leak (n = 3), liver abscess (n = 2), limited resection (n = 9), resection for portal vein thrombosis (n = 3), hepatic insufficiency (n = 2), wound infection (n = 1), biliary fistula 0% and 5 patients (23%) need a reoperation. However, according to Clavien’s, classification only 7 patients (33%) were classified by NS.

**Conclusions.** Chemotherapy with Bevacizumab has a high surgical rescue rate (56%). Blood loss, transfusion, incidence of biliary fistula, and infection is comparable to patients without Avastin. Results about haemorrhage and reoperation rate need further confirmation.

19 TREATMENT OF BILIARY FISTULAS AFTER LIVER RESECTIONS WITH ERCP

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Biliary fistulas after liver resections or liver trauma are not so infrequent after this kind of surgery. Often they will close spontaneously but, when a biliary stent in placed, treatment will be performed. We report the experience of our center with biliary Fistulas after liver surgery. ERCP was successfull in all the cases and it clearly showed the main biliary tree responsible for the bile leak. The day after the procedure the bile leak reduced and stopped after a mean of four days.

**Conclusions.** biliary leak after liver surgery is an annoying complication that sometimes stops spontaneously which depends on the gradient pressure from the biliary tree and the papilla and the duodenum. ES with a naso-biliary stent was left in place with the tip near the main damaged duct.

**Results.** ERCP was successful in all the cases and it clearly showed the main biliary tree responsible for the bile leak. The day after the procedure the bile leak reduced and stopped after a mean of four days.

**Conclusions.** biliary leak after liver surgery is an annoying complication that sometimes stops spontaneously which depends on the gradient pressure from the biliary tree and the papilla and the duodenum. ES with a naso-biliary drainage reduces the pressure between the biliary tree and the duodenum allowing the correct biliary outflow.

20 REVISITED CONSIDERATION OF SURGICAL INDICATIONS FOR BENIGN TUMORS OF THE LIVER OVER TIME

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Surgical treatment of benign tumors of the liver still represents a challenge. We reviewed the experience gained in a 20 year period with particular attention to the indication for surgery.

Two hundred sixty patients were surgically treated: there were 54 (20.8%) male and 206 (79.2%) female. Mean age was 46.5 (± 13.3 years) (range 18– 75) years. There were 93 (35.8%) pts. carrying hemangiom (HH), 77 (29.6%) with cystic lesions (CL), 51 (19,6%) with focal nodular hyperplasia (FNH), 30 (11,5%) with adenoma (LA) and 9 (3,5%) with other different benign liver tumors. One hundred thirty-six (52.3%) pts. were operated before ’93 and 124 (47.7%) thereafter.

There was no difference in the indication for surgery for LH, FNH and LA. The number of pts. carrying CL decreased from 54 (39.7%) to 23 (18,5%) (p < 0.001) of the more recent years. We observed a slight increased of pts operated for reasons different from tumors (45.9% vs. 54.3%, p = NS). Surgical indication for reasons other then symptoms increased over the year from 28.1% to 71.9% (p < 0.001). On the other hand, formal indication for surgery increased from 2.9% to 9.1% (p < 0.001) and those for tumors that increased from 1.1% to 26.4% (p < 0.001). The percentage of patients submitted to surgery based only on the diameter decreased from 11.8% to 2.5% (p < 0.001). There was no difference in patients operated for diagnostic dilemma. There were 42 (16.8%) major hepatectomy, 162 minor hepatectomy open (94,7%) and 162 laparoscopic (7,2%) resections. Seventeen (7,2%) patients required a reoperation. 12 patients (4.6%) had a complication of grade IIIa (NS) or higher. Five patients stay in hospital for diagnostic dilemma. Mean hospital stay in liver resection was 17.15 (± 10.5 days). Overall mortality and morbidity was 0 and 11.6% respectively. Indications for liver transplantation were 5 symptomatic polycystosis, 3 angiomatosi, 1 adenomatosis and 1 nodular regenerative hyperplasia. Mean hospital stay in liver transplantation was 24.43 (± 14.6 days). Overall mortality and morbidity was and 30% and 30% respectively.
Benign liver lesions represent a consistent indication for hepatic surgery. The increased knowledge of these diseases led to a substantial change in their indication for removal. Futile liver resection in this field should be avoided.

21 THE IMMUNOSUPPRESSANT DRUG FTY720 INHIBITS PDGF-BB-INDUCED HEPATIC STELLATE ACTIVATION

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Introduction. Liver fibrosis is the common response to chronic liver injury, characterized by the accumulation of Extra-Cellular-Matrix (ECM) proteins. It is widely recognized that activated Hepatocellular Stellate Cells (HSCs) play a pivotal role in the development of liver fibrosis. Platelet-derived growth factor (PDGF)-BB actually represents the most vigorous mitogen and stimulator of chemotaxis for HSCs. Furthermore, sphingosine-1-phosphate (S1P), released from activated platelets, has been recently shown to increase the proliferation of cultured HSCs (i.e. trans-activation of PDGF-receptor). A relevant issue has been recently led to the hypothesis of a possible interference of SP1 receptors with FTY720, which is a potent immunomodulator. The aim of this study is to investigate the potential anti-fibrotic role of FTY720 in the liver.

Results. Our work demonstrated the FTY720 can interfere in the signalling pathways of HSCs activation, with a reduced mitogenic effects. Furthermore, our data support that the phosphorylated form of the drug contributes to its action, but not exclusively, suggesting that FTY720 is effective also in the not-phosphorylated form. HSCs treatment with FTY720 resulted in a significant inhibition of PDGF-induced proliferation in a concentration-dependent manner, without cytotoxic effects. However, since FTY720 exerts a more powerful effect on PDGF stimulation than a standard Gi-protein inhibitor, we can suppose that the drug might act not only through receptors but also through intracellular targets.

Finally, the evaluation of chemotaxis confirmed the 50% decrease of cell migration when the cells, stimulated by PDGF, were pre-treated with FTY720.

Conclusion. Our results suggest the validity of this molecule as a potential novel anti-fibrogenic drug, and further reinforce and extend its role for other potential clinical applications.

22 MITOCHONDRIAL SRC-DEPENDENT PHOSPHORYLATION IN A RAT MODEL DURING HEPATIC REGENERATION

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Introduction. Hepatocytes are highly differentiated cells with a potential capacity of proliferation under particular circumstances such as liver injuries. Hepatic proliferation in vivo is controlled by several cellular stimuli including growth factors, hormones ect. Besides, mitochodria have been recently recognized to have a pivotal role in the signalling pathway. Our aim is to demonstrate the mitochondrial involvement in the tyrosinic signalling during liver regeneration.

Materials and Methods. 20 Wistar rats underwent 70% liver resection. Sub-cellular fractions of liver were purified in different times after surgery. Cells aliquots of them were used to verify the immunoreactivity to the anti-phosphotyrosin antibodies, anti-Lyn, anti-Jak, anti-ERK1/2 and phos- phorylated forms, and some other proteins usually considered markers for the cellular cycle. Tyrosin kinase Src dependent activity was evaluated using a specific substrate for Src kinases.

Results. Our data showed an increased activity in terms of tyrosinphosphorylation for several mitochondrial proteins along with an highly activity of mitochondrial Lyn kinase, which is the most expressed protein of Src family in liver during regeneration. Even though it is widely recognized that Src family is involved in the cellular signalling in the plasmatic membrane, however its presence has been recently shown also in other cellular compartments such as mitochondria, together with phosphotyrosin phosphatase activity.

Specifically, our results showed that a tyrosin-kine Src-dependent activity exists and it is highly expressed in the mitochondria between G1 and S phase during hepatic regeneration. Therefore, immunoreactivity assay of Lyn protein and its mRNA level (real time PCR) showed that the increased activity of the mitochondrial tyrosin kinase has been due to its translocation from the cytoplasm to the mitochondria.

Conclusions. Mitochondrial translocation of Lyn tyrosin kinase highlighted the potential role of the phosphotyrosin signalling during proliferative phase. A further investigation of Src family might help us to better understand molecular mechanisms of diseases related to mitochondrial dysfunctions.

23 ELEVATED PREOPERATIVE NEUTROPHIL TO LYMPHOCYTE RATIO PREDICTS POOR OUTCOME AND INCREASED RECURRENCE RATE AFTER RESECTION FOR COLORECTAL LIVER METASTASES

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Background. The neutrophil-lymphocyte ratio (NLR) provides an indicator of inflammatory status, and an elevated NLR has been shown to be a prognostic indicator in primary colorectal cancer. The immunological response to malignancy is partly mediated by lymphocytes and monocytes, resulting in a relative lymphocytopenia that occurs in patients with raised NLR may incur a higher risk of recurrence and a poorer prognosis. The aim of this study is to establish whether NLR can predict outcome in patients undergoing surgery for colorectal liver metastases.

Methods. Retrospective analysis of the white cell and differential counts for 440 patients undergoing liver resections for colorectal liver metastasis between January 1996 and January 2006. An NLR 5:1 was considered to be elevated.

Results. White cell counts were available for 440 patients. 289 males and 151 females were included with a mean age of 64.1±10.7 years and mean follow up of 30±19 months. 78 patients (18%) had elevated NLR, and of these 59 died, therefore giving elevated NLR a positive predictive value for overall survival of 76%, while 60 of the 78 had recurrent disease giving raised NLR a positive predictive value for recurrence of 78%. The 5year survival for patients undergoing resection with high NLR was significantly worse than that for patients with normal NLR (5 year survival High NLR 22%, Normal NLR 58% Log Rank Test p<0.0001). Univariate analysis of factors affecting survival revealed that raised NLR, number of metastases (>8), tumour size >5cm and age (>70) significantly affected outcome. All factors except tumour size remained significant predictors of term survival on multivariate analysis (p<0.0001, HR=2.261 CI 1.694-3.129 (NLR), p=0.047, HR=1.611 CI 1.006-2.579 (Mets >8), p=0.037, HR=1.418 CI 1.049-1.930 (Age >70)). On univariate analysis of factors affecting recurrence, elevated NLR was found to be the sole positive predictor of recurrence (p<0.0001, HR=4.521 CI 2.475-8.257).

Conclusion. Elevated NLR increases both the risk of recurrence in patients who undergo surgery for colorectal liver metastases. Preoperative NLR measurement in such patients may provide a simple method of identifying patients with poorer prognosis.

24 A SIMPLE PRE-OPERATIVE PROGNOSTIC SCORE FOR PATIENTS WITH COLORECTAL LIVER METASTASES

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Background. With improvements in outcome from liver resection, the indications for resection of colorectal liver metastases (CRLM) have expanded. However, debate continues about identifying those patients that benefit from surgery.

Methods. Clinico-pathological data from a total of 687 patients who underwent resection for CRLM between January 1993 and January 1996 were reviewed from a prospectively gathered database.

Results. The median age of patient was 64 years and 36.7% of patients had synchronous disease. The presence of an inflammatory response to tumor (IRT) was noted in 25.2% of cases. The overall 5-year survival was 45%. Only the presence of 8 or more metastases and an IRT influenced both overall and disease-free survival on multivariate analysis. A pre-operative score: 0 = less than 8 metastases & absence of IRT; 1 = 8 or more metastases or an IRT and 2 = 8 or more metastases & an IRT- was derived from the results of the multivariable analysis. This “Leeds criteria” correlates with both overall and disease-free survival.

Conclusion. This study amounts to the second largest single centre experience in the surgical management of CRLM. We have validated previously published results as well as developed a simple pre-operative score that allows the clinician to stratify patients according to long-term prognosis.

25 LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA ARISING IN NON-CIRRHOTIC LIVERS

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SURGICAL TREATMENT OF INTRAHEPATIC CHOLANGIOCELULAR CARCINOMA

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Introduction and Aim. Intrahepatic cholangiocarcinoma (CCC) is associated with a poor prognosis. Since CCC is currently considered a contraindication for liver transplantation and results of chemotherapy are poor after surgical resection remains the only chance for cure. Therefore, since 04/1998 we have adopted an aggressive surgical approach to CCC.

Patients and Methods. Data of 142 patients who underwent explorative laparotomy for CCC between 1998 and 2005 were evaluated. There were no data of hilar cholangiocarcinoma or gall bladder carcinoma within this analysis.

Results. In 70 patients liver resection was performed (resectability rate 49%). There were 48 trisectionectomies, 14 left or right hepatectomies and 8 mono- or bi- or multisegmentectomies. In addition the following procedures were performed: resection of hilar bifurcation (n = 26), bile duct reconstruction (n = 1), partial resection of diaphragm (n = 4), partial resection of the inferior vena cava (IVC; n = 5), reconstruction of segment-VI-vein (n = 1), resection of portal vein (n = 2) or hepatic artery (n = 1), gastrectomy (n = 1), thoracotomy (n = 1), adrenalectomy (n = 1). There were 68 R0 resections. Following resection, the 3- and 5-year-survival rates are 48% and 30%. Survival was significantly better after R0 resection with a calculated 3- and 5-year-survival of 54% and 39% compared to 23% and 0% after incomplete resection (p < 0.005). So far, after a median follow-up of 25 months tumor recurred in 40/66 (63%) patients after R0 resection. In univariate analysis, UIICC-stage, vascular invasion and tumor grading were identified to be significantly associated with recurrence and worse survival after R0-resection. In tumors without vascular invasion (n = 39) the 3- and 5-year-survival was 79% and 65% compared to 21% and 7% with vascular invasion (p < 0.0001). Similarly, R0-resection of G1-tumors (n = 19) resulted in significantly better 3- and 5-year-survival (95%) compared to resection of G2 and G3 tumors.

Conclusions. The presented data show that an R0-resection offers a chance for long-term survival even in large intrahepatic cholangiocarcinoma. This justifies an aggressive surgical approach which often requires additional vascular or biliary reconstructions. On contrast, with regard to the poor results after incomplete (R1-/R2)-resection there is only an indication for palliative tumor resection in CCC. The high rate of irresectability underlines the use of diagnostic laparoscopy.

27 EVOLUTION IN OPERATIVE AND NON-OPERATIVE MANAGEMENT OF HEPATIC TRAUMA: A 20-YEAR SINGLE-CENTER EXPERIENCE

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Objective. To assess the evolution in operative (OM) vs. non-operative management (NOM) of hepatic trauma in a large consecutive single-center series over a 20-year period.

Background. Advances in diagnostic imaging and emergency management during the past two decades as well as the introduction of “damage control” strategies in trauma patients have influenced the practice of liver trauma management. Therefore, we investigated the impact of these factors on the management of hepatic trauma with special emphasis on OM and NOM.

Methods: Patients with liver trauma who were treated at our center during the 20-year study period (1985–2005) were reviewed. The following data were collected: demographics, mechanisms of injury, diagnostic imaging, hepatic and associated injuries, management of hepatic injury (OM vs. NOM), and outcome. The degree of hepatic trauma was graded either operatively or by CT scan according to hepatic injury scale (Moore et al. J Trauma 1989). The analysis was performed for the early (1985–1995) and late (1996–2005) study period.

Results. 322 patients (MF: 216/106, median age 31 yrs, R: 16–81 yrs) were treated for liver trauma during the entire study period. Blunt liver trauma was present in 254 patients (79%) and penetrating liver trauma in 68 patients (21%). OM was performed in 203 patients (63%) and NOM in 119 patients (37%) during the study period. There were no apparent differences in the severity of liver damage or associated injuries between both time periods. The mortality rate was 35% for the early period and improved to 23% in the late period. While only the minority of patients was treated non-operatively during the early period (OM 95%, NOM 5%), there was a significant shift to NOM in the later period (OM 52%, NOM 48%). The ratio of NOM over the study period directly correlated with the increased use of CT scan as diagnostic modality (R2 = 0.96). Non-operative treatment was successful in 95% of patients (failure rate 7%) and was associated with a low mortality rate (7%). Also, a shift to significantly shorter operation times (OM group) was noted between the early and late study period (154 vs. 242 min, p < 0.01).

Multivariate analysis revealed that age, operative therapy, transfusion...
requirement, as well as associated head and pelvic injuries were independent predictors of poor outcome.

Conclusion. During the last decade, there was a significant change in the management of hepatic trauma which resulted in improved survival. Non-operative management of hepatic trauma became the treatment of choice in hemodynamically stable patients and is associated with a high success rate. For patients requiring OM, the duration of initial surgery should be kept as minimal as possible.

28 ISOLATED TOTAL CAVAL CLAMPING WITH "REMNANT LIVER SHUNT" FOR COMBINED HEPATIC AND VENOCAVAL RESSECTION IN TUMORS INVOLVING VENACAVA

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Hepatic vascular exclusion procedures, ranging from total vascular exclusion (TVE) to selective hepatic vascular exclusion, have extended the indication for hepatic resections. TVE involves control of hepatocaval confluence, but imparts major hemodynamic consequences and morbidity in a significant number of patients.

We describe herein, a new technique of isolated total caval clamping with pericystectomy. TVE is indicated in massive liver tumors. We report 10 patients with right sided tumor involving the right hepato caval confluence underwent right hepatic resection associated with reconstruction of vena cava. After division of the liver parenchyma the superior clamp was placed underly below the confluence of middle and left hepatic veins while the inferior clamp was totally occluding the venacava above the renal veins. The left remnant liver continued to be perfused during caval reconstruction. This perfusion using the remnant liver as a shunt maintained the hemodynamic stability of all patients resulting in good postoperative outcome. This procedure would reduce the indications of TVE to exceptional cases with the involvement of the three hepatic veins.

30 SINGLE AND MULTIPLE HEPATOCELULAR CARCINOMA: A SINGLE CENTRE SURGICAL EXPERIENCE OF 120 CASES

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Aims. Hepatocellular adenoma (HA) is a rare benign liver tumor with a significant risk of bleeding and malignancy justifying resection. The aim of this single centre study including 120 patients who underwent a surgical resection for single and multiple HA, was to clarify the indications of liver resection and to study the long-term outcome.

Patients and Methods. Between 1990 and 2004, 120 patients (109 females) mean aged 37.5 yrs (range 16 - 62) with a definite diagnosis of HA established on surgical specimen, were included. Among the 59 patients who had a multiple adenoma, 3 patients underwent a liver transplantation and 13 patients (22%) had a complete resection, while every cases with a single adenoma were undergoing a complete resection. In the group with multiple HA in whom surgical excision of all tumors was not possible, only tumors = 5cm were resected. Bleeding HA was present in 25 (21%) patients and malignancy in 12 (10%). The mean follow-up was 74 months (range 18 - 192).

Results. There was no significant difference between the group with single HA and the group with multiple HA concerning age (37 yrs vs 38 yrs), use of oral contraceptive (92% vs 92%), bleeding (24% vs 17%) and malignancy (11% vs 8.5%). Tumor size was = 5cm in case of malignancy and in 24/25 (96%) patients with bleeding HA. There was a malignant HA in 5 of the 11(45%) males and in 7 of the 109 (6%) females (p<0.001). All patients with multiple malignancy (n=3) were transplanted but died due to malignant recurrence within 2 years. The other 9 patients with malignancy who were alive were alive without recurrence with a median follow-up of 54 months (18 – 132). Among the 43 patients with multiple HA incompletely resected, 5 (12%) experienced tumor progression requiring systematic re-resection in only 2 with HA =5cm, while 4 (9%) patients experienced tumor regression.

Conclusions. Whatever the number of hepatocellular adenoma, the risk of bleeding and malignancy is quite exclusively observed in large tumors ( = 5cm). Resection of HA =5cm, including those with malignancy is necessary and sufficient. There is no indication of liver transplantation for multiple HA.

31 PROGNOSTIC FACTORS IN HEPATIC RESECTIONS FOR THE COLORECTAL CANCER METASTASES

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Background. Liver resection currently serves as the only cure for a number of malignant or benign diseases. Preoperative induction of hypertrophy of the healthy part of the liver increases the resectability rates of large tumors. Two strategies are clinically available to induce selective hypertrophy of the liver; PVE and PVL.

Objective. This study aims to show that radical surgery resection of the hepatic hydatid cysts is a safe and effective technique.

Patients and Methods. A series of 49 consecutive patients operated on for liver hydatid disease between January 2003 and December 2006 was analyzed. The most common compliant were pain (62%), hepatomegaly and abdominal mass (39%). Diagnostic assessment was obtained with serology (ELISA) and radiology (US and CT scan). Surgery comprised conservative methods like pericystectomy or partial cystectomy and pericystectomy alone, or radical surgical methods like total cystectomy and liver resection (segmentectomy, lobectomy, hemihepatectomy) (23 pts.).

Results. In the entire series, morbidity was 19% of which 28% was seen with conservative surgery and 11% with radical methods (p<0.05). Biliary fistula was more frequent complication in both groups: 15.9% vs. 4.2% (p<0.01) in patients that underwent conservative methods and radical methods, respectively. 4 pts. (5.2%) of patients in the radical group suffered from postoperative infection (p<0.01). The survival rate did not significantly correlate with gender, age, location of primary tumor, BUN classification, time of diagnosis or CEA level.

Conclusion. According to our results, radical surgery of the hepatic hydatid liver disease represents the method of choice over others such as partial pericystectomy.

32 SURGICAL TREATMENT OF HYDATID LIVER DISEASE

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Background. Surgery remains the main treatment modality of hydatid liver disease. There still debate about the best approach, conservative surgery (marsupialization, drainage, partial cystectomy) has opposed to radical surgery in which the cyst is totally removed including the pericyst by total pericystectomy or partial heptectomy.

Aim. This study aims to show that radical surgery resection of the hepatic hydatid cysts is a safe and effective technique.

Methods. A series of 44 consecutive patients operated on for liver hydatid disease between January 2003 and December 2006 was analyzed. The most common compliant were pain (62%), hepatomegaly and abdominal mass (39%). Diagnostic assessment was obtained with serology (ELISA) and radiology (US and CT scan). Surgery comprised conservative methods like pericystectomy or partial cystectomy and pericystectomy alone, or radical surgical methods like total cystectomy and liver resection (segmentectomy, lobectomy, hemihepatectomy) (23 pts.).

Results. In the entire series, morbidity was 19% of which 28% was seen with conservative surgery and 11% with radical methods (p<0.05). Biliary fistula was more frequent complication in both groups: 15.9% vs. 4.2% (p<0.01) in patients that underwent conservative methods and radical methods, respectively. 4 pts. (5.2%) of patients in the radical group suffered from postoperative infection (p<0.01). The survival rate did not significantly correlate with gender, age, location of primary tumor, BUN classification, time of diagnosis or CEA level.

Conclusion. According to our results, radical surgery of the hepatic hydatid liver disease represents the method of choice over others such as partial pericystectomy.

33 NEW INSIGHTS INTO THE REGENERATIVE RESPONSE FOLLOWING MAJOR HEPATECTOMY, PORTAL VEIN EMBOLIZATION AND LIGATION

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Objective. To compare the impact of portal vein embolization (PVE), portal vein ligation (PVL) and anatomic major heptectomy on liver regeneration.

Background. Liver resection is the only cure for a number of malignant or benign diseases. Preoperative induction of hypertrophy of the healthy part of the liver increases the resectability rates of large tumors. Two strategies are clinically available to induce selective hypertrophy of the liver; PVE and PVL.

Methods. Male Wistar rats (n = 5 in each group) were subjected to selective 70% PVL, 70% PVE, as well as 70% partial heptectomy (PH) (positive control) or sham operation (negative control). PVE of liver segments was validated by angiography and intracavitary phantom that indicated minimal as possible. Liver weight and a variety of markers and mediators of regeneration were assessed at 24hr, 48hr, 72hr, and 7 days after surgery.

Results. The weight of the regenerating liver segments increased continued in all groups reaching the highest values after PH. This group also disclosed the strongest proliferative activity. For example, Ki67 staining at
Conclusion. Delayed in PVL and PVE compared to PH group. Transcript levels of cytokines (IL-1β, TNF-α, IL-6) peaked at 24 hr.

FUSION INJURY IN THE CHOLESTATIC RAT LIVER

BILIARY DRAINAGE ATTENUATES POST-ISCHEMIC REPERFUSION INJURY IN THE CHOLESTATIC RAT LIVER

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Background. Oxidative stress plays an important role in cell death and has been identified as a pathogenic factor of parenchymal injury in cholestasis. During major liver resections, vascular inflow occlusion can be applied to reduce intraoperative blood loss. The contralateral part of the liver is protected against oxidative stress potentially enhances post-ischemic reperfusion injury and increases the risk of remnant liver failure in cholestatic patients requiring extended liver resection. Biliary decompression relieves oxidative stress in cholestasis.

Objective. To study the effects of biliary drainage on post-injury liver function and pro-inflammatory cytokine production in a cholestatic rat model.

Methods. Male Wistar rats were randomized into three groups: The first group (n = 6) underwent partial liver ischemia after 7 days BDL. Partial liver ischemia was induced by clamping of the segmental portal triad to the median and left lateral lobes (+/−70% for 30 minutes. The second group (n = 6) underwent internal drainage (ID) after 7 days BDL and following 5 days, was subjected to ischemia. Control animals (n = 6) underwent sham laparotomy at 7 and 12 days, respectively, and subsequently were subjected to ischemia and unilateral in 86%. Primary tumor sites were: Urogenital (37.7%), Colon (24.6%), Hepatic (17.1%), and Pancreatic (14.8%). 51 major hepatectomies and 55 minor resections were performed. 24 patients underwent synchronous liver resection. In patients with advanced age (18.9%), about the undertreatment cases in 21 (44.7%) patients we didn't perform hepatic resection such as BCLC suggests because of advanced age and/or high level of ICG; in 20 (42.5%) patients in which BCLC suggests chemoembolization, we supposed that the combination of chemoembolization with oxalipatin might be performed because of hepatic reserve and subsequently cholecystectomy was recommended in 9 patients. About the safety of liver resection in Child B class and difficult anatomic site for selective embolization. About the overtreatment in 4 (33.3%) patients we choose hepatic resection after hepatic ischemia and reperfusion (IR) injury in a bile duct ligation (BDL) model in the rat. In addition, the effect of biliary decompression prior to IR was studied.

Methods. Male Wistar rats were randomized into three groups: The first group (n = 6) underwent partial liver ischemia after 7 days BDL. Partial liver ischemia was induced by clamping of the segmental portal triad to the median and left lateral lobes (+/−70%) for 30 minutes. The second group (n = 6) underwent internal drainage (ID) after 7 days BDL and following 5 days, was subjected to ischemia. Control animals (n = 6) underwent sham laparotomy at 7 and 12 days, respectively, and subsequently were subjected to ischemia and unilateral in 86%.

Results. Peak levels of AST and ALT were significantly higher at 6 h reperfusion compared to the control group. BDL group, AST:1597±4595 U/L; ALT:3987±1560 U/L; control group: AST:132±429 U/L; ALT:1140±329 U/L and ID group: AST:2750±1580 U/L; ALT:1979±497 U/L (p < 0.01). Plasma IL-6, IL-10 and GRO/KC were all significantly increased in the cholestatic group over 24 h reperfusion (p < 0.05 for control and ID). Prothrombin time, MPO, necrosis, lipid peroxidation and oedema were all significantly increased in the BDL group after 24 h reperfusion (p < 0.05 for control and ID). Moreover, the antioxidant activity was significantly stronger in the cholestatic group (p < 0.01 for control and ID). No significant differences for most parameters were seen in the ID group as compared to the control group.

Conclusion. Oxidative stress was significantly higher in the BDL group compared to the control group. This effect was augmented by biliary decompression. The results of this study suggest an increased risk of inflammatory events, such as clamping of the portal triad during liver resection, in the presence of cholestasis.

35 CAN BARCELONA CLINIC LIVER CANCER SYSTEM IMPROVE OUR APPROACH IN THE TREATMENT OF HEPATOCELLULAR CARCINOMA?

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Background/Aims. The Barcelona Clinic Liver Cancer (BCLC) classification has been recently validated as the best system for treatment guidance for hepatocellular carcinoma (HCC) in relation to tumor stage, liver functional status and physical status. The BCLC linking these variables divides patients in four stages combined with a treatment algorithm. In spite of this the NCCN and EASL recommend different important variables are non-BCLC factors and the best treatment in early and very early stage (indocyanine green clearance retention, future liver remnant percentage, grade of liver fibrosis, presence of active hepatitis). The aim of this retrospective study is to evaluate the usefulness of BCLC for hepatic surgeons comparing our treatment decision and BCLC algorithm indications.

Materials and Methods. A retrospective analysis of 102 patients with HCC observed from 1991 to 2002 was performed. Age, sex, Child-Pugh grade, cholestasis, type of liver injury and/or ICG test according to Malovius algorithm, were analysed. The choice of treatment was compared with the treatment schedule proposed by BCLC.

Results. Of 102 patients, in 44 (43.1%) cases our treatment and BCLC system were in agreement, while in the remnant 58 (56.9%) cases, there was an disagreement in treatment in 47 (46.2%) patients and 11 (18.9%). About the undertreatment cases in 21 (44.7%) patients we didn’t perform hepatic resection such as BCLC suggests because of advanced age and/or high level of ICG; in 20 (42.5%) patients in which BCLC suggests chemoembolization, we supposed that the combination of chemoembolization with oxalipatin might be performed because of hepatic reserve and subsequently cholecystectomy was recommended in 9 patients.

Conclusion. Analysing our conduct in the treatment of HCC during ten years before introduction of BCLC classification, we can conclude that even if the BCLC system was not applicable, the BCLC system wouldn’t changed our decision especially in surgical indication. In fact to perform an hepatic resection the presence of a single node in a patient in good health condition couldn’t be enough for a safe surgery and an estimation of liver function or hepatocytes in the remnant and BCLC system was in agreement, while in the remnant 58 (56.9%) cases, there was an disagreement in treatment in 47 (46.2%) patients and 11 (18.9%). About the undertreatment cases in 21 (44.7%) patients we didn’t perform hepatic resection such as BCLC suggests because of advanced age and/or high level of ICG; in 20 (42.5%) patients in which BCLC suggests chemoembolization, we supposed that the combination of chemoembolization with oxalipatin might be performed because of hepatic reserve and subsequently cholecystectomy was recommended in 9 patients.

Resection of colorectal liver metastases has become a standard of care. However, the value of this procedure in non-colorectal non-neuroendocrine metastases (NCRNNE) if BCLC remains controversial and is still debated.

Objective. To determine the utility of liver resection in the long term outcome of patients with NCRNNE metastases.

Methods. Records of 106 patients who underwent liver resection for NCRNNE metastases from 1989 to 2006 in 5 HPB Centers of Argentina were analyzed. Patient demographics, tumor characteristics, type of resection, long term outcome and prognostic factors were analyzed. According to primary tumor residue after hepatic ischemia and reperfusion (IR) injury in a bile duct ligation (BDL) model in the rat. In addition, the effect of biliary decompression prior to IR was studied.

Results. Mean age was 54 (17–76) years. Hepatic metastases were solitary in 62% and unilateral in 86%. Primary tumor sites were: Urogenital (37.7%), Colorectal (21.7%), Breast (17.9%), Gastrointestinal (6.6%), Melanoma (5.7%), and others (10.4%). 51 major hepatectomies and 55 minor resections were performed. 24 patients underwent synchronous liver resection. In 89.6% an R0 resection could be achieved. There was no surgical mortality. Overall 2 and 5 year survival rates of 46% and 18% were observed. Survival was significantly longer for metastases of urogenital (p = 0.0001) and breast (p = 0.003) origin. Curative resections (p = 0.04) and metastatic disease (p = 0.0001) were predictors of better survival. The disease free interval from tim of original disease to presentation with liver metastases and the extent of previous surgery were also predictors of better survival. We conclude that surgical treatment could be an effective treatment for NCRNNE liver metastases; it allows a satisfactory long term survival especially in metachronous disease, in patients with metastases from urogenital and breast tumors and when R0 resection can be performed.

37 RIGHT PORTAL VEIN LIGATION IS AS EFFICIENT AS PORTAL VEIN EMBOLIZATION TO INDUCE HYPERTROPHY OF THE LEFT LIVER REMNANT

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Background and Aim. Right Portal Vein Ligation (PVL), which is supposed to result in an incomplete and transient occlusion,
has been considered to be less efficient than right Portal Vein Embolization (PVE) before a right hepatectomy. The aim of this study was to compare PVL and PVE before right hepatectomy in terms of efficacy for induction of left liver hypertrophy.

Methods. Between 1998 and 2003, 35 patients with liver metastases underwent a right portal branch occlusion before “high risk” right hepatectomy. A primary tumor of a future remnant liver volume less than 30% of the total liver volume or because of a postchemotherapy liver parenchyma. PVE was performed percutaneously in 18 patients, while 17 patients underwent a PVL during a first stage laparotomy for resection of the primary tumor (n = 10) and/or resection of left liver metastases (n = 16).

Results. Right portal vein occlusion was complete in all the cases in both groups except for one patient in group PVE. Interval time between portal vein occlusion and liver resection was similar in both groups (7 ± 3 weeks after PVE vs. 8 ± 3 weeks after PVL, p = 0.6). There was no complication following PVE and postoperative hospital stay was 2 ± 1 days. In group PVL, 6 patients had postoperative complications which were related to primary tumor resection and postoperative hospital stay was 13 ± 6 days. The left liver volume increased from 509 ± 222 ml to 641 ± 220 ml after PVE (p < 0.001), and from 477 ± 192 ml to 638 ± 192 ml after PVL (p < 0.001). After PVL occlusion, the increase of the left liver volume was not significantly different between the two groups (35 ± 38% after PVE vs. 38 ± 26% after PVL, p = 0.7). After PVE, 6 patients were not eligible for right hepatectomy because of insufficient hypertrophy of the left liver (n = 2) or tumor progression (n = 4). After PVL, 3 patients were not eligible for resection because of tumor progression (n = 2) or death (n = 1). Prior to resection, CT-scan showed a portal cavernoma in 3 patients of each group. Technical difficulties during surgical procedure were similar in both groups according to duration of procedure (6.4 ± 1 hours vs. 6.7 ± 1 hours, p = 0.7) and transfusion rates (33% vs. 28%, p = 0.7) after PVE and PVL, respectively.

Conclusion. Right PVE and PVL result in a comparable hypertrophy of the left liver. During the first laparotomy of a two-step liver resection, PVL can be efficiently and safely performed.

38 SEQUENTIAL PREOPERATIVE IPSILATERAL PORTAL AND ARTERIAL EMBOLIZATION IN PATIENTS WITH LIVER TUMORS
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Introduction. Preoperative portal vein embolization (PVE) induces ipsilateral atrophy of the hepatic parenchyma to be resected, as well as contralateral compensatory hypertrophy of the residual liver. However, there are two potential problems with this technique: inadequate contralateral hypertrophy and tumor progression while waiting for the non-embolized liver to hypertrophy. We devised a strategy to deal with these two problems by performing an ipsilateral hepatic artery embolization (HAE) 6 weeks after an unsatisfactory PVE in an effort to accelerate the hypertrophy of the remnant liver.

Material and Methods. Five patients underwent to this sequential preoperative treatment in order to achieve resectability of their tumor. Two patients had liver metastases from colorectal cancer, two patients had hepatocellular carcinoma and the last one was a primary enucleable hepatic tumor. In all patients percutaneous right PVE was realized using microspheres (300–500 mm) and metallic coils to increase the volume of the left lobe. After 6 weeks a CT scan was obtained to evaluate the volume of the left lobe and then selective right HAE was performed using microspheres (300–500 mm) and metallic coils to increase the volume of the left lobe. Finally after 3 weeks a CT scan was repeated.

Results. Table 1 showed volumes of the future remnant liver at different stages calculated by CT scan.

This strategy allowed two patients to successfully undergo to a right hepatectomy, two patients successfully received a standard right hepatectomy and in one case, resective surgery was not performed because of diffusion of the disease in the remnant lobe, although the patient is still alive waiting for a liver transplant.

Conclusion. This sequential combined ipsilateral embolization for cases where the tumor was located in the embolized part of the liver, because we do not know the effect of this approach on tumor overgrowth when the tumor is located in the non-embolized part of the parenchyma. Based on our observation in selected cases without cirrhosis or cholestasis, it is worthwhile to pursue a sequential ipsilateral portal vein and hepatic artery embolization if the remnant liver does not reach a satisfactory volume 6 weeks after PVE.

39 LIVER RESECTION FOR HILAR CHOLANGIOCARCINOMA: LONG-TERM RESULTS AND PROGNOSTIC FACTORS
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Aims. To analyze long-term results and prognostic factors of patients with hilar cholangiocarcinoma who underwent extended surgical procedures.

Patients and Methods. Single-unit, retrospective study analyzing 62 patients. Bismuth 1 four patients, Bismuth 2 ten patients, Bismuth 3 forty-seven patients, and Bismuth 4 one patient.

Results. Bile duct confluence and liver resection were associated in 55 patients (88.7%). There were 7 cases (11.1%) of non-anatomic resections. The number of dissected lymph nodes was 7.2 (95% CI: 5.5–8.8). Fifty-three patients (85.5%) had a radical resection. The in-hospital mortality and morbidity rates were 4.839% and 62.903% respectively. Mean follow up was 22.6 months (95% CI: 15.3–29.8). The 1- and 3-year overall survival rates were 71.781% and 32.977% respectively (median survival 19.8 months). The 1- and 3-year disease-free (DF) survival rates were 64.047% and 28.301% respectively (median DF survival 14.6 months). Forty-three patients (72.861%) developed a recurrence. In multivariate analysis, T stage and the presence of regional lymph node metastases were independent predictors of survival (T1-2 vs T3-4: RR 0.275, p = 0.0035). By the end of follow up, twelve patients were alive without recurrence (mean follow up 50.4 months; 95% CI: 26.9–73.9); T1-N0 eight patients, T3-N0 three patients, and T3+N+ one patient.

Conclusions. Extended curative surgical procedures can be accomplished with low mortality rates. Long-term survival is possible, mainly among node-negative patients.

40 LONG TERM OUTCOME OF PORTAL VEIN EMBOLISATION PRIOR TO MAJOR HEPATECTOMY FOR COLORECTAL CANCER LIVER METASTASES
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Background. Preoperative portal vein embolisation (PVE) can be used to increase the remaining liver parenchyma volume before major liver resection. There are few reports on long term outcome of liver resection following preoperative PVE for colorectal liver metastases.

Objective. To assess feasibility, risks and long term outcomes of preoperative portal vein embolisation prior to major hepatectomy for colorectal cancer liver metastases.

Methods. Over a period of seven years thirty six patients underwent preoperative PVE before resection of four or more liver segments for CRC liver metastases. PVE was performed when the future liver remnant (FLR) assessed by MRI scan volumetry was less than 30%.

Results. PVE was feasible in all patients. PVE significantly increased the FLR volume. The median FLR pre PVE was 295mls (range –110–588) and increased post PVE to 404mls (range –239–653) p < 0.0001. Liver resection was performed after PVE in 22 patients (61%). The mortality and morbidity were 4.5% and 27% respectively. The 1, 3, and 5 year actuarial survival was 90%, 50%, 30% and survival after liver resection was 95%, 80%, and 50%.

Conclusions. PVE allows patients with unresectable liver metastases to be considered for resection. Long-term survival comparable to that of resection without PVE can be achieved.

41 YTTRIUM 90 MICROSPHERE THERAPY FOR HEPATIC MAGNOCYCLIA: INITIAL CONSIDERATION
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Objective. Surgical resection remains the most effective methods for enhancing survival in patient with primary or metastatic liver cancer: however...
primary and metastatic liver cancer are not suitable for surgical resection both at initial manifestation and at recurrence. In these cases palliative cytoreductive therapies favourably allow the control of cancer progression. Being demonstrated the principal hepatic arterial supply for tumor growth, cytotoxic agents delivered by transarterial pathways may allow local treatment therapy. The hepatic transarterial injection of Y90 microsphere, unlike the well known external beam hepatic radiation, deliver very high radiation dose to liver tumors while radiation exposure to the whole remaining normal hepatic parenchyma remains within tolerable limits.

Methods. We enrolled patients with primary and metastatic liver disease: all patients were treated by infusion of SIR-Spheres (Sirtex, Sydney, Australia). We enrolled patients using WHO performance score criteria. Bone metastasis were not considered exclusion criteria. Baseline CT scan and PET CT scan were performed. South West Oncology Group Criteria were used during the follow up.

Results. Between December 2005 and December 2006 we treat 10 patients consecutively with an average age of 53 (range 39-74). Bilateral lesions were present in 4 patients. Two patients had HCC, 1 colon and 1 stomach cancer metastases, two by CRC metastases and one by cholangiocarcinoma. Three patients have bone metastasis. The average dose of radiation was 1.60 GBq. All patients reported moderate post embolization pain and weakness, four patients nausea and vomiting and one patient developed a gastric ulcer resolved with conservative treatment.

Two patient affected by HCC died for progressive disease. There was one treatment related death: the patient affected by cholangiocarcinoma died for hepatic radiation induced injury one month post treatment. One patient affected by breast metastasis had a complete hepatic response: the others patients are alive with stable disease.

Conclusion. Ours initial results with liver directed therapy with Y90 microspheres appear to be very promising including significant improvements in response disease, improvement in the interval of disease progression and maybe in survival: patients outcome still remains a challenge being interval from primary treatment too short for making decisive consideration about overall survival.

42 RADIOFREQUENCY ASSISTED LIVER RESECTION: RECURRENT EVALUATIONS

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Objectives. Forty-two patients undergoing curative hepatic resection for liver cancer were analyzed retrospectively All patients were treated with liver parenchyma transection technique using heat coagulative necrosis induced by radiofrequency (RF). Final endpoint were: evaluation of recurrences on the surgical margin of resection, blood loss and technical related complications.

Methods. Between September 2002 and September 2005, forty-two patients underwent liver resection with the RF-assisted technique (18 HCC, 24 colon-rectal cancer metastases). Patients were divided into 3 groups: Group A included seven patients (16.67%) who underwent resection with no margin, Group B included sixteen patients (38.1%) with a surgical margin <1 cm and Group C included nineteen patients (45.23%) with a sufficient surgical margin >1 cm. Results. Median follow-up of 42 months, twenty-five patients (59.52%) were alive and seventeen (40.48%) died. No local recurrence on the resection line was diagnosed. Twenty-eight patients (66.67%) experienced recurrence in the remnant liver. Extra-hepatic recurrence occurred in five patients (7.9%). While total operative time was 300 +/- 100 minutes, intra-operative blood loss was 175 +/- 125 mL. Two patients (5%) received blood transfusion. Nine patients (21.4%) developed post-operative complications, and no mortality was recorded. Mean hospital stay was 11 +/- 8 days.

Conclusion. The RF-assisted technique is associated with minimal blood loss, a low blood transfusion requirement, and above all the marginal necrosis of this technique is adequate for a complete sterilization of the resection site.

43 ANATOMICAL STUDY OF RIGHT PHRENIC ARTERY BY MULTI-DETECTOR COMPUTED TOMOGRAPHY IN RELATION TO HEPATOCELLULAR CARCINOMA EMBOLIZATION

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Introduction. The purpose of this study was to prospectively assess the anatomical variation of inferior phrenic arteries (IPAs) origin with Multi-Detector Computed Tomography (MDCT) scans in relation to technical and angiographic findings during transcatheter arterial embolization of hepatocellular carcinoma (HCC).

Materials and Methods. 100 patients with suspected or diagnosed hepatocellular carcinomas were examined with 16-section CT during arterial phase. The anatomy of IPAs with particular interest to their origin, was recorded. All patients with subcapsular HCC located at VII and VIII segments underwent arteriography of the right phrenic artery (RIPA) with subsequent embolization if neoplastic supply was detected.

Results. The RIPAs originated from aorta (47%), celiac trunk (43%), right gastric artery (9%), proper hepatic artery (3%), 13 types of combinations with left IPA. Twenty-three patients showed subcapsular HCCs in the VII and VIII segment and all but one underwent RIPA selective angiography, followed by embolization in 6 cases.

Discussion. MDCT well assesses the anatomy of the RIPA, fundamental for planning subsequent cemobilization and embolization of extrhepatic RIPA supply to HCC.

44 ULTRASONIC MEDIATED LAPAROSCOPIC LIVER TRANSECTION

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Background. Parenchymal liver transaction represents a fundamental phase of liver surgery. Several devices have been described for safe and careful dissection of the liver parenchyma during laparoscopic liver surgery, but the ideal technique has not yet been defined. Objectives. This report describes the combined use of ultrasonic dissector and the ultrasonic coagulating cutter for laparoscopic liver resection.

Methods. The ultrasonic dissector is used to fracture the parenchyma along the line of proposed division, and the uncovered bridging structures are sealed using the ultrasonic coagulating cutter. Results. This method of hepatic transaction has been used for 14 consecutive laparoscopic liver resections. Type of procedure included 6 left lateral sectionectomy, 4 segmentectomy, and 2 hemihepatectomy. Cirrhosis was present in four patients. No conversion to open surgery was necessary. Intraoperative median blood loss was 150 ml (range, 100 - 250 ml) and median operative time was 340 minutes (range, 290 - 400 minutes). Resections performed for a malignant diagnosis resulted in a mean margin of 1.7 cm (range, 1.1 - 3.2 cm). There was no mortality and no morbidity in these patients, in particular bile leak of any grade did not occur in any patient.

Conclusions. The combined use of ultrasonic dissector and harmonic scalpel allows liver resection to be safely performed, with the advantage of minimal surgical complication and low blood losses.

45 A MODIFIED CLINICAL RISK SCORE TO PREDICT PROGRESSION IN PATIENTS UNDERGOING LIVER RESECTION FOR COLORECTAL CANCER

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Background. Hepatic resection has become the standard of care for colorectal liver metastases, and currently remains the only potentially curative therapy. A major challenge remains the selection of patients who may benefit from liver surgery as well as the identification of patients at high risk for recurrence after liver resection who may require perioperative therapy programs. Several prognostic scores have been proposed to stratify patients based on their survival. Previous reports have found the Memorial Sloan Kettering Clinical Risk Score (CRS) to be highly predictive of survival. The CRS takes into account five variables: disease-free interval <12 months, tumour >5 cm, number of metastasis, node-positive primary cancer, and preoperative CEA level > 200 ng/mL. In spite of their well known detrimental effect over both the overall and the disease-free survival, clinical margin status and extrarectal disease were not included in the CRS point score system, since they had been considered specific contraindications to surgery. However, over the last few years, several studies have reported encouraging results for hepatic resection even in the presence of resectable extrahepatic disease or minimal tumour-free surgical margins, pushing towards an even more aggressive management of hepatic colorectal metastases.

Aim of the Study. We hypothesized that the value of CRS in predicting patient outcome after liver resection as well as identifying patients at high risk for tumour recurrence, may be improved by adding two variables, the presence of resectable extrahepatic disease and surgical margins status.

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Methods. Using a bi-institutional database, 313 patients who underwent liver resection for colorectal metastases between January 2000 and December 2006 were identified. For each patient, the original 5-point score (CRS) was calculated. Then a Modified CRS (M-CRS) was built including positive surgical margin (defined as the presence of exposed tumour along the line of transection or less than 1 mm tumour-free surgical margin or the presence of tumour cells at the line of transection detected by histologic examination) and extrahepatic disease, creating a 7-point score system with a minimum M-CRS of 0 and a maximum of 7. Discriminatory ability for death at one, three, and five years for CRS and M-CRS score were evaluated by receiver operating characteristic curve (ROC) area.

Results. The calculated CRS and M-CRS were analyzed with respect to patient survival and were found to be significantly predictive of long-term outcome and diseases free-survival (P < 0.001). Five-year survival rates for CRS of 0, 1, 2, 3, and 4 were found to be 61% 53%, 38%, 27.8%, and 21% respectively and was 0% for CRS >4. Five-year survival rates for M-CRS of 0, 1, 2, 3, and 4 were found to be 72%, 69%, 45%, 28%, and 7% respectively and was 0% for M-CRS >4. Discriminatory ability for death evaluated by ROC curve area analysis, were higher for M-CRS compared with CRS at one (0.725 vs. 0.640), three (0.771 vs. 0.640), and five years (0.786 vs. 0.698).

Conclusions. The M-CRS may represent a better point score system than CRS for the selection of patients at high risk for recurrence after hepatic resection for colorectal liver metastases.

46 IMPACT OF TYPE OF LIVER RESECTION ON THE OUTCOME OF COLORECTAL LIVER METASTASES

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Background. Wedge resection (WR) for colorectal liver metastases (CLM) has become more common in an attempt to preserve liver parenchyma. However, data from large investigator have reported that WR is associated with a higher incidence of positive margin and an inferior survival compared with anatomic resection (AR).

Objectives. This study evaluated survival, margin status, and pattern of recurrence with CLM treated with WR or AR.

Methods. We identified 232 consecutive patients, in a single institutional database from 1995 to 2004, who underwent either WR or AR. WR was defined as a nonanatomic resection and AR was defined as single resection of one or two contiguous liver segments. Patients with combined WR-AR and patients requiring resection of more than two segments or radiofrequency ablation were excluded from the analysis.

Results. 107 patients underwent WR and 125 patients had AR. There was no differences in the rate of positive surgical margin (P = 0.236), overall recurrence rates (P = 0.658), and patterns of recurrence between the two groups (P = 0.235). The median survival was 42 months for WR and 32 for AR, with 5-year survival rates of 35% and 33% respectively, with no significant difference (P = 0.248). Morbidity was similar between the two groups.

Conclusions. WR is a safe procedure and does not disadvantage the patients in terms of tumor recurrence and overall survival.

47 LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCINOMA: A NEW POLICY ON SELECTION CRITERIA AND ORGAN ALLOCATION

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Background. The selection criteria for liver transplantation of patients with hepatocellular carcinoma on cirrhosis and the liver allocation policies are debated.

Methods. We evaluated prospectively the outcome of 173 patients listed for liver transplantation with a pre-operative diagnosis of HCC during 2003-2006. Patients had a priority for liver transplantation according to MELD score, waiting time and tumor stage. Thirty eight patients had single HCC <3cm (H1); 94 patients had single HCC 3-5 cm or 2-3 HCC ≤3 cm (H2) and 41 patients had single HCC 5-6 cm or 2 HCCs 3-5 cm or multiple HCCs <6 with a diameter ≤4 cm and a sum diameter ≤12 cm, who met H2 criteria after down-stage procedure (H3).

Results. The competing risk analysis showed equal risk of transplantation and drop-out on the list among the groups. The H2-H3 cases had a significant higher risk of drop-out for tumour progression compared to H1 (12% vs. 0%, p <0.05), while the risk of death on the list was related to the real MELD score (AUC = 0.725, p <0.01) and it was comparable among the groups.

The 93 cases transplanted, after a median follow-up of 22 months, had a tumor recurrence rate close to 13% and an actuarial survival rate of 80%, without any difference among the groups.

Conclusions. The allocation policy adopted by our center and the new extended pre-operative selection criteria for HCC patients listed for liver transplantation were equal and safe.

48 IS LAPAROSCOPIC LIVER RESECTION COST EFFECTIVE?

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Introduction. Laparoscopic liver resection (LLR) is now recognised as a viable alternative to open liver resection (OLR). The economic implications of LLR have never been assessed, although savings have been demonstrated for other laparoscopic procedures.

Aims. To assess the economic impact of the recent introduction of LLR to our practice by comparison of costs relative to OLR.

Methods. 147 patients had liver resection in Southampton General Hospital between August 2003 and December 2006 (14 male, 20 female, median age 65 (21–81) years). These were matched to 27 open resections performed between 1998 and 2004 retrospectively identified as suitable for LLR (8 male, 17 female, median age 63 (29–80) years). In hospital costs were calculated using current NHS commissioning data.

Results. There were 5 complications in each group but no deaths. Mean blood loss was 462 (±185ml) OLR compared to 334 (±142ml) LLR (p = 0.005). Median lengths of stay were 7 (IQR 6–12) and 3 (2–5) days for OLR and LLR respectively (p = 0.001).

Mean operating times of 201 (±30) minutes (OLR) and 220 (±37) minutes (LLR) were not significantly different (p = 0.361).

The mean cost of OLR was £1520 (±1760) compared to £4498 (±1405) for LLR (p = 0.13).

Resection margins were comparable (97% Ro resection).

Comparing the first 8 laparoscopic left lateral resections with the most recent 9, mean cost fell from £5105 (±733) to £3637 (±1069) (p = 0.005). The equivalent open operation cost £4529 (±1349) (n.s., p = 0.1).

Conclusion. In experienced hands LLR is no more expensive than open surgery. Improvement in performance in left lateral resection suggests that increasing familiarity may eventually make the laparoscopic approach cheaper.

49 SURVIVAL AFTER SURGICAL RESECTION OF HEPATOCELLULAR CARCINOMA ACCORDING TO TIME-TO-RECURRENCE

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Objective. Evaluate survival among patients with hepatocellular carcinoma (HCC) after surgical resection in relation to time-to-recurrence.

Methods. One hundred thirty patients with HCC submitted to surgical treatment were included in the retrospective study. Surgical resection of HCC was the treatment of choice for Child-Pugh class A patients with single HCC, surgery was applied also in a selected group of patients with oligofocal HCC and/or with Child-Pugh class B7 cirrhosis.

Follow up protocol included clinical, laboratory and imaging evaluation at 6-months intervals after surgery. All HCCs with recurrence were evaluated for a new treatment with surgery, RFA, PEI, TACE or supportive therapy according to stage of HCC and degree of hepatic decompensation.

Results. Median follow up time was 27 months. The overall median survival was 44 months with actuarial 3 and 5-year survival rates of 59% and 43%.

Five-year survivors showed intrahepatic recurrence of HCC with a median disease free survival of 36 months, and an 3- and 5-years actuarial disease free survival of 43 and 25%, respectively. According to time to recurrence 24 patients recurred before 1 year and 35 patients after 1 year. Survival analysis showed that survival was significantly related with time-to-recurrence with a median survival of 12 and 64 months, respectively (p = 0.001).

We performed univariate analysis for factors related to early recurrence and we identify the following negative prognostic factors: tumor size, higher serum alpha fetoprotein level and histologic grading.

Conclusions. Surgical resection of HCC have good results in selected patients, intrahepatic recurrence of the disease are frequent and prognosis after resection is significant related to time of recurrence.

50 INFLUENCE OF PERIOPERATIVE ALLOGENIC BLOOD TRANSFUSION IN SURGICAL RESECTION OF HEPATOCELLULAR CARCINOMA

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Objective. Evaluate the relation between perioperative allogenic blood transfusions with the occurrence of postoperative complications, overall survival, and disease-free survival.

Methods. One hundred thirty patients with HCC submitted to surgical resection from 1990 to 2006 were included in this retrospective study. Blood transfusions during surgery and during the first postoperative week were recorded and analysed.

Results. The post-operative mortality was 1.7% and the morbidity rate was 37.40.6% of patients received red blood cell transfusions. The units of blood transfused varied from 1 unit to 13 units (mean 4.1 units). 30.5% of patients were transfused during operation and 16.9% in the first week after resection. A significant statistical relation was found between blood transfusion and Child-Pugh's class and the extent of liver resection. Blood transfusions were significant related to occurrence of post-operative complications, 55% and 44%, respectively (p = 0.03). In univariate analysis we observed that transfused patients had a significantly shorter survival (p = 0.02). Further analysis with multivariate Cox's regression analysis for survival identified that the only independent factor for survival was Child-Pugh score (odd ratio 1.5, p = 0.01) and did not confirmed that blood transfusion influence long-term survival. Both univariate and multivariate analysis did not identify relation between blood transfusion and disease free survival.

Conclusions. Blood losses and blood transfusion were related to higher rate of post-operative complications. In our study with univariate and multivariate analysis we did not observed relation between blood transfusions with long-term survival and disease free survival.

51 ELECTROLYTIC DESTRUCTION IS AS EFFICIENT AS RADIO-FREQUENCY ABLATION IN THE TREATMENT OF ARTIFICIAL LIVER METASTASIS IN A PIG MODEL

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Background. The best treatment option for liver metastasis is the complete surgical resection. Unfortunately at the time of diagnosis, only a small proportion of patients with liver metastases are candidates for resection. Electrolytic destruction is a novel non-thermal method of tissue destruction, which was evaluated regarding its safety and efficiency compared to radio-frequency ablation.

Methods. In a total of 8 pigs 37 tumor mimics were created by injecting glycercol/agarose gel in the liver. Two pigs served as a control without tumor mimics. The volume of the lesions was measured with ultrasound before treatment. Tumor mimics were treated either with RFA or electrolytic ablation. In all cases correct placement of the electrodes was confirmed by ultrasound. 48h after treatment the animals were sacrificed and the liver was fixed in formalin and subject to histological investigation.

Results. 18 lesions were treated with RFA. 8/18 lesions were localized near the hepatic veins. In all cases the lesions were destructed completely. Electrolytic destruction was applied on 19 Lesions. Histological investigation confirmed that after treatment with electrolysis and RFA all lesions were completely surrounded by necrosis, reflecting an efficient treatment of the target lesion. Interestingly, histological investigation showed two different types of necrosis: for RFA the cell membranes disappeared but the nuclei were still intact. In contrast to this after electrolysis cell membranes and nuclei were completely disrupted. Both types of necrosis resulted in an irreversible necrosis. In addition, after electrolysis the necrosis was surrounded by infiltrating lymphocytes in 13/19 cases. This inflammatory reaction was not apparent after RFA.

Conclusion. Electrolysis produced a predictable and reproducible necrosis in the pig liver and is as efficient as RFA in destroying a defined target lesion. The type of necrosis was different in electrolysis and RFA. The local inflammatory reaction after electrolysis may occur the development of a systemic immune response. Taken together electrolysis is an alternative treatment option for irresectable liver metastasis.

52 A NEW LOOK AT INTRAOPERATIVE ULTRASONOGRAPHY IN THE MODERN MANAGEMENT OF PATIENTS WITH LIVER METASTASES-A PROSPECTIVE STUDY IN 110 PATIENTS

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Objective. To evaluate the impact of intraoperative ultrasonography (IOUS) on the detection and surgical management of liver metastases in the area of specialized HPB surgery and modern imaging technology including PET/CT.

Background. Accurate imaging is central to achieve curative resection in many patients with liver metastases. IOUS is still considered by many as the contrast-enhanced standard modality to detect and reliably localize liver tumors. Sophisticated preoperative imaging modalities have emerged over the past decade. For example, it has been demonstrated by several groups that PET/CT influences therapy in about 20% of patients with liver tumors. Therefore we performed a study to assess the current value of IOUS in the modern work-up of patients for liver resection including routine PET/CT imaging.

Material and Methods. 110 patients operated for liver metastases between 1.1. 2004 and 31.12. 2005 were enrolled in the study. The standard preoperative work-up included contrast-enhanced CT and PET/CT in each patient. All tests were performed within a month prior to surgery. For the purpose of the study IOUS was performed by an independent and experienced ultrasonographer unaware of the preoperative staging. Mapping of the metastases through visualization and palpation by the IOUS surgeon was also recorded. The resected specimen was examined by a pathologist unaware of the previous findings. Endpoints included sensitivity and specificity of IOUS, intraoperative mapping by the surgeon and PET/CT, and eventually the impact of each respective modality on the surgical decision.

Results. Median age was 62 years (22-84 yr). The primary origin of the tumor was colorectal in 97 patients, and other sites in 13 patients. 34 patients (31%) received preoperative chemotherapy within 3 months of surgery. The final histological finding disclosed a solitary metastasis in 53 patients (48%), two metastases in 17 patients (15.5%), three in 16 (15%), and > three in 15 (13.5%). In 9 patients (8%), a R0 resection could not be achieved. Preoperative staging including PET/CT showed a positive correlation with the final histological diagnosis in 93% (71%, 79% for CT and CT PET respectively). Intraoperative inspection and palpation correlated in 104 (95%, CI: 88 – 99%); and IOUS in 108 (99%, CI: 92 – 100%). The preoperative work up combined with intraoperative palpation correlated in 106 patients (96%, CI: 89 – 99%). Most lesions exclusively diagnosed by IOUS were located in 4 patients (4%) resulting in a modification in therapy, and each of them had 4 metastatic nodules. Additionally, in 5 patients (7%), IOUS was helpful in considering intrahepatic vessels and to better define the resection plane. Conclusion. This study demonstrates that IOUS has an impact on the identification of liver metastases in the modern area of liver surgery and imaging modality. We would recommend IOUS only in patients with multiple tumors (e.g. 3 metastases) or for tumors in the vicinity of vessels, where accurate evaluation of the anatomy may impact on surgery.

53 STEREOTACTIC APPROACHES FOR SUPPORT DURING COMPLEX LIVER SURGERY

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Background. While computer based planning of surgical interventions (CAS) on the base of CT imaging (MeVis) is becoming standard especially for complex interventions at the liver, the intraoperative application of computer assisted devices in the OR is still limited. To extend the existing limitations, a navigation (stereotactic) system has been developed especially for liver surgery. It bases on the fusion of CT-based planning information with intraoperatively available 3D ultrasound imaging.

Aim. The goal of our current research is the clinical application of such a navigation system during a study in liver surgery. The device has been applied in an additional 10 patients in order to being carried out at present. The contribution will discuss applicable clinical indication as well as advantages, challenges and drawbacks of such technology.

Methods. The stereotactic system consists of a flat panel computer screen (PacoBlade), as miniature ultrasound transducer (7.5 MHz TeraSon) with a localizer which is measured in its spatial position using a stereo camera (NDI Vicra) and a six-dimensional computer mouse to control the system and the depiction of image data. During the intervention, planning information is fused to the actual ultrasound image which the surgeon fuses the both image modalities using the 6D-mouse. Using the stereo camera, movements of the tracked ultrasound probe are displayed as movements of the ultrasound image within the planning model (see Figure S1). This greatly enhances the surgeon’s orientation and its understanding of anatomical details. Additionally, navigated instruments (i.e. CUSA) can be displayed within the planning data and serve for precise orientation.

Results. Clinical integrability and ergonomical aspects of such a device are essential for its later clinical success. During the first interventions (see Figure Navigation in Liver Surgery) we identified interesting application scenarios (i.e. tumour resection) and advantages of the described technology. Since it is still a long way until such systems might applicable in daily clinical routine, it is essential to constantly discuss clinical outcome and surgical effectiveness.

Conclusion. Navigation technology and concepts have been proven useful in other clinical disciplines. The system presented is based on special concepts and approaches for extending computer assistance into soft tissue surgery. Only constant clinical application of such devices will help to identify and precisely define useful scenarios. However, ongoing efforts have to be made, to realize truly clinically suitable systems.
Abstracts

## 54 PORTAL VEIN OCCLUSION AND CHEMOTHERAPY IN TWO STAGE LIVER RESECTION

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**Aim of the Study.** After portal vein ligation for regeneration of potential remnant, 8–12 weeks are needed to achieve appropriate liver volume. Conventionally no chemotherapy is given during this period. Effect of systemic and selective right hepatic artery locoregional chemotherapy on liver regeneration was studied.

**Methods.** Out of 578 patients operated for liver tumour between 2001 – 2006, 32 were unsuitable for primary extended resection because of inadequate size of potential liver remnant. Colorectal metastasis: 19 pts, HCC : 11, metastasis of gastric cc:2. Right portal branch ligation were performed to promote regeneration of left lateral segment. 3 patients were lost after the first intervention. In a prospective study after arterial port ligation (PVL) in 10 pts arterial port was inserted through gastroduodenal artery into the right hepatic artery. (Group A). In 19 pts only PVL was performed. 9 of them underwent systemic chemotherapy according DeGra- mont (group B), in 10 pts no chemotherapy was applied. (Group C) Group A patients were treated like pts in group B, but Adriamycin was administered locoregionally into the right hepatic artery.

**Results.** All patients but one underwent second liver resection without mortality. This patient (Group A) with HCC missed readmission, but one year later no tumour was found in the previously infiltrated right lobe. Chemotherapy did not influence regeneration of left lobe. Group B = 28.4 ± 6.6% v.s. Group C = 26.6 ± 9.5%. Surprisingly regeneration was significantly better in Group A = 34.5 ± 6.7%. No significant change of volume of tumorous right lobe in groups B and C could be observed. Contrary to this, in group A both right lobe and tumour volume diminished significantly.

**Conclusions.** Chemotherapy does not interfere with liver regeneration after portal vein ligation. Hepatic artery chemoperfusion might be recommended as additional therapy before second stage liver resection.

## 55 INDOCYANINE GREEN CLEARANCE FOR EVALUATING LIVER FUNCTION FOLLOWING PORTAL LIGATION

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**Background and Objectives.** To predict and estimate the optimal time of resection following portal vein ligation (PVL) with the aid of 3D CT volumetry and indocyanine green (ICG) clearance in healthy liver. Following right PVL, hypertrophy of the left liver lobe was induced prior to an extended right hepatectomy. Methods: Fourteen patients with huge right lobe colorectal liver metastases underwent right PVL. Cut off points of ICG clearance test were: R15 < 14% or PDR > 15%/min. A remnant liver volume of 25% of the whole liver was assessed by CT scan prior to the procedures. Postoperatively, repeated ICG clearance and 3D CT volumetry tests were used to estimate the regeneration. Liver resections were performed as a second stage.

**Results.** After PVL, ICG clearance increased significantly in some patients, while in the rest, ICG clearance remained unchanged with borderline low clearance values. Between the two operations, patients with high clearance had less complications and a better regeneration rate.

**Conclusions.** ICG clearance has a significant prognostic value. Patients with an apparently inoperable right lobe liver tumor can be successfully treated using a two-stage hepatectomy. The 3D CT volumetry and ICG clearance test were essential monitoring tools in these resections.

## 56 THE GROWING INFLUENCE OF LAPAROSCOPIC SURGERY ON THE MANAGEMENT OF PATIENTS WITH LIVER TUMOURS

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**Introduction.** Many centres are reluctant to implement laparoscopy in liver surgery. The aim of the present study was to assess the effect of laparoscopic liver surgery in a single academic centre.

**Methods.** Between 2002 and 2006, hepatic surgery was performed in 516 consecutive patients (M/F: 271/245; median (range) age 61 (16 – 89) y) with primary (191 patients) or metastatic (325 patients) tumours. The majority of patients scored ASA II (n 355) and ASA III (n 117). Carcinosis was present in 78 patients, and chemotherapy within 3 months prior to surgery was given in 175 patients. Hepatic surgery consisted in resection only in 365 patients, resection combined with radiofrequency ablation (RFA) in 38, and RFA only in 113 patients. Laparoscopic liver surgery was performed in 171 patients. Significantly more hepatic resections, RFA, and laparoscopic procedures were performed in the course of the years (p <0.0001). Laparoscopy was more frequently used in patients with severe comorbidity (31% vs. 18%;
57 SHORT-TERM RESULTS OF LAPAROSCOPIC VS. OPEN RADIO-
FREQUENCY ABLATION OF HEPATIC MALIGNANCIES

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Introduction. Surgical radiofrequency ablation (RFA) of hepatic malignancies is associated with superior oncological outcome as compared to percutaneous RFA. However, the oncological benefit of RFA is associated with significantly higher intra-operative blood loss (median 2040 g vs. 375 g; p = 0.01) and postoperative complications: significant bile leakage (11% vs. 1.1%; p = 0.05), portal vein stenosis (4% vs. 0.2%; p = 0.03). The overall morbidity rate was 4% for RFA vs. 12% for laparoscopic RFA (LRFA) (p = 0.01). Laparoscopy seems preferable above open surgery for hepatic malignancies, but some drawbacks. Our reported approach based on ultrasound guided liver RFA necessitates the need for major resections and therefore is alternative to PVE. The aim of this study is to support this hypothesis.

Methods. One-hundred and sixty-nine consecutive patients who underwent surgery for liver tumor were reviewed. Forty-four patients with tumors in relation with right-sided 1st/2nd order portal branches (Zone P) and the right hepatic vein (Zone H) were selected as potential candidates for major hepatectomy. Their indication to PVE was retrospectively categorized based on debate around liver and remnant liver volume results in term of postoperative outcome and rate of recurrence were revised.

Results. Thirty-four patients (63%) with tumors located in Zone H and P resulted potential candidates to PVE, but none underwent PVE. Major resections were performed in 4 patients (7.4%), with removal of more than 3 segments in just 1 patient (1.8%). No hospital mortality was seen. Morbidity rate was 15% and major morbidity occurred in 1 patients. Blood transfusions rate was 11%. Mean tumor-free margin was 4 mm (median 2; range 0–10).

Conclusions. These results underline that the ultrasound guided liver resections allow us to perform alternative safe and effective surgical treatment in patients generally submitted to major hepatectomy and preoperative PVE.

58 CONSIDERING THE OUTPUT OF THE BARCELONA-
CLINIC-LIVER-CANCER CLASSIFICATION: A NEW ROLE FOR SURGERY BASED ON AN INTENTION-TO-TREAT ANALYSIS

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Background. For the Barcelona-Clinic-Liver-Cancer classification (BCLC), hepaticocellular carcinoma (HCC) patients with multiple and/or with vascular invasion, palliation is the only feasible approach. However, some experiences show benefit after surgery in more advanced patients. We prospectively evaluated resectability, short- and long-term outcome of HCC patients under BCLC criteria of an intention-to-treat algorithm in which the BCLC intermediate and advanced stage were not contraindicated.

Methods. Among 142 consecutive HCC patients, 104 (73%) underwent surgery and 98 patients of these were resected (94%). Of the 98 patients, 51 were BCLC stage A, 21 were stage B, and 26 were stage C. BCLC criteria patients, due to the concomitance of macroscopic vascular invasion. Surgical strategy was based on the relationship between the tumor and the intrahepatic vascular structures at intraoperative ultrasonography (IOUS). Mortality, morbidity and rate of cut-edge local recurrences and of distant recurrence were evaluated.

Results. Hospital mortality was 1%. The overall morbidity rate was 27% and major morbidity occurred in 4%. Surgical clearance was achieved in all cases without local recurrence. For patient in the BCLC 0-A, B and C stages 1- and 3-year overall survivals were respectively: 88–90%; 88–85%; 52–87%. Similarly, disease-free 1- and 3-year survivals were respectively: 84–48%; 85–45%; 67–51%.

Conclusions. This study shows that hepatic resection may offer survival benefits in patients with BCLC class B and C HCC when resection is feasible and safe under strict IOUS guidance. These results should induce to revise the BCLC treatment recommendations.

59 ULTRASOUND GUIDED LIVER RESSECTION: DOES THIS AP-
PROACH LIMIT THE NEED FOR PORTAL VEIN BRANCHES
EMBOLIZATION?

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Background. To enlarge the feasibility and safety of hepatectomies for liver tumors, ultrasound guided liver ablation (UPLA) is often used. However, PVE has some drawbacks. Our reported approach based on ultrasound guided liver resection minimizes the need for major resections and therefore is alternative to PVE. The aim of this study is to support this hypothesis.

Methods. One-hundred and sixty-nine consecutive patients who underwent surgery for liver tumor were reviewed. Forty-four patients with tumors in relation with right-sided 1st/2nd order portal branches (Zone P) and the right hepatic vein (Zone H) were selected as potential candidates for major hepatectomy. Their indication to PVE was retrospectively categorized based on debate around liver and remnant liver volume results in term of postoperative outcome and rate of recurrence were revised.

Results. Thirty-four patients (63%) with tumors located in Zone H and P resulted potential candidates to PVE, but none underwent PVE. Major resections were performed in 4 patients (7.4%), with removal of more than 3 segments in just 1 patient (1.8%). No hospital mortality was seen. Morbidity rate was 15% and major morbidity occurred in 1 patients. Blood transfusions rate was 11%. Mean tumor-free margin was 4 mm (median 2; range 0–10).

Conclusions. These results underline that the ultrasound guided liver resections allow us to perform alternative safe and effective surgical treatment in patients generally submitted to major hepatectomy and preoperative PVE.

60 CONTRAST-ENHANCED INTRAOPERATIVE ULTRASONOGRA-
PHY DURING SURGERY FOR HEPATOCELLULAR CARCINOMA
IN LIVER CIRRHOSIS: IS IT USEFUL OR USELESS? A PRO-
SPECTIVE COHORT STUDY OF OUR EXPERIENCE

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Background. Preliminary results showed that contrast-enhanced intraoperative ultrasonography (CEIOUS) could provide information not obtainable with conventionalIOUS during surgery for hepatocellular carcinoma (HCC). The aim of the study was to prospectively validate the role of CEIOUS based on a larger experience and new classification of its findings.

Methods. Eighty-seven consecutive patients underwent surgery for HCC. Those patients with new lesions at IOUS underwent CEIOUS. They received intravenously 4.8 mL of sulphur-hexafluoro microbubbles. Pattern of enhancement, and consequences were classified into 3 categories: A (resection), A2 (resection), and B (no treatment).

Results. Twenty-nine patients (33%) had 59 new lesions at IOUS, and underwent CEIOUS. Twenty-seven nodules showed a B-pattern at CEIOUS, and were not resected, while 11 nodules were CEIOUS A, in 5, A2 in 11, and A3 in 16; they were removed, and at histology, 5 A1, 9 A2, and 6 A3 confirmed to be HCC. CEIOUS modified the operative decision making in 79% of the patients.

Conclusions. CEIOUS is certainly useful during surgery for HCC, improving IOUS accuracy and surgical radicality. Specificity of CEIOUS has to be further improved, although intrinsic drawbacks exist in the diagnostic criterion of tumor vascularity.

61 PROSPECTIVE RANDOMIZED COMPARISON OF MONOPOLAR
FLOATING BALL VERSUS BIPOLAR FORCEPS IN LIVER RE-
SECTION

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Background. Intraoperative blood loss and blood transfusions are important predictors of outcome in hepatic surgery. Dissection by Pèan-clas is a safe, simple and low cost approach, while, methods for coagulation are still object of debate. Monopolar floating ball (Tissuelink) (Figure 1) is proposed for liver dissection, but blunt dissection with may lead to a necrotic layer on the cut surface possible source of postoperative morbidity. However, this method seems more efficient for achieving the hemostasis. For this purpose, we compared in a prospective randomized trial, the traditional bipolar forceps coagulation with the monopolar floating ball used only for coagulation (Figure 2), both using Pèan-clas for liver transection.

Methods. Fifty-one consecutive patients (42 male, 9 female; mean age: 67.4 yrs) undergoing ultrasound guided liver resection for liver tumors were randomized in two groups, according to transection device: Group A (Tissuelink, n = 24) and Group B (bipolar forceps, n = 27). The two groups
were homogeneous in terms of tumors and background liver features. Blood losses, transaction time, number of ligatures per cm², overall red blood cell transfusions, and amount of drains discharge, were respectively; p < 0.001. On multivariate analysis, five risk-factors were found to be independent predictors of a positive resection margin, ranked in the order of importance: number of hepatic metastases > 3 involving > 50% of the liver vs. < 3 metastases (R1 = 31.7% vs. 6.6%, odds ratio (OR) = 5.1, p = 0.0001); bilobar or unilobar disease (R1 = 19.0% vs. 5.6%, OR = 3.4, p = 0.001); revisional vs. primary hepatic resection (R1 = 17.9% vs. 8.1%, OR = 3, p = 0.002); abnormal vs. normal pre-operative liver function tests (R1 = 13.7% vs. 7.5%, OR = 1.8, p = 0.044); and wedge excision or extended hepatectomy vs. left hepatectomy (R1 = 16.6%, OR = 4.3, p = 0.045, 0.165 respectively). Patients with the best and worst prognostic criteria had an expected positive resection margin ranging from 2.2% to 78.6%. When tested the model fitted the data well, with an area under the receiver operating characteristic curve of 77.4% (p < 0.001).

Conclusions. The present study describes a simple and accurate model for quantifying the risk of a positive margin following hepatic resection for liver metastases. The model may be used pre-operatively within the context of a multidisciplinary team for identifying patient who may benefit from neoadjuvant therapy prior to liver surgery, thus minimizing the risk of a positive margin.

62 BILE LEAKAGE AFTER LIVER RESECTION: PREDICTIVE FACTORS OF SPONTANEOUS HEALING

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Background. Bile leakage after hepatectomy is usually managed by conservative treatment, but some authors suggest early interventional procedures.

Aim. To identify early predictive factors of bile leakage spontaneous healing failure in order to avoid useless long waiting time.

Methods. Clinical data from patients who underwent liver resection from January 1996 to January 2006 were analysed. Hepatoc tomies associated with extra-hepatic biliary resection and reconstruction were excluded. Bile leakage was defined as the drainage of 50 cc or more of bile from the surgical drain or from drainage of an abdominal collection, over a period of 3 days or more. Conservative management was the initial bile leakage treatment in all patients. Failure of conservative management was defined as necessity of interventional procedures because of sepsis and/or choleperitoneum or because of prolonged drainage of high output.

Results. Postoperative bile leakage occurred in 34 out of 596 patients (5.7%), from the surgical drain in 24 cases and from percutaneous drainage of an abdominal collection in 10. Conservative approach was successful in 26 patients (76.5%) with a median healing time of 15 days (range 4–180). In 8 patients interventional procedures were required because of sepsis in 2, choleperitonum in 1 and prolonged drainage of large amount of bile in 5 (mean output of 290 cc after mean waiting time of 36.5 days). At univariate analysis, associated extra-hepatic resections, associated vascular resections, delayed primary repair (< 72 h) and 1, 3 and 10 were significant predictors of spontaneous healing. With the ROC curve analysis the best drainage output cut-off values were identified: 300 cc in day 1, 250 cc in day 3 and 100 cc in day 10. At multivariate analysis drainage output higher than 100 ml in day 10 and the independent predictors of failure of conservative management (RR 55.085, CI95% 2.826–1108.956. p = 0.008), with a 80% sensitivity, 93.3% specificity and 90% accuracy.

Conclusions. Wait and see treatment for bile leakage after hepatectomy is successful in most cases. Patients with drainage bile output higher than 100 ml 10 days after bile leakage diagnosis should be scheduled for interventional treatments.

63 QUANTIFICATION OF THE RISK OF A POSITIVE RESECTION MARGIN (R1) FOLLOWING HEPATIC RESECTION FOR METASTATIC COLORECTAL CANCER: A MULTIFACTORIAL MODEL

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Aims. The present study aimed to identify risk-factors and develop an index for quantifying the likelihood of a positive resection margin (R1) for patients undergoing hepatic resection for metastatic colorectal cancer.

Methods. Clinical, pathological and complete follow-up data were prospectively collected from consecutive patients undergoing primary (n = 844) or revisional hepatic resection (n = 67) for colorectal liver metastases with a curative intent at a tertiary referral centre from 1987–2005. Patients with extra-hepatic disease were excluded. Multivariate logistic regression was used to identify independent predictors of margin involvement and to develop a predictive index. The model was validated using measures of discrimination and calibration.

Results. The positive resection margin (R1) was 8.8% (n = 80/911) with a 5-year cancer-specific survival for R0 and R1 hepatic resections of 39.7% and 20.3% respectively; p < 0.001. On multivariate analysis, five risk-factors were found to be independent predictors of a positive resection margin, ranked in the order of importance: number of hepatic metastases > 3 involving > 50% of the liver vs. < 3 metastases (R1 = 31.7% vs. 6.6%, odds ratio (OR) = 5.1, p = 0.0001); bilobar or unilobar disease (R1 = 19.0% vs. 5.6%, OR = 3.4, p = 0.001); revisional vs. primary hepatic resection (R1 = 17.9% vs. 8.1%, OR = 3, p = 0.002); abnormal vs. normal pre-operative liver function tests (R1 = 13.7% vs. 7.5%, OR = 1.8, p = 0.044); and wedge excision or extended hepatectomy vs. left hepatectomy (R1 = 16.6%, OR = 4.3, p = 0.045, 0.165 respectively). Patients with the best and worst prognostic criteria had an expected positive resection margin ranging from 2.2% to 78.6%. When tested the model fitted the data well, with an area under the receiver operating characteristic curve of 77.4% (p < 0.001).

Conclusions. The present study describes a simple and accurate model for quantifying the risk of a positive margin following hepatic resection for liver metastases. The model may be used pre-operatively within the context of a multidisciplinary team for identifying patient who may benefit from neoadjuvant therapy prior to liver surgery, thus minimizing the risk of a positive margin.
LARGE HEPATOCELLULAR CARCINOMA: TIME TO STOP PRE-OPERATIVE BIOPSY

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Introduction. In Western countries Hepatocellular Carcinoma (HCC) often presents at a large size, which is seen as a contraindication to transplantation and often resection. Although diagnosis by imaging and alpha fetoprotein is usually straightforward, non-specialist units continue to use biopsy to prove that diagnosis before transfer for specialist surgical opinion. We have looked at the impact of this on our practice.

Methods. We retrospectively analysed all large HCC’s resected in our unit over the last 12 years. Survival data was calculated according to size and univariate prognostic analysis was carried out to determine the impact of preoperative, operative and histological factors affecting outcome.

Results. We identified 85 large HCC’s (>3 cm) and classified 42 as giant (>10 cm). Overall survival at 1, 3 and 5 years was 76%, 54% and 51%. Size did not influence survival, although more complex surgical techniques were required for giant tumours. Predictors of poorer disease free survival were positive surgical margin (p<0.001), multiple tumours (p=0.003), macroscopic vascular invasion (p=0.015) and pre-operative lesion biopsy (p=0.027).

Conclusion. Overall our large resection series shows excellent outcomes after resection for large/ giant HCC. This supports the management of such patients in large volume units which are fully equipped and experienced in the management of these patients.

Abstracts

MODIFIED CATELL’S PANCREATICO-JEJUNOSTOMY, BUT- TRESSING AND ISOLATED BILIO-PANCREATIC LOOP RESULTS IN BETTER OUTCOMES FOLLOWING PANCREATICO-DUODENECTOMY

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Introduction. Pancreatic leak following Pancreatico-duodenectomy (PD) continues to be the most serious complication (1) accounting for up to 80% of post-operative death (2).

Objective. To assess outcomes following PD adopting a combination of reconstructive preventive techniques.

Patients and Methods. Over a 4 year period, between May 2002 and June 2006, 50 PDs were performed by a single surgeon performing a modified Catell’s pancreatico-jejunostomy on an isolated bilio-pancreatic loop after pylorus preserving PD (3). Patients with recent previous attacks of soft pancreatic cancer were included. The influence of previous attacks of acute biliary pancreatitis (ABP) on the likelihood of a subsequent severe attack remains unclear. Previous attacks of ABP increase the likelihood of a future severe attack compared with those who did not [15 of 23 patients (65%) vs. 18 of 74 patients (24%), p=0.001].

Results. Median pancreatic duct size 4mm (0.2-10mm) respectively. The median length of stay was 1 (1-3) days. At a median (range) follow up of CP patients of 2.5 (0.1-7.5) days. At a median (range) follow up of CP patients of 36 (1-5) months, the median VAS score declined from 7.5 (1-10) preoperatively to 3 (0-10) postoperatively. There were no conversions to thoracotomy, operative complications or mortality. The median (interquartile range) postoperative hospital stay was 1 (0.5-3) days. At a median (range) follow up of CP patients of 36 (1-63) months, the median VAS score declined from 7.5 (1-10) preoperatively to 3 (0-10) postoperatively. The median (range) follow up of cancer patients of 2 (1-15) months, the median VAS score declined from 8 (0-30) preoperatively to 2 (0-30) postoperatively, while the opiate requirements were markedly reduced in 5 patients and increased in 2 patients. At a median (range) follow up of cancer patients of 2 (1-15) months, the median VAS score declined from 8 (0-30) preoperatively to 2 (0-30) postoperatively, while the opiate requirements were markedly reduced in 5 patients and increased in 2 patients (one patient was lost to follow up).

Conclusion. Our results suggest, modified Catell’s pancreatico-jejunostomy on an isolated bilio-pancreatic loop after pylorus preserving PD is a safe and useful minimally invasive approach to patients with intractable upper abdominal pain after failed medical therapy.

INTRACTABLE ABDOMINAL PAIN IN PATIENTS WITH CHRONIC PANCREATITIS AND PANCREATIC CANCER: RESULTS OF BILATERAL THORACOSCOPIC SPLANCHNOTOMY

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Background. Division of the greater and lesser splanchnic nerves is reserved for patients with intractable upper abdominal pain after failed medical therapy.

Methods. Selected patients with opiate-dependent upper abdominal pain secondary to chronic pancreatitis (CP) or malignancy underwent bilateral thoracoscopic splanchnotomy (BTS). Response to surgery was assessed using the visual analogue scale (VAS), and the analgesic requirements were recorded.

Results. Between 2001 and 2006, 20 patients (male, 14) with a median age of 50.5 years who suffered with CP (n=12) or malignancy (n=8) underwent 20 BTS procedures. The median (range) operating time was 30 (20–75) minutes. There were no conversions to thoracotomy, operative complications or mortality. The median (interquartile range) postoperative hospital stay was 1 (0.5–3) days. At a median (range) follow up of CP patients of 36 (1–63) months, the median VAS score declined from 7.5 (1–10) preoperatively to 3 (0–10) postoperatively, while the opiate requirements were markedly reduced in 5 patients and increased in 2 patients (one patient was lost to follow up).

Conclusion. BTS is a safe and useful minimally invasive approach to palliation of intractable upper abdominal pain with good short-to-medium term results in patients with malignancy and those with CP.

DECLAYED GASTRIC EMPTYING AFTER PANCREATICODU- DENECTOMY CAN BE REDUCED BY A FAST-TRACK CLINICAL PATHWAY

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Background. Delayed gastric emptying (DGE) is a frequent postoperative complication of pancreaticoduodenectomy (PD).

Aim. To evaluate the fast-track clinical pathway is effective in decreasing the incidence of DGE in a large series of patients undergoing PD.

Methods. A fast-track clinical pathway was introduced in our unit in July 2004. The protocol includes early removal of nasogastric decompression (day 1), early mobilization and early postoperative oral intake (liquid food from day 3 and solid intake from day 4 or 5 when tolerated). Until December 2006 224 patients were prospectively evaluated (group A) and compared to an historical group of 224 patients, treated from February 2001 to June 2004, with the traditional fast-track pathway (group B). DGE was defined by the need for nasogastric decompression or vomiting after 10 days from operation. Statistical analysis was made with Chi-square and Mann-Whitney test.

Results. We observed 54 DGE in the group B (24.1%), 35 as single complication (15.6%) and 19 in association with other intra abdominal complications (8.5%), and 30 DGE in group A (13.4%), 12 alone (5.3%), and 18 with other IAC (8%) respectively. In both groups post-operative pancreatic fistula was the most frequent complication associated.

The difference between the incidence of DGE non associated with other IAC in the post-fast-track pathway was significant reduced in group A (51.3% vs 62.9%, p <0.05), with no significant difference in terms of mortality (3.1% group B and 2.7% group A), re-laparotomy (8% B and 8.4% A) and re-recovery rate (6.2% in both groups).

Conclusions. A fast track clinical pathway is feasible also in patients undergoing major pancreatic surgery and is associated to a reduction in postoperative DGE and postoperative stay.

71 THE CHIMERA OF RADICALITY IN Pancreatic CANCER RESECTION

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Background. Pancreatic cancer has a dismal prognosis even in patients undergoing resection. This is partially justified by the aggressive behaviour of this cancer: 70–80% of resected cases had metastatic lymphnodes, and margin invasion is reported in up to 50% of cases.

Aim. To describe the frequency and pattern of relapse in pancreatic cancer patients in which resection achieved an apparent radicality, namely patients with neither negative resection margins (R0) and negative lymphnodes (N0).

Methods. Retrospective evaluation of prospectively collected data. Between 1/1995 and 12/2004 we performed 354 pancreatic resections for ductal pancreatic adenocarcinoma. Pathologic evaluation of resection margins was made by the pathologist after inking the specimen margins. 45 patients (12%) resulted R0-N0, but 7 of them were excluded because they had less than 10 nodes isolated in the surgical specimen (NX). Another patient was lost at follow-up at 12 months. The remaining 37 patients were the object of the study. Disease failure was assessed by CT scan performed every 3–4 months after surgery, or when recurrent disease was suspected. Survival analysis was made by the Kaplan-Meier curves and log-rank test.

Results. Patients were treated by 31 pancreaticoduodenectomies and 6 distal pancreatectomy with splenic preservation in 5%) whereas a major hand surgery was performed in 47% of cases (enucleation in 38%, middle pancreatectomy in 30%, and 25%). 13% of patients showed mitoses/10HPF and angioinvasion was present in 25%.

Conclusions. Endocrine tumors classified as well differentiated with uncertain behaviour (WDET-U) represent a poorly characterized clinical-pathological entity; few information are available about their natural history.

To describe the frequency and pattern of relapse in pancreatic cancer patients with more than one WHO parameters and in 0/33 patients with only one parameter (p =NS). Three patients died for reasons not related to the disease; all the other patients were alive and disease-free.

73 UROKINASE PLASMINOGEN ACTIVATOR RECEPTOR AS A NEW USEFUL MARKER IN Pancreatic CANCER: PRELIMINARY RESULTS

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Background. Distant metastases at the time of resection. R0N0 pts had local recurrence. Furthermore, 40% of R0N0 pts had occult metastases. Stratifying the study group by age, tumour size, grading and tumoral and inflammatory disease reached statistical significance, as showed in the table (attached files).

Whereas we did not report any significant relationship among uPAR levels, tumoral markers, pathological features and survival in pancreatic cancer patients, probably owing to the relative narrowness of our series.

In conclusion, uPAR appeared to be a potentially useful marker for diagnosis and follow-up in pancreatic cancer. Further evaluation is required on a large number of patients to confirm these preliminary results and investigate a possible relationship with clinical features and survival.

72 PREDICTION OF MALIGNANCY IN WELL DIFFERENTIATED ENDOCRINE TUMOURS WITH UNCERTAIN BEHAVIOUR

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Background. Endocrine tumors classified as well differentiated with uncertain behaviour (WDET-U) represent a poorly characterized clinical-pathological entity; few information are available about their natural history.

Aim. To evaluate clinical behaviour and adequacy of surgical treatment in WDET-U.

Methods. 40 patients (25 female and 15 male; mean age 47, 3 years) underwent pancreatic radical resection between 1987 and 2005 for unifocal, non-MEN associated WDET-U (according to WHO 2000 classification if present at least one of these four parameters: size >2 cm, Ki-67 index >2%, angioinvasion, mitoses/10HPF >2). An atypical pancreatic resection was performed in 47% of cases (enucleation in 30%, middle pancreatectomy in 12%, distal pancreatectomy with splenic preservation in 5%) whereas a typical resection in 53% (pancreatectoduodenectomy in 28%, distal splenopancreaticojejunostomy in 25%). 40% were non-functioning tumors and 60% were functioning. Mean size was 3.8 cm (range 0.8–17.2 cm; >2 cm in 67%). Ki-67 index was <2% in 86% of cases, 2–5% in 11%, >5% in 3%. Angioinvasion was present in 25% of cases. 13% of patients showed mitoses >2 mitoses/10HPF. In 33 cases only one of the 4 pathological parameters was present, in 6 cases two, in 1 case three. Mean follow-up was 87 months (range: 7–223 months).

Results. We observed distant relapse in 2 patients at 76 and 84 months, in the first case in the adrenal gland and in the second case in the liver. The first patient underwent a pancreaticoduodenectomy; the pathological evaluation showed a size of 3.8 cm and angioinvasion was present; in the second patient a distal splenopancreatectomy was performed, tumor size was 4 cm, angioinvasion and 2 mitoses/10HPF were present. In both cases relapse was surgically removed; both patients are alive and disease-free at respectively 147 and 10 months after re-intervention. Recurrence was observed in 27 patients with more than one WHO parameters and in 0/33 patients with only one parameter (p =NS). Three patients died for reasons not related to the disease; all the other patients were alive and disease-free.

Conclusions. Endocrine tumors classified as WDET-U, though very low, have a malignant potential; the presence of >1 WHO parameter predicts a high risk of malignancy. Since no local recurrence was found, atypical resection is indicated to treat WDET-U. A long-term follow-up (>5 years) is needed, because the onset of metastases occurred very late.
Introduction. Leakage from the pancreatic-pancreaticojejunostomy is a major cause of septic complications and mortality after classical partial pancreateoduodenectomy (Kausch-Whipple procedure) as well as pylorus-preserving partial pancreateoduodenectomy (Traverso-Longmire procedure). The objective of this study was to evaluate the safety of a new technique of pancreatic anastomosis described by Blumgart (371 /22, 2003) for pancreatic cancer. Clin. Cancer Res. 2003;9:4935–43.

Methods. In two different patient’s cohorts with pancreatic head resections for pancreatic cancer the classical pancreatico-pancreaticojejunostomy (cppj) was compared with the pancreatic anastomosis described by Blumgart (371 /22, 2003). From 01/1998 until 12/2002 (n = 90, m = 53, w = 37) the pancreatic anastomosis following pancreatic head resection was exclusively performed as a classical pancreatico-pancreaticojejunostomy: after incision of the antimesenterial wall of the bowel the back wall was sutured with single stitches including the back wall of the pancreatic duct. After completion of the back wall including the pancreatic duct the anterior wall of the anastomoses to the bowel was sutured with single stitches, again including the front wall of the pancreatic duct. From 01/2003 until 03/2005 (n = 92, m = 52, w = 40) a new technique for the pancreatic anastomosis was applied. For the so-called Blumgart technique transpancreatic U-stitches were placed straight through the pancreatic remnant about 1 cm distal from the cut surface starting at the ventral side of the pancreatic remnant through the remnant gland to the dorsal side, then through the back wall of the jejunal loop and finally back through the pancreatic remnant. In addition, after point incision of the antimesenterical wall of the jejunal loop, a duct-to-mucosa anastomosis was performed by single stitches. The pancreatico-jejunostomy was finished by placing the four transpancreatic U-stitches finally both through the front wall of the jejunal loop and performing a knot on the jejunal wall. We retrospectively collected the following information for each patient: age, sex, preoperative co-morbidity, type of surgery, ASA-classification, intraoperative blood loss, duration of surgery, postoperative hospital length of stay, postoperative length of ICU stay, local postoperative complications (insufficiency of the pancreatic or biliary anastomosis, postoperative hemorrhage) and systemic postoperative complications (wound, central venous catheter, and urinary tract infection, wound abscess). Comparisons between groups were made by the unpaired t-test (continuous variables) and by Chi-square statistics (categorical variables). A P value of 0.05 or less in a 2-tailed test was considered statistically significant. Variables found to be associated with the frequency of total systemic complications or of local complications in the univariate analysis (P < 0.20) were entered into a stepwise logistic regression model to estimate adjusted odds ratios (ORs) and 95% CIs.

Results. The age distribution of the patients was comparable between the two groups, the perioperative management was carried out following the same standard operating procedures. The multivariate analysis of the data resulted in a significant higher hospital mortality following classical pancreatico-pancreaticojejunostomy as compared to the pancreatic anastomosis described by Blumgart (cppj vs. cppb, p < 0.02) and the overall anastomotic insufficiency rate was significantly higher than that of classical pancreato-pancreaticojejunostomy as compared to the pancreatic anastomosis described by Blumgart (371 /22, 2003). The multivariate analysis of the data demonstrated that the technique of the pancreatic anastomosis was the only variable that significantly influenced the postoperative frequency of total systemic complications (p = 0.001, OR 7.11, 95% confidence interval 2.32–21.76) and local complications at the operation site (p = 0.038, OR 2.28, 95% confidence interval 1.04–4.98).

Summary. In our patient’s cohort the pancreatic anastomosis described by Blumgart resulted in a significant reduction of perioperative morbidity as compared to the classical pancreatico-pancreaticojejunostomy. The multivariate analysis of the data demonstrated that neither ASA-classification, age, or sex nor intraoperative blood loss or duration of surgery were significantly associated to postoperative frequency of total systemic complications or local complications at the operation site. The only factor of significant influence was the technique of the pancreatic anastomosis. In our institution the technique of an asymptomatic, fast and reliably feasible pancreatic anastomosis described by Blumgart became accepted as gold standard for the pancreatico-pancreaticojejunostomy following pancreatic head resection.

74 REOPERATION FOR BLEEDING AFTER PANCREATEO-DUODENECTOMY: FROM “EARLY EASY” MANAGEMENT TO LATE LIFE THREATENING CONDITIONS. RESULTS ON A CONSECUTIVE SERIES OF 658 PATIENTS

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Abstracts

Levels of serum uPAR in selected pancreatic disease.
Levels of urine uPAR in selected pancreatic disease.

References

Levels of serum uPAR in selected pancreatic disease.
Levels of urine uPAR in selected pancreatic disease.

40) a new technique for pancreatic anastomosis described by Blumgart became accepted as gold standard for the pancreatico-pancreaticojejunostomy following pancreatic head resection.
Introduction. For almost a century the rate of complications in Severe Acute Pancreatitis (SAP) paralleled the clinical severity of attack, recently it has been shown that clinical severity is more related to development of infected necrosis and pancreatic necrosis. Nowadays surgical debridement and drainage remains preferred approach for infected necrosis despite occasional reports of successful conservative management. Mortality for acute necrotizing pancreatitis (ANP) is ranging between 25% to 50% in specialized center.

Objectives. We report overall low mortality rate in the management of acute necrotizing pancreatitis in a tertiary referral center particularly related to long standing severe illness patients.

Methods. Retrospectively collected of all patients admitted at the department of general and pancreatic Surgery of Verona with diagnosis of acute pancreatitis between 1997 to 2004 were reviewed focusing on severe ones. The continuous variables were described using the median value as a measure and the interquartile range (IQR) as a dispersion measure. Retrospective consecutive patients suffering from acute pancreatitis, there were 54 (6.9%) patients with CT proven necrotizing pancreatitis, 43 (79.6%) of these patients were transferred from other Institution after a median time from diagnosis of 35 days (IQR 13.5 – 67.7). At the diagnosis all NFS were performed. Twenty (38%) (70.3%) were treated using a stapler closure. Overall 41 (75.9%) patients underwent surgery for sepsis due to infected necrosis. Twenty of them had the first operation elsewhere, 18 (90%) were subsequently re-operated in our Institution. The median length of stay was 20 days (IQR 10-40) and in 4 (7.9%) patients the surgery was a salvage procedure.

Discussion and Conclusion. Patients suffering from acute necrotizing pancreatitis should be transfer to tertiary referral center: repeated surgical treatment. There was no significance statistical difference in mortality, morbidity and incidence of pancreatic fistula for each prognostic factor analyzed. A fistula developed in 5 patients of 29 treated with a stapler suture versus stapler suture. Data were evaluated using the Fisher’s exact test.

Results. Overall post-operative morbidity and mortality were respectively 20% and 5%. In 24 patients died during postoperative course for acute myocardial infarction). In 29 patients (28.7%) the pancreatic remnant was treated using a stapler, in 72 patients (71.3%) the surgeon performed an handsewn closure. Eleven patients (10.9%) developed a pancreatic fistula. All of them were treated conservatively with medical and/or surgical treatment. There was no significance statistical difference in morbidity, mortality and incidence of pancreatic fistula for each prognostic factor analyzed. A fistula developed in 5 patients of 29 treated with a stapler (17.2%) and in 6 (8.3%) of the 72 patients in which an handsewn closure was performed (p value =0.287).

Conclusions. Age, co-morbidities, ASA score, surgical procedure, pancreatic stump treatment and pancreatic disease are not linked to morbidity, mortality and incidence of pancreatic fistula. Despite the recent results published in worldwide literature which suggest the use of a stapler to treat the pancreatic remnant, in our cases incidence of pancreatic fistula was higher, even if not statistical significant, in patients in whom a stapler closure was performed.

78 ANTI-BIOTIC PROPHYLAXIS IN SEVERE ACUTE PANCREATITIS: EXPERIMENTAL EVALUATION OF ERTPANEM EFFICACY

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Objective. Secondary infection of the inflamed pancreas is the principal cause of death after severe acute pancreatitis (AP). Prophylactic antibiotics that were used in AP were always initiated after hours from induction of pancreatitis. The effectiveness of antibiotics initiated earlier is unknown. The aim of this study was to evaluate the effectiveness of ertapenem initiated when AP is induced in rats.

Methods. A total of 40 rats (Sprague-Dawley) were studied. AP was induced in rats by intraduodenal injection of 3% taurocholate. Rats were divided randomly into two groups: group 1 rats received normal saline as a placebo, group 2 received ertapenem 15 mg/kg after AP induction. At 24 h, 20 rats (10 group I and 10 group 2) were killed for quantitative bacteriologic study. A pathologic scoring system of histological features was used to evaluate the severity of the pancreatitis. The remaining 20 rats (10 group I and 10 group 2) were killed after 21 days for quantitative bacteriologic study and survival analysis. Chi square, Student and Kaplan- Meier tests were used for survival analysis. Results: All rats showed pathologic signs of acute pancreatitis. Ertapenem administrated after induction of AP significantly reduced the prevalence of pancreatic infection and 24 hours mortality as compared to controls. 21 days survival was significantly better in group 2 compared to group 1.

Conclusion. Early antibiotic prophylaxis with ertapenem reduces pancreatic infection rate after AP and it has a beneficial effect on survival.
81 SYSTEMATIC REVIEW AND META-ANALYSIS OF STANDARD AND EXTENDED LYMPHADENECTOMY IN PANCREATICO-DUODENECTOMY FOR PANCREATIC CANCER

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Background. The extent of lymphadenectomy in pancreaticoduodenectomy for pancreatic cancer is still controversially discussed. Some retrospective studies have shown increased survival rates with extended surgery.

Methods. In this meta-analysis, randomized controlled clinical trials (RCTs) were included which compared standard and extended lymphadenectomy within pancreaticoduodenectomy. Overall survival was analyzed using hazard ratios (HRs) and corresponding standard errors (SE). Pooled estimates of overall survival for standard or extended procedures were calculated using a random effects model (odds ratio and 95% confidence interval, C.I.).

Results. A large number of retrospective analyses had to be excluded while in total four RCTs were identified out of which three were available as full text. Thus, three RCTs were eligible for meta-analysis. The log hazard ratios on survival of these RCTs were 0.36 (SE = 0.22), –0.15 (SE = 0.17) and –0.21 (SE = 0.15); the weighted mean log hazard ratio for survival, taken across all three trials, was 0.93 (95% C.I. 0.77 to 1.15) revealing no statistically significant difference for standard or extended procedure (P = 0.48). Morbidity and mortality rates were also comparable with a trend towards higher rates of delayed gastric emptying for extended LA. The number of resected lymph nodes was significantly higher in the extended LA group (P < 0.001).

Conclusions. Extended lymphadenectomy does not provide any survival benefit but may be associated with a trend towards increased morbidity. Thus, we believe that it should only be used within adequately powered controlled clinical trials.

82 MUCINOUS CYSTIC NEOPLASM OF THE PANCREAS DEFINED BY OVARIAN STROMA: IS THIS REALLY AN AGGRESSIVE ENTITY? LESSONS FROM 163 RESECTED PATIENTS

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Objective. Mucinous cystic neoplasms (MCNs) of the pancreas have often been confused with intraductal papillary mucinous neoplasms. We sought to evaluate the clinicopathological characteristics, prevalence of cancer, and prognosis of a large series of MCNs in two tertiary centers.

Methods. Analysis of 163 patients with resected MCNs, defined by the presence of ovarian stroma and lack of communication with the main duct. Resections were mostly in women (95%) and in the distal pancreas (97%); 25% were incidentally-discovered. Symptomatic patients typically had mild abdominal pain, but 9% presented with acute pancreatitis. 118 patients (72%) had adenoma, 17 (10.5%) borderline tumors, 9 (5.5%) in-situ carcinomas and 18 (11.2%) invasive carcinoma. Patients with invasive carcinoma were significantly older than those with non-invasive neoplasms (55 vs. 44 years, P = 0.01). Findings associated with malignancy were presence of nodules (P = 0.0001) and diameter 50 mm (P = 0.0001). All neoplasms with cancer were either 40 mm in size or had nodules. There was no operative mortality, and morbidity was 46%. Median follow up was 57 months (range: 4 – 233), and only patients with invasive carcinoma had recurrence. The 5-year disease-specific survival for non-invasive MCNs was 100% in patients with cancer. 6 (7.5%) patients developed local recurrence.

Conclusions. This series, the largest with MCNs defined by ovarian stroma, shows a prevalence of cancer of only 17.5%. Patients with invasive carcinoma are older, suggesting progression from adenoma to carcinoma, therefore warranting resection in all cases. In low risk MCNs (4 cm/no nodules), more conservative resections can be considered.

83 QUALITY-OF-LIFE IN PANCREATIC CANCER: ANALYSIS OF STAGE AND TREATMENT

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Objective. Considering the limited treatment options in pancreatic cancer, decision-making work-up. The gain in survival and palliation of symptoms should be balanced against social and functional impairment. In pancreatic cancer, most of QOL studies have been performed in a palliative setting.

The aim of this work was to compare QOL in patients with different stages of pancreatic adenocarcinoma who underwent surgical and/or medical interventions. We also evaluated differing treatments, readmissions, need for endoscopic palliation and surgery-related procedures.

Methods. A prospective single-center study comprising 94 patients (48 female, 46 male, mean age of 66 years, range: 42 – 89) with pathologically proven ductal adenocarcinoma of the pancreas was performed over a 2-year period.

Results. At diagnosis, 31 patients (32.9%) had localized disease (Group 1); 34 (36.1%) were locally advanced (Group 2); and 29 (30.8%) had metastatic disease (Group 3). There were no differences regarding age or gender between groups. Psychiatric comorbidity (depression/ anxiety) was present in 16% of patients before cancer diagnosis.

No significant difference in QOL was found between the three groups as a whole. Quality-of-life was better among those with surgery without resection about adjuvant chemo/chemoradiation than in those treated (p = 0.019).

Additionally, higher QOL scores were found in the resected group when compared to patients who did not undergo resection (p = 0.04).

After a mean follow up of 8.3 months (range: 1 – 21), 64.5% of Group 1 patients, 23.5% of Group 2, and 7% of Group 3 were alive (p = 0.0001).

Conclusions. Unexpectedly, pancreatic cancer stage had no overall significant impact on QOL. QOL was better in patients who underwent resection, but chemoradiation diminished QOL, a fact that needs to be balanced against its survival and palliative benefits.
spleen can be preserved safely. However, considering that spleen preservation Nowadays DP can be performed safely, even in case of

### Methods

A web-based database was designed to collect patient demographic, preoperative evaluation, intraoperative and postoperative data on patients who had a pancreateodudenectomy (PD) for any cause. Each patient was given a unique identifying code that allowed them to enter de-identified patient data. Pancreatic anastomotic leak was defined using either the ISGPF definition (3 days, amylase 3x normal) or Sarr's definition (5 days, amylase 5x normal). Missing data was excluded from the descriptive analysis of each variable.

Results: 1,907 cases submitted to the database from 20 institutions and 40 surgeons. The median age reported was 64 (15–91) with 53.8% of patients being males. A history of pancreatitis was reported in 17.5% of all the cases. The use of preoperative stents in the main pancreatic duct was reported in 53.8% of patients. A history of neoplastic disease was present in 86.7% of all the cases. The median LOS was 10 days (1–80 days) with a median ICU stay of 1 day (0–30 days). The diagnosis of ductal adenocarcinoma was identified in n=812 (77.4%) of patients on final pathology. Postoperative morbidity included bile leak (3.5%), intra-abdominal abscesses, (6.5%), delayed gastric emptying (12.5%), intra-abdominal bleeding (3.6%), and reoperation (5.5%). The pancreatic leak rate was 1.3% (n=18). Using the ISGPF definitions the pancreatic leak rate was 2.1%. By comparison, using the Sarr definition of a leak revealed a rate of 9.4%.

**Conclusion.** PD appears to be safe with a low post operative mortality. The choice of these data significantly differs when using 2 common definitions. This highlights the need for a standardized definition making continued participation in this study essential.

### 86 DISTAL PANCREATECTOMY: A RETROSPECTIVE ANALYSIS OF 248 OPERATIONS

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**Introduction.** Complications occurring after distal pancreatectomy (DP), yet seldom fatal, occur frequently carrying significant morbidity and added costs. We herein report our Institutional experience with a consecutive series of 248 DPs and analyze their short and long term outcomes.

**Methods.** Between November 1987 and August 2006 248 DPs were performed at a single Institution. Patient demographics, intraoperative findings, pathology data and outcome were recorded prospectively into a computer database and analyzed retrospectively for the purposes of this study. There were 112 (45.2%) males and 136 (54.8%) females; the mean age was 57.1 years (range 15–86 years); 216 patients (87.1%) underwent splenopancreatectomy (SPDP), while the remaining 32 (12.9%) received a spleen preserving distal pancreatectomy (SPDP); in 22 cases the procedure was carried out laparoscopically (9.0%).

**Results.** The operative time was 357 minutes (range 140–720 minutes); the median number of red blood cells units transfused was 0.4 (range 0–12). Perioperative mortality and morbidity rates were 24.6% (61/248) and 3.6% (9/248), respectively. The most common surgical complications were: pancreatic fistula (n=26; 10.5%); intraabdominal fluid collection/abscess (n=7; 2.8%); and bleeding (n=6; 2.4%). A relaparotomy was required in 12 patients (4.8%). Final pathologic diagnosis was pancreatic adenocarcinoma in 88 patients (35.5%), neuroendocrine tumor in 42 patients (16.9%), post-infectious in 44 patients (17.7%) and inflammatory in 44 patients. In 24 types in 49 patients (19.7%) and other benign disease in 25 cases (10.1%). The median length of postoperative hospital stay was 15.9 days (range 4–101 days). Patients undergoing SDP and SPDP showed a similar post-operative morbidity rates (9/216; 27.3% vs 5/32; 15.6%, respectively; p>0.05). The overall postoperative mortality was 3.6% (10/248) as compared to conventional DP (24.7%) or mortality (1.3%) as compared to conventional DP. Likewise, survival at 1, 3, and 5 years was not worse after extended DP (60.9%, 27.1%, and 24.7% respectively) as compared to conventional DP (70%, 48.8%, and 40% respectively) (p>NS). Survival of patients diagnosed with ductal adenocarcinoma at the same time points was 60.1%, 27.8% and 22.3%, respectively.

**Conclusions.** Nowadays DP can be performed safely, even in case of concurrent resection of large, non-splenic, retroperitoneal vasculature. The spleen can be preserved safely. However, considering that spleen preservation is technically more complex than splenectomy, and that the incidence of overwhelming post-splenectomy infection is low (in our study over the last 10 years we reported only 3 cases with attendant risk of fluid collection/abscess formation, remaining the leading cause of morbidity after DP and, in this regard, few improvements have been achieved over the years.

### 87 ROLE OF MULTIDETECTOR COMPUTED TOMOGRAPHY IN CHARACTERIZATION NEUROENDOCRINE PANCREATIC LESIONS

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**Purpose.** Role of multidetector CT in differentiating malignant and benign lesions among neuroendocrine pancreatic neoplasms.

**Materials and Methods.** We evaluated 40 pancreatic lesions in 22 patients (2 patients affected by MEN 1 syndrome with 15 and 5 lesions respectively). CT scans were done before and after 120mL iodine contrast medium administration (5 ml/min) in early arterial (20'), pancreatic (35'), venous (70') and delayed (180') phases. Two different patterns of post-contrast enhancement (in arterial and pancreatic phases) and delayed enhancement (in venous and delayed phases). For each lesion also the greatest diameter was considered. CT results were compared with pathological results after resection.

**Results.** 30 lesions showed an early enhancement with a mean diameter of 12mm; at pathology 23/30 resulted to be benign, 2/30 borderline and 5/30 malignant lesions. Among the 10/40 lesions with delayed enhancement, 2 resulted to be borderline, while 8 neoplasms were malignant. At CT the mean diameter of malignant lesions with early and delayed enhancement pattern was 37mm and 42mm respectively. The sensitivity and positive predictive value of CT in detecting the nature of neuroendocrine lesions has been 91% and 85% respectively.

**Conclusions.** The multidetector study, performed by means of multi- detector approach allows to suggest the nature of neuroendocrine pancreatic neoplasms on the basis of their post-contrastographic enhancement pattern.

### 88 MULTIDETECTOR CT IN PANCREATIC NEOPLASMS: EVALUATION OF RETROPORTAL PANCREATIC MARGIN INFILTRATION AND CORRELATION WITH HISTOPATHOLOGICAL FINDINGS

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**Purpose.** Role of multidetector CT in the assessment of the retroportal pancreatic margin by correlating CT findings with histopathological results.

**Materials and Methods.** We evaluated 43 patients affected by ductal adenocarcinomas of the pancreatic head or uncinate process, submitted to surgical resection.

The suspicion of infiltration (microinfiltration or macroinfiltration) of the retroportal margin arose at CT when the fatty layer localized between the mesenteric artery appeared obliterated, irregular or with abnormal density. **Results.** CT suggested the infiltration of the retroportal lamina in 19 cases (84.2%) of ductal adenocarcinomas of the pancreatic head or uncinate process. 6/19 cases (31.5%) were microinfiltrations, 13/19 macroinfiltrations and the absence of infiltration in 44 cases (20.9%).

CT pathology correlation showed that CT correctly identified the infiltration in 19 cases (84.2%) and the absence of infiltration in 44 cases (20.9%).

**Conclusions.** CT was 82% sensitive, specificity of 81% with an overall diagnostic accuracy of 81%.

**Abstracts**

**DISCLOSURE**

Annalisa Belcari, Sabrina Pallocci, Rosa Pasquaerriolo, Elena Cavazzà, Luca Emanuele Pollina², Nicola Funè³, Daniela Campani³, Marco Del Chiario³, Ugo Boggi³, Franco Mosca¹

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Hypothesis. Pancreaticoduodenectomy (PD) and the “open”, transgastric variant are associated with a lower postoperative complication rate following pancreaticoduodenectomy (PD) when compared to pancreaticojejunostomy (PJ).

Design. Retrospective analysis of a prospectively collected database.

Setting. Academic tertiary care university hospital.

Patients. Between January 2002 to June 2006, 261 PDs for peri-ampullary cancers with soft residual parenchyma were carried out. Reconstructions by PJ were 146. PG was performed in 115 patients; of these, 40 received “classic” and 75 “open” PG.

Main Outcome Measures. Indications for surgery, intraoperative and postoperative variables, postoperative morbidity and mortality.

Results. The median survival rate, as well as the incidence of multiple complications, were not significantly different between PJ, “classic” and “open” PG group. On the contrary, the incidence of pancreatic fistula (PF) was significantly lower in “open” PG group (p = 0.03). When analyzed according to the “open” variant, a safe alternative to PJ after PD, with a significantly lower rate of PF, biliary fistula, intra-abdominal collections and relaparotomy, we found significant differences in favor of “open” PG (p < 0.001 and 0.04 respectively).

Conclusions. Retrospective analysis shows the PG, and in particular the “open” variant, is a safe alternative to PJ after PD, with a significantly lower rate of pancreatic fistula, biliary fistula, intra-abdominal collections and relaparotomy.

90 PROGNOSTIC FACTORS IN NON-FUNCTIONING PANCREATIC ENDOCRINE TUMOUR: ANALYSIS ON 180 PATIENTS

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Background. Endocrine pancreatic tumours are a rare and represent a heterogeneous disease, whose natural history is not well known.

Aim. The study was aimed to assess in a single centre population of non-functioning pancreatic endocrine tumour (NFPET) the prognostic role of serum and/or clinical parameters.

Methods. 180 patients suffering from sporadic NFPET entered in our prospective database between 1990 and 2004 were analysed. Relevant clinico-pathological data were collected and tested as predictors of prognosis in univariate and multivariate models.

Results. After a median follow-up of 43.1 (range 0.4–196) months, the overall median disease-related survival was 116.4 months (95% CI: 65.2–164.7 months). At univariate analyses the following variables were negatively associated with survival: non incidental diagnosis (p = 0.0008), pain (p = 0.003), age > 50 years (p = 0.0008), venous invasion (p = 0.0008), and weight loss (p < 0.00001), size (p = 0.0017), poor differentiation (p < 0.0001), liver or nodal metastases (p < 0.0001), Ki67 value (< 5% p < 0.0001). Upon multivariate analysis (Cox proportional hazard model) poor prognosis was associated with non incidental diagnosis (p = 0.0003); pain (p = 0.0003); weight loss (p < 0.00001); size (p = 0.0017); poor differentiation (p < 0.0001); liver or nodal metastases (p < 0.0001), Ki67 value (< 5% p < 0.0001). Upon multivariate analysis (Cox proportional hazard model) poor prognosis was associated with non incidental diagnosis (p < 0.0001), pain (p < 0.0001), age > 50 years (p < 0.0001), venous invasion (p < 0.0001), and weight loss (p < 0.00001), size (p < 0.00001), poor differentiation (p < 0.0001), liver or nodal metastases (p < 0.0001), Ki67 value (< 5% p < 0.0001).

Conclusions. Ki67 was confirmed the prognostic role of Ki67; tumour differentiation and liver metastasis and introduce weight loss at diagnosis as clinical prognostic survival factors.

91 SURVIVAL IN NON-FUNCTIONING PANCREATIC ENDOCRINE TUMOR: ANALYSIS ON 180 PATIENTS

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Background. Non-functioning pancreatic endocrine tumours (NFPET) are a heterogeneous group of endocrine neoplasms. Few data are available in large series according to different stage of the disease.

Aim. The study was targeted to a single centre population of NFPET in order to describe the survival rate.

Methods. Between 1990 and 2004 all the patients suffering from sporadic NFPET registered in a prospective database were analysed. Survival analysis was performed by Kaplan-Meier survival function.

Results. One-hundred-eighty patients entered in the study (92 males; 88 female; median age 58 years). In 93 (51.6%) patients a radical resection was achieved, whilst in 19 (10.5%) with unresectable liver metastases a debulking procedure was performed. Twenty patients had a surgical by-pass. After a median follow-up of 43.1 (range 0.4–196) months, the overall median disease-related survival was 116.4 months (95% CI: 65.2–164.7 months). With 5 and 10-yr survival rate of 67 and 49.3%, respectively, no differences were observed between unrecorded (3-yr: 37.3%; 10-yr: 17.4%) and palliative resected patients (3-yr: 47%; 10-yr: not reached) (p = 0.81). Radically resected patients had a 5-yr and 10-yr survival rate of 93 and 80.8% respectively. Patients with nodal involvement (N1) but no liver metastases (M0) had a 5-yr survival of 49.4% (median 58.9 months, 95% CI: 29.5–86.3), whilst was 40% for those with M1 (any N) (p = 0.01).

Conclusions. NFPET have a general good prognosis even in advanced stage being the better for patients who can be radically resected.

92 THE LAPAROSCOPIC APPROACH TO DRAINAGE OF PANCREATIC PSEUDOCYSTS: IS IT SUITABLE FOR ALL COMERS REQUIRING SURGERY?

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Introduction. Pancreatic pseudocysts (PP) are traditionally managed by laparotomy. Our experience with the laparoscopic approach for all comers requiring surgical drainage is presented.

Methods. Between 2001 and 2007, 14 consecutive patients (8 male) underwent 15 surgical drainage procedures for PP, all of which were attempted laparoscopically.

Results. The median PP size was 13.5 (range, 6.5–23) cm. The procedures included cyst-gastrostomy (n = 13), Roux-en-Y cyst-jejunostomy (n = 1), and an unplanned external drainage due to extensive adhesions (n = 1). The approach to cyst-gastrostomy was transgastric (n = 8), endogastric (n = 3) and retrogastric (n = 2). Two patients underwent a conversion to open drainage. There were no conversions to open surgery. Pancreatic necrosis was present in 12 patients of whom 9 required debridement. The median operative time was 120 (interquartile range, 80–145) minutes. There were no postoperative complications and the median postoperative hospital stay was 2 (range, 1–4) days. At a median follow up of 14.5 (range 1–41) months one patient developed a recurrent PP (7.7%) that was drained laparoscopically.

Conclusions. Laparoscopic drainage of PP is a feasible, safe, an effective alternative to laparotomy for all comers with PP that require internal drainage, and is associated with rapid recovery, short hospital stay and a recurrence rate comparable to open surgery.

93 THE ROLE OF PANCREATICODUODENECTOMY IN THE TREATMENT OF COMPLEX PANCREATIC TRAUMA

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Objectives/Background. This study evaluated the role of pancreaticoduodenectomy in the management of complex proximal pancreatic injuries.

Patients and Methods. Demographic data, mechanism and extent of injury, associated injuries, complications and outcome were analyzed in 64 patients who had pancreatic injuries between January 2003 and December 2006.

Results. 8 patients (median age 27 years; 4 gunshot, 3 blunt trauma), 1 had pancreaticoduodenectomy for complex duodenopancreatic injury. 2 had IVC and 1 portal vein injuries. Three patients had a pylorus-preserving PD and five patients had a standard Kausch-Whipple resection. The mean ATI was 47 (range 34–76). The median intraoperative blood loss was 1200 (range 200–10000) ml. The median duration of surgery was 5h 25min (range 4h 10min to 6h 50min). One patient died postoperatively of multi-organ failure. Complications included anastomotic leaks due to pancreatic (1) and biliary (1) fistulae, delayed gastric emptying (2). Factors complicating surgery were shock on admission, the number of associated injuries, coagulopathy, hypothermia and gross bowel oedema.

Conclusions. Pancreaticoduodenectomy is a life-saving procedure applicable as a small cohort of patients with complex unreconstructable or devitalized injuries to the pancreas. INN score accurately predicted severity and mortality.

94 PANCREATIC CANCER – OCCURRENCE 9–13 YEARS EARLIER IN ALLERGIC SMOKERS*

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Introduction. An increasing incidence of pancreatic cancer has been observed during the last decades. This may be due to an increase of risk factors such as smoking, that may accelerate onset of pancreatic cancer. An additional risk factor for pancreatic cancer also may be allergies, that have increased during the last decades, too. We provide epidemiological evidence for such an association.
Materials and Methods. Age of onset of patients with histo- or cytologically proven adenocarcinoma of the pancreas was compared with linear regression analysis using the R software; gender, smoking status, and history of allergy. Additional variables included in the model were history of cancer in the family and consumption of alcohol, which was analyzed in men only. Data were obtained from our prospectively developed pancreatic tumor database.

Results. Multivariate analysis taking into account history of an allergy, smoking status, alcohol consumption and history of pancreatic cancer revealed that an allergy was associated with a 3.11 years (SE 1.14, p = 0.0068) earlier onset of pancreatic cancer in 349 male patients (intercept 65.69 years). Smoking contributed to a 2.86 years earlier onset of pancreatic cancer in this group of patients (SE 1.14, p < 0.0000, $R^2$ = 0.15). The same analysis with the exception of alcohol consumption conducted in 202 female patients with pancreatic cancer showed a 3.68 years (SE 1.43, p = 0.0107) earlier onset of pancreatic cancer when an allergy was present and a 9.48 years (SE 1.64, p < 0.0000) earlier onset when patients smoked (intercept 66.46 years, SE 1.15, $R^2$ = 0.18).

Conclusions. Allergy and smoking may be associated with an approximate mean loss of health life time in patients developing pancreatic cancer of approximately 9-13 years, with smoking contributing by 6-9 and allergy by 3-4 years. This quantitative epidemiological evidence further encourages efforts to reduce both adverse factors.

95 PREDICTING INFECTED PANCREATIC NECROSIS WITH THE APPLICATION OF AN ARTIFICIAL NEURAL NETWORK

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Background. Infected pancreatic necrosis (IPN) is associated with high morbidity and mortality and is mandatory for surgical or radiosurgical intervention. Aim. We evaluated the accuracy and discriminating power of an artificial neural network to predict infected pancreatic necrosis.

Patients and Methods. We analyzed data from 291 patients with severe acute pancreatitis in 1996–2005. Predictors used for ANN training were selected by computing the value of statistical and information gain with respect to infected pancreatic necrosis. Presentation data on admission and at 48 hours were collected. Acute Physiology and Chronic Health Evaluation (APACHE) II and Glasgow severity (GS) score were calculated. The configuration of the ANN was chosen by using a software tool. Then the training of the ANN was performed based on data from a training set (n = 200). Testing validation was performed. Statistical analyses were performed by SPSS. ANN accuracy was chosen by using a software tool. Then the training of the ANN was performed based on data from a training set (n = 200). Testing validation was performed. Statistical analyses were performed by SPSS.

Results. ANN accuracy was 83.5%, sensitivity 78.1% and specificity 85.2% in predicting IPN. The areas under the ROC curve follow: ANN, 0.816 (0.776–0.852); APACHE II, 0.575 (0.525–0.620); GS, 0.664 (0.618–0.709). ANN discriminatory power was superior to those of the other predictors (P < 0.05).

Conclusions. An ANN was able to predict development of infected necrotizing pancreatitis with considerable accuracy and outperformed other clinical scoring systems (P < 0.05).

96 LOCALLY ADVANCED PANCREATIC HEAD ADENOCARCINOMA: RESECTION OR PALLIATIVE SURGERY?

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Background/Aims. The only definitive treatment for primitive pancreatic adenocarcinoma is R0 resection, although with grim 5-year survival rate results; surgical treatment of locally advanced tumors (defined by lymphatic vascular invasion and/or portal-mesenteric vascular involvement) is still a matter of debate between aggressive and nihilistic surgeons. The aim of our study was to determine whether locally advanced adenocarcinoma is better treated by DCP or by derivative surgery, considering perioperative morbidity, mortality and long term survival.

Patients and Methods. It was performed a retrospective analysis of pancreatic resections between 1996 and 2006 by revision of clinical-radiological, intraoperative and postoperative (anatomopathologic) data; patients or their relatives were contacted by phone call or through registries of relatives. Principles of the R0 resection were performed according to the R0 criteria.

Results. 93 patients diagnosed with primitive pancreatic cancer underwent surgical exploration: 24 patients were in stage I (resectable), 30 patients were in stage II (locally advanced) and 39 presented with metastatic disease. The Whipple procedure was performed in 18 patients in stage II; the remaining 12 patients with locally advanced tumors underwent derivative surgery. No statistically significant difference was observed between the two groups; the following factors were analyzed: age (resected: 62 ± 12 years, derive 66 ± 8 years, p = 0.43); sex, ASA (p = 0.9), tumor site, tumor size (resected 3.2 ± 1.3 cm, derived 3.2 ± 1 cm; p = 0.54), clinical presentation (pain, jaundice, weight loss, anorexia, diarrhea, palpable mass, hyperglycemia). One patient died postoperatively after DCP; significative difference was observed between the two groups in terms of morbidity (resected 72%, derive 65%), side effects (resected 46%, derive 42%), intensive care unit stay (resected 3.2 days, derive 5.9 days), blood transfusions (resected 5.2 U, derived 1.3 U), relaxometry (resected 22%, derived 0%), postoperative hospital stay (resected 47.3 days, derived 22 days). Mean survival rate of patients who underwent derivation was 9.2 months, while for resected patients was 39 months (p = 0.001, chi square test); survival rate at 2 years (95% confidence intervals) for patients in stage I and II. Invasion of peripancreatic nodes was associated with a mean survival rate of 43 months after resection, while distal nodule involvement (hepatoduodenal ligament and celiac trunk) was associated with a mean survival rate of 12 months after resection. No survival difference was found with portal mesenteric invasion and/or portal-mesenteric vascular involvement. Conclusions. Patients with locally advanced disease who underwent surgical resection presented more complications but better survival in comparison with the patients in the same stage which have been surgically palliated. Resection of locally advanced cancer leads to similar results in terms of survival when compared with resection performed for cancer in earlier stage; nevertheless, postoperative complications are more frequent in the former group. A reasonable aggressive surgical approach extended to locally advanced pancreatic head adenocarcinoma may lead to a considerable increase in long-term survival.

97 PROBIOTICS REDUCE OXIDATIVE STRESS IN THE EARLY PHASE OF ACUTE PANCREATITIS

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Introduction. The underlying factors which determine the severity of acute pancreatitis. Oxidative stress and inflammatory mechanisms play a major role in acinar cell injury and may contribute to the severity of pancreatitis. In the initial stage of acute pancreatitis, interstitial oedema and infiltration of neutrophils contribute to oxidative stress in the pancreas. Prophylactic administration of probiotics has been shown to reduce the severity of experimental acute pancreatitis. However, little is known about the effect of probiotics on pancreatic oxidative stress and the subsequent acinar cell injury.

Aim. The aim of this experiment was to study the effects of prophylactic multispecies probiotics on oxidative stress and acinar cell injury during the early phase of acute pancreatitis.

Methods. 48 Male Sprague-Dawley rats were allocated into four groups: 1) controls (sham operated, no treatment), 2) pancreatitis, no treatment, 3) pancreatitis and probiotics 4) pancreatitis and placebo. Pancreatitis was induced by intraductal glycodeoxycholate infusion (15 mM) and intravenous cerulein (5ug/kg/hr, for 6 hours). Daily probiotics or placebo were administered intragastrically, starting five days prior to induction of pancreatitis. Six hours after the induction of pancreatitis the animals were sacrificed and pancreas samples were collected for analysis of lipid peroxidation, trypan blue staining and histological grading of pancreatic injury. In brief, normal was scored as 0, oedema as 1–3, fat inflammation as 1–3, parenchymal inflammation as 1–2, fat necrosis as 3–7 and parenchymal necrosis as 3–7.

Results. Acute pancreatitis caused an increase in lipid peroxidation in pancreas compared to controls (0.49 ± 0.19 pM MDA/mg tissue; P < 0.001). Probiotics attenuated acute pancreatitis induced increase in lipid peroxidation (0.27 ± placebo 0.52 pM MDA/mg tissue; P < 0.001). In the pancreatitis group, histological scoring revealed extended areas of complete structural damage by necrosis and a significant increase in pancreatic damage compared to sham operated rats (4 (3–7.25) vs. 0 (0–0); P = 0.001). The severity of pancreatic injury was abolished in animals pre-treated with probiotics (1.5 (0.88–3.25) vs. placebo 5.5 (3–6.1); P = 0.014). The most detrimental effects of probiotics were observed in the histopathological scoring for necrosis and oedema (0 (0–0) vs. placebo 1 (0–4.25); P < 0.01 and 1 (0.5–1.1) vs. placebo 1.5 (1.3–2); P < 0.05, respectively). Furthermore, water content of the pancreas was significantly reduced in probiotic treated animals (78.88 vs. 82.95% water; P = 0.05).

Conclusion. Modulation of the intestinal microflora by multispecies probiotics reduced the severity of experimental severe acute pancreatitis. This was demonstrated by a reduction of acute pancreatitis induced oxidative stress, acinar cell injury and interstitial oedema.

98 EFFECTS OF THALIDOMIDE IN A MOUSE MODEL OF CERULEIN-INDUCED ACUTE PANCREATITIS

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Introduction. Current knowledge shows that pathophysiology of acute pancreatitis is characterized by intra-acinar enzyme activation and subsequent downstream mediators of the immune response. Interactions between leukocytes, soluble mediators and vascular endothelium contribute to the systemic progression of the inflammatory response and, thus, to disease severity. Immunomodulatory and anti-cytokine agents have been shown to significantly ameliorate the course of experimental pancreatitis; but the effects of thalidomide, a TNF-alpha inhibitor and anti-angiogenic drug, have never been studied.

Objectives. The aim of the present study was to assess the effects of thalidomide in a murine model of acute pancreatitis induced by the secretagogue cerulein.

Methods. Acute pancreatitis was induced by injection of cerulein (hourly × 5, 50 microg/kg) in mice (n = 20). Thalidomide was administrated (200 mg/kg orally) at 1 hour after first cerulein injection; control groups received vehicle treatment. Mice were sacrificed by exsanguination at 24 hours after the induction of inflammation. We analyzed histological and biochemical features of pancreatitis, expression of proinflammatory cytokines, VEGF and adhesion molecules, neutrophil infiltration (myeloperoxidase activity) and pancreas apoptosis.

Results. Rats were autopsied by counting the mice with thalidomide significantly reduced histologic degree of pancreas injury, pancreas edema (p < 0.01), amylase and lipase plasma levels (p < 0.01), intra-pancreatic and plasma levels of TNF-alpha and IL-1 (p < 0.01), immunostaining for selectin and ICAM-1 (p < 0.01), immunostaining for nitrotyrosine and tissue malondialdheide levels were significantly reduced (p < 0.01), neutrophil accumulation (p < 0.01), intra-pancreatic and plasma levels of TNF-alpha and IL-1 (p < 0.01), immunostaining for TGF-beta and VEGF (p < 0.01), the degree of pancreas apoptosis (assessed by TUNEL) and immunostaining for FasL and Bax (p < 0.01), immunostaining for nitrotyrosine and tissue malondialdheide levels were significantly reduced (p < 0.01), immunostaining for TGF-beta and VEGF (p < 0.01), the degree of pancreas apoptosis (assessed by TUNEL) and immunostaining for FasL and Bax (p < 0.01).

Conclusions. Our results provide the first evidence that thalidomide reduces the development of cerulein-induced acute pancreatitis in mice. We propose that blocking protein-kinases activity may be a novel approach for the therapy of this inflammatory condition.

Methods. In the clinical evaluation 244 pancreatic cancer patients were included. Additionally, 50 sections of normal liver from these patients have been stained for CD45 and CD68. Subsequently, the whole tissue sections were analyzed by counting the CD45 and CD68 positive cells in the liver, which correlated negatively with the nutritional status (albumin) of the patients and positively with the inflammatory status (C-reactive protein) of the patients.

Conclusions. Our results suggest that the clinical development of cachexia is not primarily dependent on the tumor size/loard, but rather dependent on the systemic effects of the tumor. This is underlined by the finding that already normal liver tissue of patients with tumor-associated cachexia is infiltrated by immunomodulatory cells, which directly affects the clinical condition of the patient.

REFINING THE ROLE OF LAPAROSCOPIC ULTRASOUND FOR THE STAGING OF PANCREATIC MALIGNANCIES

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Introduction. Given the poor outlook of patients with pancreatic cancer, there is a need for early and accurate staging of the disease: laparoscopic ultrasound (LUS) was employed in this prospective study to evaluate the feasibility of LUS in the staging of pancreatic malignancies.

Methods. Two consecutive studies were performed: in the first, all consecutive patients with pancreatic cancer were submitted to LUS. In the second study, only the patients with high probability to be resectable were included. In all patients, LUS (primary tumor and regional lymph nodes) and CT scan were performed. All available clinical and/or laboratory findings (including medical history, PS, SN, TNM clinical stage, LUS, and CT findings, ascites, or clinical or laboratory findings suggesting advanced disease such as marked weight loss, hypoaalbuminemia, and elevated CA 19-9) were included in the staging.

Conclusions. LUS seems to represent a useful examination for staging pancreatic malignancies prior to surgical resection only in selected patients with high probability to have a irresectable disease.
102 POSTOPERATIVE Pancreatic FISTULAS: RESULTS OF A RETROSPECTIVE STUDY WITH FISTULOGRAPHY AND CLINICAL CORRELATION

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Aim. To describe the radiological features of post-operative pancreatic fistula (FP) and correlation with clinical impact. Methods. A retrospective study was performed on 102 cases of surgical pancreatic fistula. Fistulograms were performed using the international study group (ISGPF) protocol as grade A, B and C. Results. Fistulograms were performed only on patients with important clinical impact of FP (Grade B and C) or with suspicion of drain migration into an intestinal loop. We correlated the results of fistulography (incidence and site of FP, occurrence of fluid collection, communication with main pancreatic duct, biliary tree and jejunal loop and presence of drain into the jejunal loop or stomach) with the clinical suspicion of FP. Results. Forty-two out of 56 Patients (75%) had PF confirmed by fistulogram. We visualized 29 communications with the jejunal loop, 8 with the jejunal loop or the biliary tree, 12 with the main pancreatic duct and 9 with the stomach. In 14 Patients (25%) the drain was abnormally placed inside the jejunal loop or stomach: in all these cases, once the drain was mobilized, the complication resolved within 12 hours. Conclusions. Fistulogram helps in the confirmation of clinical suspected of PF decreasing post-operative morbidity and re-operation rate. Fistulogram is determinant in distinguishing cases of gastro-intestinal fistula due to the migration of the drain into an intestinal loop.

103 POSITIVE NODES NUMBER AND ECHelon ARE BETTER OUTCOME FOR PancreATIC DuctAL CaNCER THAN NODE STATUS

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Aim. To evaluate the impact of positive nodes number and their distribution on survival of pancreatic head ductal cancers after resection with extended lymphadenectomy. Patients and Methods. From 1/1995 to 12/2004, 80 patients were consecutively resected for ductal pancreatic head cancer. They underwent a lymph node dissection extended to hepatic pedicle, celiac trunk, SMA (anterior and right lateral aspect) and para-aortic nodes from celiac trunk to IMA. Positive nodes were classified as first echelon if peripancreatic or second echelon if beyond peripancreatic node groups. After exclusion of operable with tumor invasion (T3 and T4) and deaths for other causes (2), we analysed univariate and multivariate analysis the impact on overall survival of the following prognostic factors: sex, age >65 years, Ca19-9 >200, operation type (CP vs total pancreatectomy), vein resection, postoperative morbidity, biloma and drain. Results. N status, N echelon (0 vs first vs second echelon), positive N number (0 vs 1–3 vs >3), R status, perineural invasion, neurotic emboli, adjuvant chemotherapy. Conclusion. Overall median survival was 16 months. Ten patients are alive and disease-free with a median follow-up of 43 months. N status was 0 in 17 cases. Among 56 N+ cases, nodes echelon was peripancreatic in 25 and beyond peripancreatic in 31. Ca19-9 >200, diameter >2 cm, N echelon, positive N number, R status and adjuvant chemotherapy significantly predicted to univariate analysis. The all variables but Ca19-9 retained their significance to multivariate analysis. The survival of patients with first echelon positive nodes was not inferior to N0 cases. Median survivals for patients with first and second echelon positive nodes were 22 and 14 months, respectively (p <0.05). Conclusion. Along with tumor diameter, R status and adjuvant chemotheraphy, type of nodal involvement was a significant prognostic factor to multivariate analysis. Both nodes echelon and positive nodes number were better predictors of outcome than node status.

104 CHEMORADIATION AND CURATIVE RESECTION FOR PanCREATIC ADENOCARCINOMA REFERRED AFTER PRIOR PALLIATIVE SURGERY

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Background. Resectability criteria of locally advanced pancreatic head cancer varies widely among surgical departments. In clinical practice, the final decision for curative surgery is made by the surgeon. In such cases, the enrolment for chemoradiation after radiological reassessment of local disease spread, could permit a chance of curative resection to patients deemed unresectable during a previous operation. Patients and Methods. Since 1999 all the patients consecutively observed with diagnosis of locally advanced pancreatic cancer were enrolled in institutional protocols of primary chemoradiation. All patients had biopsy positive nodes, were staged CT and classified on the basis of precise determination of the pattern of vascular involvement. Among them, three patients were referred after a prior palliative operation during which the tumor had been deemed unresectable. Results. Previous palliative surgery consisted in a double biliary and gastric bypass in 2 cases and a gastric bypass in the remaining. Tumors were classified as borderline resectable locally advanced head cancers, because of vein stenosis in 2 and SMA impingement in the last one. Maximum tumor diameter was superior to 4 cm and Ca19-9 was superior to 500 in all. One patient had back disease progression from CT. They underwent chemoradiation consisting in 380Gy EBRT and 50Gy oxaliplatin in 2 cases. All showed absence of disease progression at restaging and were scheduled for surgery. A duodenopancreatectomy was performed in 2 patients. Previously constructed Roux limbs were re-used in 2 cases. There were 2 complications: a case of DGE and an hemopterion due to re-operation. Conclusions. Intraoperative assessment of resectability is unreliable. Patient with locally advanced cancer should be properly staged and included in a multidisciplinary treatment protocol. Prior palliative surgery does not preclude the feasibility of chemoradiotherapy and the chance of long term survival after a curative resection.

105 MANAGEMENT OF DELAYED ARTERIAL HAEMORRHAGE AFTER PancreaticoduodenECTOMY

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Background. Controversy exists regarding the best management of delayed haemorrhage after pancreaticoduodenectomy. The current manuscript analysed the published literature describing this complication to examine the role of diagnostic and intervention radiology and laparotomy in the management of this serious condition. Methods. A literature search of all reported cases of delayed haemorrhage after pancreaticoduodenectomy was performed. For meta-analysis, the end points evaluated were of operative and functional outcomes and adverse events. A random-effect model for analysis and sensitivity analysis was used to examine the bias in patient selection. Results. One hundred and forty delayed arterial haemorrhage have been described in the literature following 2503 pancreaticoduodenectomies (PF) after pancreaticoduodenectomy (PD) and their correlation with the occurrence of PF (Grade B and C) or with suspect of drain migration into an intestinal loop. PF was clinically defined according to the international study group (ISGPF) and were scheduled for surgery. Out of a total of 380 PDs performed from 2001 to 2005, 56 fistulogram were found. PF decreasing post-operative morbidity and re-operation rate. Fistulogram is determinant in distinguishing cases of gastro-intestinal fistula due to the migration of the drain into an intestinal loop.

106 LIMITED PanCREATIC RESECTION FOR BENIGN OR BORDER-LINE LESIONS OF THE PanCREAS

Cosimo Sperti¹, Claudio Pasquali, Laura Frison, Mattia Berselli, Tania D’Amico, Sergio Pedrazzoli, Marco Nardoni, Claudio Bassi, Sergio Sperti¹, Claudio Pasquali, Laura Frison, Mattia Berselli, Tania D’Amico, Sergio Pedrazzoli, Marco Nardoni, Claudio Bassi
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Pancreatic lesions located in the head or the body of the gland are usually removed by pancreaticoduodenectomy or distal pancreatectomy; however, these procedures can be associated with impaired pancreatic function or post-splenectomy infections. To avoid an extensive pancreatic resection, more limited pancreatectomy, such as central pancreatectomy (CP) and duodenum-preserving pancreatic head resection (DPPHR) have been proposed as organ-sparing procedures to decrease postoperative functional problems. We report our further experience with these techniques, with particular attention to perioperative outcome.

Methods. From November 1985 to December 2005, 54 patients underwent segmental pancreatectomy: 30 patients had CP and 24 had DPPHR. There were 19 males and 35 females, with mean age of 50.2 years (range 13–74 years). The final pathologic diagnosis were: 13 serous cystadenomas, 9 insulinomas, 9 non-functioning endocrine tumors, 7 intraductal papillary mucinous neoplasms, 7 chronic pancreatitis, 4 mucinous cystadenomas, 2 metastatic renal cell carcinomas, 1 papillary-cystic tumor, 1 biliary cyst and 1 solitary true cyst.
Results. There were no operative death. Postoperative course was complicated in 27 patients (50%); 16 patients showed a pancreatic fistula (30%), 5 bile leak (9%), 2 abscess (4%), 2 peritoneal bleeding (1 reoperation), 1 digestive bleeding, and 1 pneumonia. Morbidity accounted for 15/30 (50%) patients who underwent CP; pancreatic leak was the most frequent complication (n = 13; 43%). Complications occurred also in 12/24 (50%) patients who had DPPHR: biliary leakage was present in 5 patients (21%). At a median follow-up of 48 months (range 14-168) only one patient showed recurrence of the tumor (renal cell metastases); 6 patients (11%) had impaired glucose metabolism and 10 patients (18%) required pancreatic enzyme supplementation.

Complete surgical pancreatic resection may preserve endocrine and exocrine function in a significant proportion of patients. While operative mortality is absent, this type of surgery is associated with a high complication rate, even in experienced hands. So, caution is necessary when using these procedures, accurate selection of the patients being essential.

107 THE MANAGEMENT OF RECURRENT PANCREATIC AND PERIAMPULLARY CANCER
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Complete resection of primary tumor is the treatment of choice for patients with pancreatic or periampullary malignancies. Unfortunately, most of the patients develop tumor’s recurrence within 2 years of surgery, and recurrent cases are typically treated by chemotherapy. Little is known about the effect of treatment of patients with recurrent carcinoma in the periampullary region. The purpose of this study was to evaluate the effect of treatment on patients with recurrent pancreatic or periampullary cancer who had previously been treated with curative intent.

Methods. From January 1998 to December 2005, 82 patients who underwent resection for pancreatic (n = 65) or periampullary cancer (n = 17) were prospectively investigated with intensive follow-up including tumor markers (CEA and CA 19–9), abdominal ultrasound and/or helical computer tomography, chest X-ray, every 3 months for the first 2 years, and then every six months. Whole-body PET scan was performed also in 74 patients. Median follow-up time was 24 months (range 14-96 months). Validation of diagnosis was made by surgery, percutaneous biopsy, or follow-up.

Results. A total of 66 patients showed tumor’s recurrence: 56 with pancreatic cancer and 10 with periampullary cancer. Eighteen patients underwent surgery, 8 had radical resection of tumor’s recurrence, 3 palliative resection, and 7 had bypass operation. The median survival time after recurrence in this group was 11.5 months; 16.5 months after resection and 4 months after palliative surgery. Thirty-four patients underwent chemotherapy and/or radiotherapy with a median survival time of 9.0 months, while 14 patients had only supportive therapy with a median survival time of 2.5 months.

Conclusions. Radical resection of recurrent tumor may be achievable in selected patients who had undergone pancreatectomy for pancreatic or periampullary carcinoma. Prolonged survival is possible in this subset of patients comparing to those receiving chemotherapy or supportive care alone. Intensive and accurate follow-up is warranted for these patients in order to improve the management of recurrent disease.

108 JAUNDICE IS RELATED TO DECREASED CIRCULATING IMMUNE CELLS AMOUNT IN PANCREATIC ADENOCARCINOMA PATIENTS
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Introduction. Literature reports that, in cancer patients, jaundice is related to an impaired immune function, consisting in lowered levels of circulating lymphocytic cytokines. Our study was aimed to evaluate the relationship between elevated bilirubin levels and immune system circulating cells in pancreatic cancer patients.

Methods. Between September 2002 and September 2006, 49 pancreatic adenocarcinoma patients were classified in group A with bilirubinemia >5mg/dL and group B with bilirubinemia <5mg/dL. For each group the amount of total lymphocytes, T (CD3+), CD4+ and CD8+ lymphocytes and Natural Killer (NK) cells was determined. Immune deficiency consisted in total lymphocytes <1500/mmc, CD3+ <900/mmc, CD4+ <500/mmc, CD8+ <400/mmc, NK <200/mmc.

Results. In group A all the considered parameters were lower than in group B, although statistical significance was achieved only for total lymphocytes (1,376 ± 602 vs 1,843 ± 585/mmc; p = 0.0096) and T lymphocytes (1,010 ± 508 vs 1,326 ± 531/mmc; p = 0.0587). Our data show a strong relationship between hyperbilirubinemia and decreased count of total lymphocytes (OR 4.43; IC 95% 2.91 - 5.95; p = 0.0145), CD3+ (OR 6.35; IC 95% 4.11 – 8.59; p = 0.0169), CD4+ (OR 13.1; IC 95% 6.55 - 20.17; p = 0.0046) and NK (OR 3.69; IC 95% 2.34 – 5.04; p = 0.0359).

Conclusion. Our data showed that jaundice is strongly related to decreased levels of immune cells within the bloodstream in pancreatic adenocarcinoma patients. This may justify a preoperative immunotherapy in order to improve the immune function.

110 LIMITED PANCREATIC RESECTIONS FOR NON-INVASIVE INTRADUCTAL PAPILLARY AND MUCINOUS NEOPLASMS (IPMN) OF THE PANCREAS
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Aims of the Study. In case of non-invasive IPMN limited to a branch-duct (BD) or to the mid-pancreas, a pancreaticoduodenectomy (PD) or a distal pancreatectomy (DP) can be considered as excessive due to its functional disorders. An enucleation (E) or a medial pancreatectomy (MP), preserving more parenchyma, could be an alternative. The aim of this study was to study the results of E and MP in non-invasive IPMN.

Patients and Methods. Of 179 patients operated on for IPMN from 1997 to 2006, 34 (19%) had an attempt to E (n = 20) or MP (n = 14), indicated for invasion of MPN involving branch duct (BD) (n = 9) or involving BD with mural nodules (n = 2), or suspicion of mucinous cystadenoma (n = 2). Lesions treated by E were localized in the uncinate process (n = 10), head (n = 5), neck (n = 2), and distal pancreas (n = 5). E followed by a definitive frozen section (E/D). MP was followed by a definitive frozen section (MP/D).

Results. Of 20 attempts to E, 3 were immediately converted into PD due to marked inflammation (n = 2) or result of FS (n = 1). During the 17 E, the communicating duct (CD) could be analyzed by FS in 13 cases. At definitive evaluation (accuracy of FS = 100%), the CD was involved by low-grade (mild or moderate) dysplasia (LGD) (n = 16) or high-grade dysplasia (HGD) (n = 1); the CD was normal (n = 6) or involved by LGD. Of 14 attempts to PM, 7 (50%) were followed by 1 to 2 additional segmental resection due to result of FS (involvement of MD, and/or involvement of BD = borderline IPMN); results of the second FS was normal in 3 cases and “abnormal” in 4 (leading to immediate conversion to 2 PD and 1 DP, whereas one patient had 1 contra-indication for PD). Overall, of the 35 pancreatic cut surfaces analyzed by FS, definitive pathological examination confirmed results of FS in 34/35(97%). Specimens of the 11 MP included LGD in 9 and HGD in 2.

There was no postoperative death. Mean length of stay was 21 days after E and 38 days after MP. Pancreatic fistula occurred after 53% of E and 82% of MP, and healed under medical treatment associated with percutaneous drainage (n = 3), pancreatic endoprosthesi (n = 2), transarterial embolization (n = 1), and reoperation (n = 1). During follow-up (median length for E and PM = 20 and 37 months, respectively), all patients are alive without any clinical recurrence, de novo disease recurrence, de novo tumor recurrence and de novo recurrence needing enzyme therapy occurred in one patient each (both after MP). Postoperative imaging (MRI ± CT ± endoscopic ultrasound; n = 23 patients) demonstrated that only 2 patients developed another BD localization after E. Cytoscaproscopy. This study demonstrates that limited pancreatic resections can be performed for non invasive IPMN limited to a BD or to the mid-portion of the pancreas. Their immediate morbidity seems counterbalanced by infrequent postoperative functional disorders and low rate of medium-term and long-term recurrence. If these results are confirmed by a longer follow-up, this approach will increase acceptance of surgery in patients with non-invasive IPMN.

111 PATTERNS OF FAILURE FOLLOWING CURATIVE RESECTION OF PANCREATIC ADENOCARCINOMA
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Introduction. Surgical resection is the only potentially curative treatment of pancreatic cancer. Diffuse metastatic disease is responsible for death from pancreatic cancer. However, data are lacking with regard to patterns of failure and risk factors determining where and when recurrences arise after curative (R0) resection.

Methods. From January 1998 until December 2005, 152 consecutive patients (M:F, 79:73; median age 66 years (32–85 y) with ductal adenocarcinoma of the pancreas underwent surgical resection with curative intent. Patient data were analysed retrospectively. Patterns (n = 12) were identified for each recurrence. In case of non-invasive IPMN limited to a branch-duct (BD) or to the mid-pancreas, a pancreaticoduodenectomy (PD) or a distal pancreatectomy (DP) can be considered as excessive due to its functional disorders. An enucleation (E) or a medial pancreatectomy (MP), preserving more parenchyma, could be an alternative. The aim of this study was to study the results of E and MP in non-invasive IPMN.
111 MILD ACUTE BILIARY PANCREATITIS: VALIDITY OF THE MAGNETIC RESONANCE CHOLANGIO-PANCREATOGRAPIH (MRCP) BEFORE THE VIDEO-EPARACHESTECTOMY (VLC)

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Introduction. The therapeutic ERCP before the VLC in the patients with moderate-severe acute biliary pancreatitis (ABP) is a well recognized practice; the necessity of ERCP in the patients with mild acute biliary pancreatitis is not well defined.

Objectives. Aim of the study: to evaluate the usefulness of the MRCP before the VLC in patients with mild ABP.

Methods. A prospective study performed from 2003-2006, twenty-five patients were submitted to a MRCP (15 females, 10 males, mean age 62 years, range 32–75) with mild ABP (Glasgow’s criteria) without increase of the cholestasis tests (direct bilirubin, alkaline phosphatase, gamma-GT) and absence of choleodocholithiasis at ultrasonography. During a follow-up period of 15–60 days after the VLC, the presence of jaundice or relapse of ABP were evaluated in all patients by means of clinical/laboratorial/instrumental examinations.

Results. Six patients had choleodocholithiasis (stones/sand/slugde) at the MRCP and they were submitted to an ERCP, stones removal and after to the VLC; 19 patients with a negative MRCP were submitted to the VLC. All the 25 patients did not have jaundice or relapse of the ABP during the follow-up period.

Conclusions. The MRCP was an accurate investigation for the preoperative diagnosis of choleodocholithiasis; so, it is an important procedure for patients with mild ABP, avoiding the ERCP.

112 EARLY RESULTS OF A RANDOMISED TRIAL OF A SHORT COURSE OF POSTOPERATIVE ANTIBIOTIC THERAPY IN LOW-RISK ACUTE CHOLECYSTITIS

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Short courses of antibiotics have been suggested for resectable surgical infections. Early surgical operation is the treatment of choice for acute cholecystitis. Adjuvant antibiotic treatment is always given, but the optimal choice, timing and duration of antibiotics in operated cholecystitis remain unclear.

Aim. To compare the early postoperative results in terms of surgical site infection (SSI), other morbidity and hospital stay between two groups of patients operated for acute cholecystitis with different length of antibiotic therapy.

Methods. Multicenter prospective randomised clinical trial comparing a short course of antibiotic treatment (SC: preoperative treatment with Piperacillin-tazobactam until 24 hours of operation) with a long course (LC: same treatment prolonged for 5 days after surgery) for acute cholecystitis treated by early cholecystectomy. Inclusion criteria were: acute cholecystitis confirmed by ultrasonography, admitted <2 days after the onset of symptoms, and operated <4 days of admission. Exclusion criteria were: subhepatic abscess, biliary peritonitis, suspicion of cholangitis, and/or normal activities by day 14. The hospital readmission rate after discharge was 2%.

Conclusion. Our results compare favourably with the literature to date and demonstrate this is a safe, acceptable and effective procedure even in a day surgery unit which is inexperienced in laparoscopic surgery.

*We would happily present this as a poster if not acceptable for oral presentation.

113 EMERGENCY LAPAROSCOPIC CHOLECYSTECTOMY FOR ACUTE CHOLECYSTITIS: THE DELAY BEYOND 72 HOURS DOES NOT INCREASE OPERATIVE DIFFICULTY OR RISK

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Background. There is reluctance to perform emergency laparoscopic cholecystectomy (LC) in patients with acute cholecystitis (AC) if surgery is delayed beyond 72 hours in fear of increased operative difficulty, morbidity and conversion to open surgery.

Methods. We adopted a policy of offering an emergency LC to patients with AC regardless of the delay incurred while awaiting access to the operating theatre. The outcomes of surgery in patients operated on within 72 hours of admission (Group I) were compared with those who underwent delayed emergency LC (Group II).

Results. Between 2001 and 2006, 75 patients underwent emergency LC for AC (Group I, n = 22; Group II, n = 53). There was no difference between the groups with regard to age, sex distribution, ASA score and frequency of life-threatening complications. The delay in performing emergency LC for AC beyond 72 hours does not increase operative difficulty or risk of operative morbidity. Patients with AC should not be denied an emergency LC if access to theatre was delayed.

114 DAY-CASE LAPAROSCOPIC CHOLECYSTECTOMY – RESULTS OF A NEW SERVICE IN A LARGE UK TEACHING HOSPITAL

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Introduction and Aim. Our aim was to set up a laparoscopic cholecystectomy service in a large teaching hospital. The day case unit had never undertaken a laparoscopic procedure up to commencing this project. Between May 2004 and April 2005 inpatient cases were performed in the day case unit to enable theatre staff to develop the skills needed for laparoscopic cholecystectomy. True day case procedures began in May 2005.

Methods. From May 2005 a prospective audit has been undertaken for all cases. Patients who have had an inpatient episode of gallstone pancreatitis or acute cholecystitis were not deemed suitable for a day case operation. Following discharge all patients are contacted by telephone on day two, five and fourteen to monitor their recovery. Data collected is entered into a database.

Results. 54 patients to date have attended with the intention of having a day case laparoscopic cholecystectomy. All operations have been completed laparoscopically, with 91% of patients successfully discharged on the day of surgery. Telephone phonebacks indicated that 91% of patients were “extremely satisfied” with the experience, and 82% had returned to work and/or normal activities by day 14. The hospital readmission rate after discharge was 2%.

Conclusion. Our results compare favourably with the literature to date and demonstrate this is a safe, acceptable and effective procedure even in a day surgery unit which is inexperienced in laparoscopic surgery.

*We would happily present this as a poster if not acceptable for oral presentation.

115 QUALITY OF LIFE INBILE DUCT INJURY PATIENTS IS NOT EXPLAINED BY FACTORS RELATED TO THE BILIARY INJURY BUT BY SOCIO DEMOGRAPHIC AND PSYCHOSOCIAL CHARACTERISTICS OF THE PATIENT

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The socio-economic impact of bile duct injury (BDI) is illustrated by increased costs, high rates of litigation claims and long-term impaired quality of life (QoL) in BDI patients. Previous research on QoL in BDI patients showed the detrimental effect of BDI on QOL outcome. However, the outcome was not influenced by injury related factors as the type of injury or the duration of treatment. Because of this remarkable finding, the aim of the present study is to determine the extent to which injury related factors, socio-demographic and psychosocial factors explain QoL in BDI patients.
Between 1990 and March 2005, 462 patients were referred to Amsterdam Medical Centre for the treatment of BDI. Four-hundred-and-three BDI were considered as eligible participants in this study of whom 65% (n=261) returned a completed questionnaire. Medical charts from responding patients were analyzed for clinical data and socio-demographic variables. QoL was surveyed by the SF-36 and Gastrointestinal Quality of Life index. Surveyed psychosocial variables were the preceeding operation of choice is duodenopancreatectomy. Although, reliable factors for predicting success would be extremely useful, they are unreported.

**Aim.** To analyze the short and long term outcome of endoscopic stent therapy after BDI, to identify factors predicting successful outcome of stent therapy for bile duct strictures, and to determine the effect of sequential insertion of multiple stents for strictures.

**Methods.** A prospective database two groups of patients were compared: patients with bile duct leakage (n = 93) and patients with a bile duct stricture (n = 110).

**Results.** Minor stent related complications occurred in 12 patients (13%) with bile duct leakage. Median duration of stenting was 1.5 months (range 1–11). One patient was referred for surgery, 3 patients (3%) developed a stenosis after stricture free interval, and one patient died due to a BDI related cause. Success rate was 96% (n = 110). In patients with a bile duct stricture minor stent related complications occurred in 33% (n = 56). The median duration of stenting was 11 months (range 1–69) with a median number of stents of 2 (1–7). Subsequent surgery was indicated in 22 patients (20%), 6 patients (6%) developed a stenosis after stent removal, and two patients (2%) died due to a BDI related cause. After a mean duration of follow-up of 4.5 years liver function tests did not show signs of occult bile duct strictures. The overall success rate was 74% (n = 81). In patients treated for a stricture the independent predictor for success was the number of stents inserted (p = 0.03). The OR was 2.9 (95% confidence interval [CI] = 1.1–8.2, p = 0.04). Independent predictors for failure were injuries classified as Bismuth III (OR = 0.12, CI = 0.02–0.91, p = 0.04) and IV (OR = 0.04 CI = 0.03–0.55, p = 0.02), and endoscopic stenting (OR = 0.23, CI = 0.06–0.87, p = 0.03). After the introduction of multiple stent therapy at the end of 2001, the overall success did not improve (before 77% vs. after 66%, p = 0.25), while more patients reported stent related pain (before 11% vs. after 28%, p = 0.02).

**Conclusion.** Stent therapy is associated with an excellent outcome in patients treated for postoperative bile duct leakage and good outcome after strictures. The benefit of sequential insertion of multiple stents for stricture minor stent related complications occurred in 33% (n = 56). The median duration of stenting was 11 months (range 1–69) with a median number of stents of 2 (1–7). Subsequent surgery was indicated in 22 patients (20%), 6 patients (6%) developed a stenosis after stent removal, and two patients (2%) died due to a BDI related cause. After a mean duration of follow-up of 4.5 years liver function tests did not show signs of occult bile duct strictures. The overall success rate was 74% (n = 81). In patients treated for a stricture the independent predictor for success was the number of stents inserted (p = 0.03). The OR was 2.9 (95% confidence interval [CI] = 1.1–8.2, p = 0.04). Independent predictors for failure were injuries classified as Bismuth III (OR = 0.12, CI = 0.02–0.91, p = 0.04) and IV (OR = 0.04 CI = 0.03–0.55, p = 0.02), and endoscopic stenting (OR = 0.23, CI = 0.06–0.87, p = 0.03). After the introduction of multiple stent therapy at the end of 2001, the overall success did not improve (before 77% vs. after 66%, p = 0.25), while more patients reported stent related pain (before 11% vs. after 28%, p = 0.02).
with malignancy remained true positive and 70% of false positive Ca19/9 levels turned in a true positive level. 

120 THE SIMULTANEOUS LAPARO-ENDOSCOPIC RENDEZ VOUS IN 30 CONSECUTIVE CASES: AN EFFECTIVE AND SAFE OPTION

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Background and Aims. The management of patients affected by gallstones and common bile duct stones is still a challenge as there are different surgical approaches. An alternating approach or totally laparoscopic treatments consists of the simultaneous laparo-endoscopic “Rendez-Vous” (RV) procedure which combines laparoscopic cholecystectomy, intra-operative cholangiography and endoscopic common bile duct clearance.

Method. The authors report their experience with the “Rendez-vous” in a group of 80 consecutive patients. We point out that in fact our definition the “Rendez-vous” consist of combined laparoscopic-endoscopic simultaneous approach involving the endoscopist and surgeon in the operating room during the unique anesthesia to clear common bile duct stones or solve associated problems related to sludge or other problems at the papilla of Vater. Our definition of RV is somewhat different as other consider a RV only when the surgeon pass the guide wire through the cystic duct to help the endoscopist All the records of the treated patients were analyzed concerning main clinical data the relevant technical features and the results concerning the overall effectiveness and safety.

Results. The diagnosis of common bile duct stones was certain preoperatively in 47 patients (36.7%), in 33 patients (41.2%) the diagnosis of stones in the common bile duct was not given preoperatively. The RV procedure was feasible in 78 patients 97.5%, The effectiveness of the procedure was 100% concerning the clearance of CBD stones, sludge, and/or resolution of problems at the papilla. Minor morbidity affected 3.3% of the patients. The whole operating time was prolonged by a mean of 14 minutes. The mean hospital stay was 3.8 days. Only one patient (1.2%) referred a recurrence of a stone.

Conclusions. This experience shows that this simultaneous laparo-endoscopic approach for the treatment of cholecytost- cholecodolithiasis is related to a very high effectiveness that seems to be better than those reported in the literature for the other available treatment’s options. This high effectiveness and the related low morbidity and the data form the literature suggests that the procedure is also extremely safe and therefore, if the mandatory collaboration between surgeons and endoscopists is guaranteed, it can be an useful option for the patient, the surgeon, the endoscopist and the hospital.

121 REAPPRAISAL OF DIAGNOSTIC LAPAROSCOPY FOR PERIAMPULLARY TUMOURS

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Background. A significant number of patients, scheduled for explorative laparotomy (EL) for a suspected periampullary malignancy, undergo a palliative bypass procedure due to distant metastases (liver, peritoneal) and/or locoregional ingrowth. Controversy still exists on the additional value of the diagnostic laparoscopy (DL) as an upstaging modality to preclude a noncurative EL. Routine DL was eliminated in 1998 from the diagnostic protocol without routine use of DL. Further studies might be necessary in a subgroup of patients in which a DL can prevent an unnecessary exploration.

122 THE OUTCOME OF SURGICAL MANAGEMENT OF PERIAMPULLARY TUMOURS

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Background and Aims. Surgery remains the curative option for treatment of periampullary tumours. The result of surgery in this group of patients was examined to assess the outcome and survival in our unit.

Methods. A retrospective review of patients with periampullary tumours undergoing either resection or palliative bypass.

Results. A total of 140 patients were identified between January 1995 and September 2004 who had surgery for preoperative diagnosis of periampullary tumours consisting of curative resection (n = 112) and palliative bypass (n = 28). The overall median survival was 0 in period I and 12 months in period II. Thirty-eight percent died within the week of resection respectively. The overall 5-year actuarial and disease-free survival after resection were 9.8 and 14.2% for palliative procedure and curative resection respectively. In patients with pancreatic adenocarcinoma, an advance age and higher CEA levels turned in a true positive level. In patients who had periampullary tumours of non- pancreatic origin, postoperative sequelae (p = 0.008) and the presence of four or more lymph nodes were found to be associated with worse survival (p = 0.009), whereas a poor tumour differentiation was found to be significantly related to shorter disease-free survival (p = 0.03).

Conclusions. Patients who had non pancreatic periampullary tumours had a better outcome than those with pancreatic periampullary tumour. Factors influencing survival and recurrence included stage of disease, number of lymph nodes, postoperative sequelae, and tumour grading.

123 LAPAROSCOPIC CHOLECYSTECTOMY (LC) AND COMMON BILE DUCT EXPLORATION (CBD) IN PATIENTS WITH A PREVIOUS GASTRIC RESECTION

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Background. An increased incidence of cholelithiasis is reported after truncal vagotomy and gastric resection. Adhesions from previous gastric surgery may hinder direct cholecystectomy to laparoscopic surgery. Aim was to evaluate the feasibility and long-term results after LC and CBD in patients with a previous gastric resection.

Methods. From April 1991 to February 2007, CBD stones were present in 1395 patients (10.5%) (1395 patients (10.5%) (1395 patients (10.5%). Thirty-three patients had a previous gastric resection (18%) and 24 patients (15%) had other types of gastroresection.

Results. Group 1 Group 2
Patients 344 192
Preoperative failed ES 44 (13.5%) 1 (5.3%) <0.05
Conversions 14 (4.3%) 1 (5.3%) n.s.
Complicated laparoscopy 330 (95.9%) 18 (94.1%) n.s.
Transcystic/Chol.tomy 199/131 51/3 <0.05
Morbidity 9 (2.7%) 3 (16.7%) <0.001

Abstracts
STONES IN PATIENTS WITH GALLSTONE DISEASE

Clinical Model to Predict Common Bile Duct Stones

Restricted for large bile duct stones that cannot be extracted through the cystic duct. Preoperative ERCP with attempt to stone clearance was performed in 24 patients. Twenty-three patients were aged 80 years or older with severe co-morbidity. Laparoscopic CBD was attempted for CBDs in the presence of acute cholecystitis in 24 patients. LCDE was performed via trans-cholecystic approach in 83 and via choledochotomy in 30 patients. Flexible cholecystoendoscopy was used in 79 and IOC-guidance in 34 patients.

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Introduction. Laparoscopic common bile duct exploration (LCDE) is as safe and efficient as trans-operative cholangiopancreatography (ERCP) in achieving bile duct clearance from stones. No clear guidelines are available on LCDE with respect to indications for trans-cystic approach vs. choledochotomy and whether to use flexible cholecystoendoscopy (FCD) or intraductal cholangiography (IOC)-guidance.

Methods. From January 2001 until November 2006, 113 consecutive patients with common bile duct stones (CBDs) and gallbladder in situ were enrolled in a prospective non-randomized study to undergo LCDE on an intention to treat basis. From October 2005 until September 2006, 335 consecutive patients were operated on at our department. Mean age was 64.2 years old, and there were 20 males (58.8%) and 14 females (41.2%). Preoperative biliary drainage was performed in 32 cases (94.1%). Extensive lymphadenectomy including all levels of lymph nodes along the common hepatic artery and celiac axis was performed in all patients.

Results. In 34 FDs, 4 cases underwent PD with extended right hepatectomy because of hilar invasion. And 2 cases underwent PD with portal reconstruction due to portal invasion. Mean operation time was 600.0 min and mean operative blood loss was 573.5 ml. There were no operation-related deaths. Pathological examination revealed that there were 6 cases of stage, 14 cases of stage 2, 14 cases of stage 3, 12 cases of stage 4, 7 cases of stage 6, 7 cases of stage A, and 1 case of stage B. The survival rates at 1 and 3 years were 88.2% and 62.7%, respectively.

Conclusions. PD with extended lymphadenectomy for CaMLB is a safe method and promises a better clinical outcome.

ORAL PRESENTATIONS—TRANSPLANTATION

EFFECT OF GRAFT SEASTOSIS ON ORGAN BLOOD FLOW AND OUTCOME AFTER LIVER TRANSPLANTATION

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Objective. To determine the effect of graft steatosis on intraoperative organ blood flow, postoperative liver function and long-term organ survival.

Background. To overcome the increasing discrepancy between liver organ availability and requirement livers with poor organ quality are increasingly accepted for transplantation. In the past steatosis has been thought to be a major risk factor for graft dysfunction.

Methods. 225 consecutive liver transplants (age 48 years ±11.5) were reviewed. Organ blood flow (perfusion of portal vein and hepatic artery), hepatic function (AST, ALT, bilirubin, prothrombin time on 1st, 2nd and 7th postoperative day) and organ survival were determined. Donor liver grafts were categorized into two subgroups according to the degree of macrovesicular steatosis: mild (less than 30%) (N=175), or moderate to severe (30%) (N=50) steatosis.

Results. The results indicate that moderate to severe steatosis was associated with significantly increased AST and ALT levels after operation and with a significantly diminished prothrombin time on the 1st and 2nd postoperative day. By day 7 differences in liver function were no longer evident. Portal and hepatic blood flow were not affected by the degree of liver steatosis. After adjustment for potential confounders, organ survival did not depend on the degree of donor steatosis (5-year-survival rates: 68% and 58% with steatosis <30%, or 30%, respectively) (hazard ratio 0.754, confidence interval 0.458–1.242, p=0.268).

Conclusion. Differences in organ blood flow are not responsible for temporally diminished organ function in moderately or severely steatotic
livers following transplantation. Steatotic livers can be transplanted safely with good results for long-term organ survival if other contraindications are absent.

129 USE OF ELDERLY GRAFTS FOR LIVER TRANSPLANTATION: THE PARADOXICAL PARADIGM OF OCTAGENARIAN DONORS

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Objective. To analyze the outcome of liver transplantation (LT) according to different categories of donor age, with particular reference to octogenarian donors.

Background. Older donor age is considered a risk factor for poor outcome in liver transplantation, but a stratification of results according to classes of old donor age has rarely been reported.

Methods. 553 LTs performed between 1998 and 2006 were divided according to donor age categories (group 1 [n = 173]: <50 years; group 2 [n = 96]: 50-59 years; group 3 [n = 132]: 60-69 years; group 4 [n = 111]: 70-79 years; group 5 [n = 41]: >80 years). Clinical parameters were comparable between groups. Group 5 donors had the lowest mean ICU stay and only one graft showing macrovesicular steatosis >30%. Recipient and donor parameters were similar between groups in 221 HCV-positive patients.

Results. 5-year graft survival was significantly higher in group 1 (75%) vs. group 2 (60%) and 3 (44%) (P = 0.01 and P = 0.001, respectively), and in group 5 (81%) vs. group 3 and 4 (P = 0.04 and P = 0.01, respectively). Group 5 had the shortest time to HCV recurrence, but also the highest rate of patients receiving antiviral treatment and showing sustained virological response. Graft losses due to HCV recurrence were significantly lower in group 1 (7%) than in group 3 and 4 (21% and 25%, respectively) (P < 0.001, respectively).

Conclusions. In liver transplantation, but a stratification of results according to classes of old donor age has rarely been reported. There is clear a contribution of splenic flow to portal hyperperfusion or small-for-size syndrome (SFSS) is a well recognized clinical complication that may occur related liver transplantation (LRLT).

Background and Aim. The portal hyperperfusion or small for size syndrome (SFSS) is a well recognized clinical complication that may occur related liver transplantation (LRLT).

Method. From May 2000 to January 2005, 292 orthotopic liver transplants were performed using 28 (9.6%) septuagenarian and octogenarian liver donors (mean age 73.3 years, range 70 to 82). They were perfused using Celsior (CS = limits; Sangstie, Lyon, France) solution in ten cases, University of Wisconsin solution (UW = Visaplan; Dupont Pharma, Dordrecht, The Netherlands,) in eight cases and Custodiol (HTK = Koeler Chemie, Custodiol) in eight cases. Liver allografts were perfused via the aorta according to manufacturing and donor weight. The main recipient and donor variables were evaluated among the three groups.

Conclusion. To analyze the outcome of liver transplantation (LT) according to different categories of donor age, with particular reference to octogenarian donors.

Introduction. Liver transplantation (LT) is the best treatment for HCC arising on a background of cirrhosis, but organ shortage limits this option. Liver resection (LR) provides a broader application for patients with small HCC with preserved liver function, employing LT as a salvage procedure in the event of HCC recurrence.

Objectives. The aim of this study is to establish the safety and efficacy of the strategy of LT in case of HCC recurrence after LR.

Methods. From 1996 to 2005, we treated 30% cirrhotic patients with HCC: 165 LR and 144 LTs. Salvage LT (n = 16) was compared with primary LT for HCC (n = 128) documented by histology, to assess the safety of this procedure. Among these 16 cases, the outcome of LT for HCC recurrence after LR (n = 10) was compared with the outcome of primary LT with HCC (n = 6) and with patients with end-stage liver disease. To analyze the outcome of each surgical strategy, LR in transplantable patients (n = 81), according to local selection criteria of LT, was compared with primary LT (n = 128).

Results. There was no operative mortality in the salvage LT group vs. 6% in the primary LT group (P = NS); in addition, there was no difference regarding HCC recurrence (10% vs 9%) and post-operative morbidity.

Conclusion. LR is a valid treatment for small HCC in selected patients and in the event of recurrence, salvage transplantation is a safe and effective procedure.

131 LIVER TRANSPLANTATION USING SEPTUAGENARIAN AND OCTAGENARIAN DONORS: COMPARISON BETWEEN THREE DIFFERENT PERFUSION SOLUTIONS

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Introduction. The chronic shortage of organ donation and the increasing number of patients listed for liver transplantation has questioned an arduous debate about acceptance criteria for donor organs. In the last years several strategies have been afforded to expand organ procurement and livers from older patients still represent a possible organ-pool for transplant. However, their use is associated to a high risk of primary graft dysfunction (PFD). In this context, we retrospectively examined the efficacy of three different perfusion solutions commonly used for liver-graft preservation.

Patients and Methods. From 1990 to 2005, 292 orthotopic liver transplants were performed using 28 (9.6%) septuagenarian and octogenarian liver donors (mean age 73.3 years, range 70 to 82). They were perfused using Celsior (CS = limits; Sangstie, Lyon, France) solution in ten cases, University of Wisconsin solution (UW = Visaplan; Dupont Pharma, Dordrecht, The Netherlands,) in eight cases and Custodiol (HTK = Koeler Chemie, Custodiol) in eight cases. Liver allografts were perfused via the aorta according to manufacturing and donor weight. The main recipient and donor variables were evaluated among the three groups.

Conclusion. To analyze the outcome of liver transplantation (LT) according to different categories of donor age, with particular reference to octogenarian donors.

132 ROLE OF SPLENIC ARTERY EMBOLIZATION IN THE MANAGEMENT OF SMALL FOR SIZE SYNDROME IN ADULT TO ADULT LIVING RELATED LIVER TRANSPLANTATION

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1ISMETT-UPMC Italy

Background and Aim. The portal hyperperfusion or small for size syndrome (SFSS) is a well recognized clinical complication that may occur after segmental liver transplantation. Here we present our strategy to perform early splenic artery embolization (SAE) for the treatment of SFSS after living related liver transplantation (LRLT).

Methods. Five patients developed small-for-size syndrome defined as: onset within the 1st week after LRLT of progressive hyperbilirubinemia without mechanical cause, cholestasis at liver biopsy, and refractory ascites in absence of vascular complications.

Results. All five patients (Table 1) underwent SAE improved rapidly their clinical condition, with an evident decrease in the value of bilirubin in the serum, in production of ascites and improvement of the pancytopenia. Coagulopathy expressed by the INR value was not a reliable marker of SFSS in this series; in fact a slight improvement of this test was present already immediately after LRLT before SAE.

Conclusion. There is a contribution of splenic flow to portal hyperperfusion, early SAE can reduce the partial graft from the deleterious effect of portal overflow.

133 LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCI-NOMA UNDER THE MILAN CRITERIA

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Table 1. Demographics, operative data and outcome related to the five recipients of LRLT with SFSS

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Patient 1</th>
<th>Patient 2</th>
<th>Patient 3</th>
<th>Patient 4</th>
<th>Patient 5</th>
</tr>
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<tbody>
<tr>
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<td>61</td>
<td>47</td>
<td>60</td>
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<tr>
<td>Age</td>
<td>47</td>
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<td>47</td>
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<td>HCC + autoimmune</td>
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<td>HBV</td>
<td>HCV</td>
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<tr>
<td>MELD</td>
<td>18</td>
<td>26</td>
<td>23</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>CP</td>
<td>B8</td>
<td>C1</td>
<td>C12</td>
<td>C9</td>
<td>C11</td>
</tr>
<tr>
<td>GRBW</td>
<td>1.02</td>
<td>1.26</td>
<td>1.55</td>
<td>1.14</td>
<td>1.44</td>
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<tr>
<td>Operative data</td>
<td></td>
<td></td>
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<tr>
<td>Bilirubin (mg/dL) Peak Before SAE</td>
<td>14</td>
<td>&lt;100</td>
<td>11.0</td>
<td>&lt;100</td>
<td>&lt;100</td>
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<tr>
<td>Ascites Volume Peak Before SAE (mL/day)</td>
<td>2100</td>
<td>1800</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
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<td>INR Before SAE</td>
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<td>1.4</td>
<td>1.3</td>
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<td>24</td>
<td>76</td>
<td>25</td>
<td>29</td>
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<td>Bil. Rec.</td>
<td>Duct To Duct</td>
<td>Duct To Duct</td>
<td>Duct To Duct</td>
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<tr>
<td>Platelets After SAE</td>
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<td>Graft failure</td>
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<td>none</td>
<td>POD 28</td>
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<tr>
<td>Survival (days)</td>
<td>362</td>
<td>28</td>
<td>135</td>
<td>92</td>
<td>92</td>
</tr>
</tbody>
</table>

CP indicates Child-Pugh, GRBW, graft weight to recipient body weight ratio, Bil.Rec, biliary reconstruction, ICU, intensive care unit, LOS, length of stay, T-LOS, total length of stay.

Aim. Limits of hepatocellular carcinoma (HCC) for liver transplantation (LT) are being discussed nowadays. We report our experience with LT for HCC under Milan criteria with five-year follow-up. From February 1996 to October 2005 we performed 566 LT on 536 patients. HCC with cirrhosis was the main reason of LT in 133 cases (25%). Patients were predominantly males (81%). Average age was 58 ± 7 years. Hepatitis C virus cirrhosis (HCV) was the underlying disease in 52.5%, alcoholic cirrhosis in 36%, and hepatitis B virus cirrhosis in 6%. Only 5 patients had alpha-theratoprotein higher than 200 ng/mL. These patients had no preferences in the waiting list, and their average stay was 114 days. A double therapy based on tacrolimus and steroids was used in the majority of the patients. Median ICU and hospital stay was 3 and 15 days, respectively. In the explanted liver, only 70% still fulfilled the Milan criteria, while 16% fulfilled the San Francisco criteria and 14% were out of the former criteria. Microvascular invasion was seen in 21 livers.

Tumor recurrence appeared in 12 patients (9%). The average time of recurrence after transplantation was 18 months (± 2.44 ± 5.1 months), and the average survival after recurrence was 20 months (± 5.5 ± 3 months). Recurrence was surgically removed in 5 patients: one patient with lymph node retroperitoneal recurrence is alive 41 months after surgery; the other 4 patients with recurrence at adrenal gland (2) and liver (2), died due to the tumour at 6, 33, 36 and 53 months, respectively. Average survival of resected patients was 31 ± 5 months.

The follow-up was 1864 ± 947 days (± 437 - 3925 days). Hospital mortality was 2.25% and overall one was 25%. Ten patients died of tumour recurrence: 5 fulfilled the Milan criteria in the explanted liver (5.3% mortality); 1 fulfilled San Francisco criteria (4.7% mortality); and 4 did not fulfill either criteria (21% mortality).

Actuarial survival at 1, 5 and 10 years was 95%, 81% and 77.5%, respectively. Patients with alcoholic cirrhosis had better survival than HCV cirrhotic patients at 1, 5, and 10 years (91.5%, 87.5%, 85.5% versus 81.5%, 77% and 70%, respectively).

Conclusion. Liver transplantation is an excellent treatment for hepatocellular carcinoma under the Milan criteria, even if these criteria are exceeded after surgery. However, when the explanted liver shows tumour out of either Milan or San Francisco criteria, the mortality was considerably increased. Consequently, exceeding the Milan criteria preoperatively was probably associated with worse outcome. HCC on HCV cirrhotic patients has less survival than alcoholic cirrhotic patients due to the poor survival of HCV cirrhosis. When recurrence is resected an increase in survival can be expected.

134 LONG TERM RESULTS OF LIVER TRANSPLANTATION FOR HEPATOCELLULAR CARCINOMA: AN UPDATE OF THE UNIVERSITY OF PADUA EXPERIENCE

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Background. Hepatocellular carcinoma (HCC) competes with benign liver disease as indication for liver transplantation (LT). Aim of this study is to determine long-term results of LT for HCC at Padua University.

Methods. We retrospectively analysed the prognostic role of HCC diagnosis at pathologic exam in adult LT. In the HCC group we evaluated the prognostic role of the time of diagnosis (incidental versus non incidental) and of pathologic tumor TNM staging. The primary end point was 1, 3, and 10-years patient survival.

Results. From 1991 to 2006, 580 adults underwent first LT at Padua University. HCC was found in 120 patients at pathologic exam. In 26 cases (22%) the diagnosis of HCC was incidental. There were 59 cases (49%) of pathologic T1-T2 tumor (1 nodule <5 cm, or 2–3 nodules <3 cm, without metastases and/or vascular invasion), and 61 cases (51%) of pathologic T3 – T4a tumor. HCC diagnosis did not show a significant prognostic impact at Cox survival analysis. After a median follow up of 31 months, 1, 5, and 10 years survival was 91%, 81% e 73% in the HCC group, and 84%, 76%, e 67% in the non HCC group. Time of HCC diagnosis (incidental versus non incidental) and the pathologic TNM staging (T1-T2 versus T3–T4a) did not result significant survival predictors at Cox analysis.

Conclusion. In our experience, the long term results of LT for HCC overlapped with that of LT for benign disease, although 51% of tumors were T3-T4a at pathologic exam.

135 THE PROGNOSTIC IMPACT OF MELD SCORE IN PATIENTS UNDERGOING LIVER TRANSPLANTATION WITH SUB OPTIMAL LIVERS

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Background/Aims. The aim of this retrospective study is to analyze the prognostic impact of MELD score in patients undergoing LT with sub-optimal livers.

Methods. Between January 2002 and January 2006, 160 adult patients with liver cirrhosis received a whole liver for primary LT at our Institution: 81 had a sub-optimal liver (SOL group), 79 had an optimal liver (group OL). Definition of sub-optimal liver was: one major criteria (age >60 years, steatosis >20%) or at least two minor criteria (sodium <155 mEq/L, ICU stay >7 days, dopamine >10 microg/kg/min, abnormal liver tests, and relevant hemodynamic instability).

Results. Baseline recipients characteristics were comparable in the two study groups. The SOL group had a significant higher number of early graft deaths, with a significant higher number of early graft deaths.
with advanced MELD score, thus supporting a donor-recipient matching significantly associated with early graft death rates only in the SOL group.

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Internet has led to widespread web consulting, whose proportions are not yet as known and on whose management there is no as yet agreement. We verified the typology and needs of people and patients of a single language population inquiring about a homogenous group of diseases treated in tertiary reference centers and their reason for writing. Data were extracted and coded from e-mail messages received over 27 months by a non institutional site (www.chirurgiadelfegato.it) devoted to surgically treatable hepato-biliary-pancreatic diseases. Consultation activity was verified by the number of answers and subsequent messages. 1247 users sent 1788 messages to one of the website address. 1179 (94.6%) identified themselves as doctors. Consultation activity was characterized by a shorter time to receive an answer (2.5 ± 3.6 vs. 3.5 ± 5.3). Each user sent a mean number of 1.4 ± 0.7 messages (from 1 to 8).

Web consulting is a powerful tool for patients and health professionals emerging from physician communication problems. Nevertheless, the Internet is still pushing doctors toward a reconsideration of the principles of medical ethics and a revocation of rules and regulations to deal with these new communication methods.

THE EFFECT OF SIGNALLING LYMPHOCYTE ACTIVATING MOLECULE (SLAM) AND SLAM-ASSOCIATED PROTEIN ON CYTOTOXIC T-CELLS

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Signalling Lymphocyte Activating Molecule (SLAM; CD150) is a costimulatory receptor involved in lymphocyte activation...SLAM Associated Protein (SAP; SH2D1A) has a strong affinity to activated SLAM. SLAM bound SAP can activate FYN or can recruit already activated FYN, which enhances lymphocyte activation. Upon stimulation of the TCR an increase of cytotoxic activity can be observed that peaks at day seven of cultivation. Our research shows a strong correlation between the cytotoxic maximum of effector cells at day seven and the expression maximum of Signalling Lymphocyte Activating Molecule (SLAM) and SLAM Associated Protein (SAP) at day six of cultivation. This correlation was shown both on surface expression of SLAM as well as on mRNA and protein levels for both SLAM and SAP. Over expression of SLAM at difference days of cultivation increased cytotoxic activity at day seven, but also induced cytotoxicity earlier during cultivation.

To prove that SLAM caused the increased cytotoxicity we silenced both SLAM as well as SAP using small interfering RNAs (SiRNAs). Silencing of SLAM results in the reduction of SLAM surface expression as well as SLAM mRNA expression. In addition the absence of SLAM in effector cells leads to reduced cytotoxic activity when compared to untreated effector cells. Silencing of SAP does not affect the expression of SLAM; however silencing SAP has the same negative effect on effector cell cytotoxicity as the silencing of SLAM. This supports the thesis that SAP is bound to SLAM upon activation and triggers lymphocyte activation. In addition we could show that SLAM is primarily localized in Lipid Rafts on activated CD8+ T-cells by generating HLA-A2 specific T-cell clones and activating them with HLA-A2 specific peptides presented by T2 cells or HLA matched dendritic cells.

By establishing an animal model using immunodeficient mice and a subcutaneous tumour model using COLO205, a colo-rectal carcinoma cell line, we further investigated the effect of SLAM and SAP on activated T-cells. The mice received the tumour cells and subsequently were treated with effector cells. We can show that the survival of the mice is increased when treated with effector cells expressing SLAM in comparison to mice that received SLAM silenced effector cells. Furthermore we can show that mice receiving SLAM overexpressing T-cells show the best survival rates. In conclusion; SLAM and SAP are important for T-cell cytotoxicity, cells lacking either SLAM or SAP show a reduced cytotoxicity, cells with increased SLAM levels show an increased cytotoxic activity.

Background. Hepatic inflow occlusion (Pringle manoeuvre) is often employed for the reduction of blood loss during resectional liver surgery. There is much variation in the usage and duration of this manoeuvre. This study was undertaken to determine the current practice of UK liver surgeons.

Methods. All the practicing liver surgeons (n ~67) identified from UK liver surgeons group (UKLSG) were contacted via email, telephone or in person. Surgeons not responding in 4 weeks were sent a reminder email. Questions were asked about frequency of use of Pringle manoeuvre, maximum clamp time, liver recovery time and average number of cycles of vascular occlusion.

Results. Of the 47/67 (70%) surgeons who responded to the questionnaire, 33/47 surgeons performed more than 20 liver resections a year. 40/47 (85%) used the Pringle manoeuvre for a variable period of time. 12/47 (25%) surgeons used continuous occlusion for the duration of hepatic resection. Clamp times for the 28 surgeons practicing intermittent occlusion were <10 minutes for 8 surgeons, 10–20 minutes for 14 and >30 minutes for 6 surgeons. 20/28 (71%) surgeons using intermittent occlusion allowed a 5-10 minutes recovery period between two periods of occlusion. The remaining 8 surgeons used a 10–20 minutes recovery period.

Conclusion. There is no consensus among UK surgeons regarding use of Pringle manoeuvre during liver resections and practice remains variable. More research is needed to facilitate the standardization of the practice of Pringle manoeuvre on the basis of evidence.

EARLY EXPERIENCE WITH LAPAROSCOPIC LIVER RESECTION FOR MALIGNANT AND BENIGN LIVER TUMOURS

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Background and Aims. Advancements in surgical technique and technology have facilitated laparoscopic liver resection in selected patients. The aim of this study is to evaluate the feasibility and outcome of laparoscopic liver resection.

Methods. Patients with lesions situated in the anterior and left lateral segments were selected for laparoscopic resection. Data were collected prospectively.
Results. Between 2003 and 2006, 17 patients (8 males) with a median (range) age of 63 (32–85) years underwent 17 laparoscopic hepatic resections for colorectal metastases (n = 14) and other indications (n = 3). The resections included left hepatic lobectomy (n = 9), 2 bi-segmental (n = 4), uni-segmental (n = 2) resections, and metastatectomy (n = 2). All procedures were completed laparoscopically and there was one intra-operative complication of port-site small bowel injury that was managed laparoscopically with no adverse effect. Estimated median (range) blood loss was 100 (25–500) and one patient received a total of two units blood transfusion. One 83-year-old female patient developed a transient left bundle branch block in recovery but recovered with no complications. The median (range) post-operative hospital stay was 3 (1–14) days. The resection margins were clear in 12 of 14 patients with malignant disease; and at a median (range) follow up of 13.5 (5–36) months, 4 patients (29%) had disease recurrence and 12 patients (86%) are alive.

Conclusions. In selected patients with lesions in the anterior and left lateral segments, laparoscopic liver resection is feasible, achieves adequate cancer resection, and is associated with smooth and rapid recovery. Long-term follow up data are required for oncological results.

141 MULTIFOCAL MANIFESTATION DOES NOT AFFECT VASCULAR INVASION OF HEPATOCELLULAR CARCINOMA: IMPLICATIONS FOR PATIENT SELECTION IN LIVER TRANSPLANTATION

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Background and Aims. Liver transplantation (OLT) for hepatocellular carcinoma (HCC) improves patient survival when tumour size and number are limited according to the Milan criteria. However, the impact of tumour size vs. the number of lesions for tumour recurrence after OLT is unclear. Microvascular invasion appears to be a significant risk factor for tumour recurrence. Therefore, it was the aim of this study to investigate tumour differentiation and microvascular invasion in relation to tumour number and size and their impact on survival after transplantation.

Patients and Methods. In 97 adult HCC patients who underwent OLT between June 1985 and December 2005 the incidence of microvascular invasion, tumour differentiation and the number and size of tumour lesions were analyzed retrospectively. Their impact on survival was studied by multivariate analysis.

Results. Microvascular invasion was the only independent negative predictor of survival after OLT for HCC (p = 0.007). Tumour size >5 cm was predictive for microvascular invasion (p = 0.007). In contrast, tumour number did not affect the incidence of microvascular invasion or cumulative survival.

Conclusion. The size of the largest HCC lesion, but not the number of tumours determined microvascular invasion, a predictor of the outcome following OLT for HCC. Thus, the number of HCC lesions should not be applied for patient selection prior to OLT. These data support the extension of Milan criteria for selection of HCC patients for OLT with regard to tumour number, but not tumour size.

142 THE EFFECT OF DIPYRIDAMOLE ON LIVER REGENERATION IN EXPERIMENTALLY HEPATECTOMIZED RATS

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Background and Aim. The phosphodiesterase inhibitors (PDEIs) have been proposed to improve hepatic reperfusion injury and hepatoplastic circulation, but the effects of these agents on liver regeneration have not been investigated thoroughly. To assess the effect of dipyridamole, a type 5 PDEI, on liver regeneration in experimentally hepatectomized rats.

Materials and Methods. This experimental study has been performed in Hakan Cetinsaya Experimental and Clinical Research Center (DEKAM) at Erciyes University Medical Faculty between April and June 2006. Sixty Wistar-Albino rats weighting between 250 and 350 g were used in the study. Rats were divided into two as the control and dipyridamole groups. Each group has been divided into three subgroups containing 10 rats each. First, jugular venous catheters were placed before hepatic resection. After 70% liver resection has been performed to the rats, upon resection dipyridamole infusion to the study group and 0.9% NaCl infusion to the control group has been done. After 70% liver resection the study and control groups received dipyridamole and 0.9% NaCl infusion, respectively. Then the resected wet liver tissues were weighed. Rats were allowed to survive for 24th, 48th and 72nd hours and then they were sacrificed. Blood samples were collected from vena cava inferior and remaining liver tissues were resected and weighted. Serum AST, ALT, ALP, albumin and PT were measured. Relative liver weight was used as a morphological parameter for liver regeneration.

Results. There were statistically significant differences between dipyridamole and control groups in ALT and relative liver weights at 24th, 48th and 72nd hours (p < 0.05).

There were also statistically significant differences between the groups in PT and albumin levels at all times but 48th hours for PT and 24th and 72th hour for albumin levels (p < 0.05). Mitotic index and PCNA labelling index were significantly higher in dipyridamole group for each time period (p < 0.05).

Conclusion. Dipyridamole increases liver regeneration both morphologically and functionally in experimental liver resection model in rats. With further studies, clinical implementation should be considered.

143 EXTRACORPOREAL PORCINE LIVER PERFUSION SYSTEM AS A LIVER SUPPORT DEVICE

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Analysis of the dipyridamole and control groups at the 24th, 48th, and 72th hours
Background and aims. A large number of acute liver failure patients die while waiting for a liver transplant. An effective liver support device can keep patients alive till a donor becomes available or death occurs. An isolated perfused porcine liver can provide such support. In the past, this has been achieved by perfusing porcine liver with patients’ blood. The theoretical risk of transmission of xenogeneic viruses into humans can be avoided by separating the patient circulation from the extracorporeal porcine liver circulation using an optimum filter that would prevent transfer of unwanted large molecules or pathogens. The current study was designed to develop a new model of extracorporeal porcine liver perfusion system integrated with a filter capable of providing liver functions across a membrane.

Materials and methods. The experimental set up included two circuits—one for the normothermic perfusion of porcine liver comprising of two reservoirs, centrifugal pump, paediatric oxygenator and a heat exchanger. The other circuit consisted of a reservoir and roller pump circulating fluid having high levels of ammonia and bilirubin, mimicking a patient in acute liver failure. A hollow fibre filter unit, Evaclio EC2A, separated the two circulations. Organ was retrieved from slaughterhouse animals and perfused using a priming solution through the extracorporeal circuit, and the liver size and vascular system were preserved both from perfusate and tissue physiological viabilities. Viability and function of the liver was assessed by bile production and the elimination kinetics of test substances indocyanine green and galactose. Clearance of ammonia and bilirubin was recorded.

Results. A total of 20 isolated porcine livers were perfused using the extracorporeal circuit for a mean duration of 5.8 ± 1.5 (2.5 – 9.5) hours. The bile output recorded was 6.0 ± 3.5 (1.2 – 23.0) ml/hour. About 73% of added indocyanine green was cleared from the perfusate within 15 minutes. The mean lactate elimination rate was 128.0 ± 51.9 (66.6 – 223.3) mg/min/kg of hepatic tissue. The model was shown to lower the ammonia and bilirubin levels.

Conclusion. Preliminary data suggests that this model for extracorporeal porcine liver perfusion can provide liver functions across a semi-permeable membrane. The logical progression is to support an animal model of acute liver failure using this perfusion system in further studies.

144 THE EFFECT OF MELATONIN ON SERUM AND LIVER LIPID PEROXIDATION AND NF-KAPPA B EXPRESSIONS IN LPS INDUCED HEPATIC ISCHEMIA REPERFUSION INJURY

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Hepatic ischemia-reperfusion injury (IR) is a severe condition which is seen after hepatic arterial injury and in hepatic graft in living donor transplantation. Increased Nitric Oxide (NO) production and inducible Nitric Oxide Synthetase (iNOS) expression is observed. Interactions between free radicals causes production of hazardous peroxynitrite (ONOO−) anions, and cellular injury and apoptosis as a result. IR is reported to induce tolerance to subsequent endotoxin stimulation if the lipopolysaccharide (LPS) challenge is delayed until the late, neutrophil-mediated phase of reperfusion. NO production and inducible nitric oxide synthase (iNOS) activity are increased and antioxidative activity is decreased. The antioxidant defense system is impaired by decrease in reduced glutathione (GSH) and the activity of glutathione peroxidase in OJ. In this study, we planned a model in which we could examine changes in LP assays, iNOS expression and histopathological and ultrastructural changes in the liver tissue of septic rats in the first eight days after the bile duct ligation (BDL) as the duration and intensity of IR.

We randomized 30 rats into 5 groups. Group A: Sham group; Groups B, C, D and E represented OJ groups, and were first, third, fifth and eighth days after BDL respectively. Bilirubin, nitrite, nitrate and malondialdehyde (MDA) levels and antioxidant status, were examined with light and electron microscopy to evaluate the histo- morphologic and ultrastructural changes. Serum bilirubin levels increased progressively as the duration of BDL increased. Serum and tissue MDA levels started to increase significantly at the first day of BDL and reached to peak level at the third day of BDL. Tissue ATPase levels decreased progressively. Serum nitrite and nitrate levels started to increase just after the BDL and reached to peak level at the third day. Tissue GSH levels decreased progressively. Histopathologically ductal proliferation was observed in group A and group B significantly lower than group D and E. iNOS expression started just after cholestasis and reached to peak level at the third day of BDL. NO formation and iNOS expression in OJ were significantly higher than in, ATPase activity was detected in segment 4 by both CT and MNR. She underwent segment 4 segmentectomy. Histologic examination showed mature HCC with pseudo-glandular pattern. The patients finally died, at age 15.

This girl belongs to an extended kindred with familial adenomatous polyposis (FAP) (23 siblings in 4 generations) with APC germ-line mutation at codon 1467. This girl had fetal HB, mixed type, with clear cell. Twelve years later, after a long asymptomatic interval, a new ultrasound detected a 10x9 cm in diameter mass in segment 4. The mass was targeted in segment 4 by both CT and MNR. She underwent segment 4 segmentectomy. Histologic examination showed mature HCC with pseudo-glandular pattern. The patients finally died, at age 15.

145 THE EFFECTS OF CHOLESTASIS ON LIPID PEROXIDATION AND ULTRASTRUCTURAL CHANGES IN RAT LIVER TISSUE AFTER BILE DUCT LIGATION

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The mechanisms and mediators responsible for the pathogenesis of liver damage caused by acute biliary obstruction remain largely unknown, although intrahepatic accumulation of toxic bile salts, increased production of proinflammatory cytokines (TNF and IL-6), bacterial endotoxins and oxidative stress are thought to be the important causes. Lipid peroxidation is a significant problem during acute biliary obstruction and the increased production and inducible nitric oxide synthase (iNOS) activity are increased and antioxidative activity is decreased. The antioxidant defense system is impaired by decrease in reduced glutathione (GSH) and the activity of glutathione peroxidase in OJ. In this, we planned a model in which we could examine changes in LP assays, iNOS expression and histopathological and ultrastructural changes in the liver tissue of septic rats in the first eight days after the bile duct ligation (BDL) as the duration and intensity of IR.

We randomized 30 rats into 5 groups. Group A: Sham group; Groups B, C, D and E represented OJ groups, and were first, third, fifth and eighth days after BDL respectively. Bilirubin, nitrite, nitrate and malondialdehyde (MDA) levels and antioxidant status, were examined with light and electron microscopy to evaluate the histo- morphologic and ultrastructural changes. Serum bilirubin levels increased progressively as the duration of BDL increased. Serum and tissue MDA levels started to increase significantly at the first day of BDL and reached to peak level at the third day of BDL. Tissue ATPase levels decreased progressively. Serum nitrite and nitrate levels started to increase just after the BDL and reached to peak level at the third day. Tissue GSH levels decreased progressively. Histopathologically ductal proliferation was observed in group A and group B significantly lower than group D and E. iNOS expression started just after cholestasis and reached to peak level at the third day of BDL. NO formation and iNOS expression in OJ were significantly higher than in, ATPase activity was detected in segment 4 by both CT and MNR. She underwent segment 4 segmentectomy. Histologic examination showed mature HCC with pseudo-glandular pattern. The patients finally died, at age 15.

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147 EPIDEMIOLOGY OF PRIMARY LIVER CANCER – A 31 YEAR ANALYSIS
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Introduction. The majority of tumours that present in the liver are usually a result of metastatic disease. Primary cancer of the liver is a relatively rare occurrence.

Methods. The Surveillance, Epidemiology, and End Results (SEER) Program, compiled by the National Cancer Institute (NCI), is a cancer registry collecting data in 9 regions ('registries') of the United States. We used SEERStat software to obtain the data for our analysis.

Results. Between the period of 1973 and 2003, there were 23,048 cases of primary liver cancer recorded by the SEER program, accounting for just 0.71% of all cancers of the body. The most common histology of liver cancer (75.3%) is hepatocellular carcinoma (HCC); other types including adeno-carcinoma, cholangiocarcinoma and carcinoïd tumours make up just 5.2%, 3.5% and 0.4% respectively. (The age-adjusted) incidence of HCC is 2.6 per 100,000, peaking in the 75–79 year age group (incidence = 13.98) before decreasing slightly thereafter. Over the past 31 years, the incidence has risen on average 4.03% per year (APC, P < 0.05) to reflect a percentage change of 189.66% (from 1.508 in 1973 to 4.369 per 100,000 in 2003). HCC is now 3 times more common in males (adjusted Male:Female ratio in 2003 = 3.05), and slightly more common in the white population (adjusted white:black ratio in 2003 = 0.80).

The majority (70.91%) of HCC are of unknown histological grading. Of those successfully graded, most are well differentiated (11.41%), moderately differentiated (8.88%) or poorly differentiated (7.46%) and only 1.34% are anaplastic. Most HCC are diagnosed with localised spread (50.17%). Regional spread is more common in poorly differentiated tumours (49.13%) whereas distant spread is more common in moderately differentiated (22.19%) respectively. Better differentiated tumours have survival rates of 13.10% and 12.50% respectively; differentiated tumours also fair better, with well and moderately differentiated tumours yielding survival rates of just 4.30% and 1.40% respectively. Better differentiated tumours also fair better, with well and moderately differentiated tumours having survival rates of 13.10% and 12.50% respectively; anaplastic tumours have poor survival at 4.30%. Survival rates have slightly improved over the period analysed, from 2.90% in 1973 to 7.30% in 1998.

Discussion. Primary cancer of the liver is rare and associated with poor survival. The past 31 years has seen its incidence increase slowly and the prognosis remaining poor.

148 PERITONEAL IMPLANTATION OF CRYOPRESERVED ENCAPSULATED PORCINE HEPATOCYTES IN RATS WITHOUT IMMUNOSUPPRESSION: VIABILITY AND FUNCTION
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Introduction and Aim. Encapsulated hepatocyte transplantation is a promising option to cell transplantation without immunosuppression as an alternative to whole organ liver transplantation. The aim of this study was to assess viability and function of encapsulated cryopreserved porcine hepatocytes implanted intraperitoneally in rats without immunosuppression.

Materials and Methods. Porcine hepatocytes were isolated by collagenase digestion method, encapsulated in AN69 polymer and cryopreserved at -196 degrees Celsius for 1 month. Four groups were created: Group 1 (n = 10), cryopreserved encapsulated porcine hepatocytes cultured in albumin-free medium for 10 days; Group 2 (n = 10), cryopreserved encapsulated porcine hepatocytes implanted in rat peritoneum without immunosuppression for 1 month, and cultured for 10 days after explantation; Group 3 (n = 10), freshly encapsulated porcine hepatocytes cultured for 10 days; Group 4 (n = 10), freshly encapsulated porcine hepatocytes implanted in rat peritoneum without immunosuppression for 1 month, and cultured for 10 days after explantation. Hepatocyte viability, liver enzymes release, urea and albumin production were measured. Hepatocyte function was assessed by measuring EROD enzyme activity in presence of specific cytochrome P450 inducers. Results. There was no significant difference in urea synthesis between the 4 groups. Albumin synthesis was significantly decreased in group 2 compared to other 3 groups (p < 0.01). There was no significant difference in AST, ALT and LDH concentrations in culture medium (p > 0.05). Encapsulated cryopreserved porcine hepatocytes explanted from rat peritoneum after 1 month appeared morphologically viable and their ultrastructure was preserved. Hepatocyte function was maintained.

Conclusion. Long-term cryopreservation of porcine hepatocytes results in retention of their biological activity and in significant viability when transplanted into rat peritoneum without immunosuppression. Cryopreserved hepatocytes were as efficient as fresh hepatocytes.

149 TWO PHOTON MICROSCOPY FOR THE STUDY OF EARLY TUMOR/STROMAL INTERACTIONS IN METASTATIC LIVER DISEASE
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Introduction. Colorectal cancer remains one of the leading causes of cancer related deaths in Europe and the United States. Most patients will succumb to their disease with metastases in the liver. Many of the cellular processes and mechanisms that govern the earliest steps in metastasis of this tumor remain elusive. In these studies we examine the utility of multiphoton microscopy to study metastatic disease in the liver in an orthotopic, intact whole organ, murine model of colorectal cancer metastasis.

Experimental Procedure. C57BL/6 mice undergo splenic injection of syngeneic murine colon carcinoma cells. Mice are sacrificed at prescribed times and the livers are prepared for imaging of the intact organs on a glass plate by use of a Leica microsystems DM LFS A microscope and Leica Confocal System TCS SP2 (True Confocal Scanner), fitted with a Mai Tai Wideband, Mode-Locked Ti:Sapphire laser (Spectra-Physics). Tumor cells are labeled by the stable transfection of a GFP reporter gene. The vasculature of the liver is separately labeled using rhodamine dextran. The whole organ preparations remain stable for several hours.

Results. Whole murine livers are examined by multiphoton microscopy at 2 hour, 6 hour, 12 hour, 24 hour, 48 hour, 72 hour, and 7 day time points. Hemangiomata, including the complex vasculature of the liver, is visualised in clear detail. Focal planes at up to 100 μm depth from the surface of the liver are visualised and digital stacks of images can be reconstructed in 3 dimensions to clearly demonstrate tumor cells, intravascular, and extravascular spaces. Early time points (2, 6, 12, 24 hours) after splenic injection demonstrate single GFP positive cells and occasional clusters of cells within the hepatic vasculature. Over time, cells demonstrate intravascular clustering (48, 72 hours) that is most pronounced at the 7 day time point. At these time points, we observed a marked contribution of host cells (cells lacking GFP expression) in microscopic lesions. The identity of these cells, which make up a substantial proportion of the tumor, is currently under investigation.

Conclusions: Multiphoton microscopy provides a unique capability to image metastatic tumor cells within the orthotopic microenvironment of the liver. Relationships of tumor cells to their microenvironment and patterns of tumor cell invasion can be uniquely and quantitatively assessed. Multiphoton imaging allows for direct observation of the earliest interactions of colorectal cancer cells with the microenvironment of the metastatic site in the liver.

150 ENUCLEATION AND RESECTION FOR SURGICAL TREATMENT OF GIANT LIVER HEMANGIOMA
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Hemangiomata is the most frequent focal liver lesion. It affects mainly women and may cause symptoms such as abdominal pain, mass, and early satiety, or complications such as heart failure or coagulopathy (Kasabach-Merrit syndrome). Indication to surgery are untreated symptoms and inability to exclude malignancy. Between January 2000 and April 2006 we evaluated 180 patients in an out-patients setting; of them 12 patients affected by giant symptomatic hemangiomata (range 8 – 13cm) were operated. When superficially located in the liver (4 cases) hemangiomata were treated by enucleation. Detailed pathologic examination has demonstrated an interface between hemangiomata and the normal liver tissue that allowed the procedure. In the resected patients (8 cases) enucleation was not feasible for biliary or vascular involvement or deep location in the liver. In this group 3 right hepatectomy, 3 left lateral sectionectomy and 2 bisegmentectomy were carried out. Median operative blood loss was 90 ml (range, 50 - 190 ml) in the enucleated patients and 270 (150 – 500 ml) in the resected patients. No transfusions were used in both groups. We had no mortality and 2 minor postoperative complications. Surgical treatment of liver hemangiomata is limited to giant and strongly symptomatic lesions or to cases of uncertain diagnosis. No mortality and a low complications rate are mandatory. When feasible enucleation is the procedure of choice.

151 LAPAROSCOPIC LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA ON HISTOLOGICALLY PROVED CIRRHOSIS: SHORT AND MIDDLE TERM RESULTS. A COMPARATIVE STUDY
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Laparoscopic liver resection allows to remove a focal hepatic lesion with a low complications rate and is a valid alternative to open surgery. In patients affected by hepatocellular carcinoma (HCC) on histologically proven cirrhosis, the indications are limited because of the risk of both incomplete surgical removal and of postoperative complications. The aim of this study was to compare the outcomes of laparoscopic liver resection (LRR) to open surgery (OS) in patients affected by HCC on cirrhosis.
but its efficacy remains debated. The aim of this study was to assess the treatment for patients with unresectable hepatocellular carcinoma (HCC),

**Methods.** 23 patients with HCC on histologically proved cirrhosis who underwent a hepatic resection (37±16) were compared with an historical group formed of 23 patients who underwent a conventional open resection (OH). Inclusion criteria were Child-Pugh A cirrhosis, small sized (< 5 cm) exophytic or subcapsular tumor located in anterolateral segments of liver (segment II-VI according to Couinaud classification). In LH group we performed 15 subsegmentectomies, 3 segmentectomies and 5 left lateral sectionectomies while in OH group were performed 12 subsegmentectomies, 5 segmentectomies and 6 left lateral sectionectomies.

**Results.** One patient (4.3%) of LH group was converted to laparotomy for intraoperative bleeding. Mean operative times was statistically longer in LH group (148 min vs 125) while blood transfusions (4 patients (17.3%) vs 0), Pringle maneuver (5 patients (21.7%) vs 0), mean hospital stay (12 days vs 8.3) and postoperative complications (11 patients (47.8%) vs 3 (13%) were significant. There were no differences in the postoperative relevance in blood loss, surgical margins, mortality and 2-years survival rate between the two groups.

**Conclusion.** This study confirms that laparoscopic liver resection, in patients with low liver reserve, could improve patients’ QOL, avoiding the disadvantages of open hepatectomy. It should be increasingly used in liver surgery, especially for cirrhotic patients, but only by surgeons expert in both liver and advanced laparoscopic surgery.

152 SAFETY OF LIVER RESECTIONS OUT OF A HIGH CASE-LOAD SPECIALIZED CENTER

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**Abstracts**

**Aim.** The relationship between volume and outcome has been established in the literature for several complex surgical procedures. Hepatic resection is one such high-risk surgical procedure. Operative mortality is still greater than 2% even in most large high volume hepatobiliary units. In this study we report the first 93 liver resections undertaken at a single institution of general surgery. The aim of the report is to demonstrate that hepatic resection can be approached safely and routinely performed in a tertiary referral surgical center without a specific program of hepaticepancreato-biliary surgery.

**Method.** Demographic, clinical, pathological, treatment and follow-up data were recorded prospectively on all the liver resection performed by the author between 01/01/2002 and 31/12/2006. The main outcome measures of the study were operative mortality and morbidity rates.

**Results.** Malignant tumours were the most common indication for hepatic resection (42 resections) followed by cirrhosis (40 cases) and colorectal cancer. Thirty-six patients underwent a lobectomy (right lobectomy 22, left lobectomy 16) while a further 8 patients underwent extended resection, and 47 patients underwent segmental or bisegmental hepatic resection. Major and minor liver resections were equally distributed over the four years of the study period. More than 50% of patients were submitted to a major liver resection. In 6 cases a right portal vein embolization and in 1 case a right portal vein ligation were necessary to reach an adequate volume of the remnant liver. There were 9 resections. Additional surgical procedures were performed in 12 cases. Major complications occurred in 6 patients (6.4%) while 19 patients (20.4%) experienced a minor complication. The 30-day mortality rate was 2.1%. The first patient died from a liver failure following an extended right resection for an HCC involving the right lobe with right portal vein thrombus. The second patient, submitted to a right hepatectomy for an HCC, died on day 20 from pulmonary complications. Both these two patients were operated during the last period of the study. The rate of liver failure was 3.2%. The risk of complications was directly related to the magnitude of resection. All the six major complications were observed in patients undergoing resection of more than two liver segments.

**Conclusions.** Our experience suggests that liver resection can be undertaken safely with low mortality and morbidity rates also at a relatively low-volume referral center, provided an experienced surgical team prove to be skilled with advanced surgical techniques in hepatic resection.

153 TRANS-ARTERIAL CHEMOEMBOLIZATION FOR HEPATOCELLLAR CARCINOMA-INSTITUTIONAL EXPERIENCE

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**Introduction.** Lipiodol chemoembolization is a widely used method of treatment for patients with unresectable hepatocellular carcinoma (HCC), but its efficacy remains debated. The aim of this study was to assess the outcome of trans-arterial chemoembolisation (TACE) in the management of unresectable hepatocellular carcinoma.

**Methods.** Between January 2002 and May 2006, patients with unresectable hepatocellular carcinoma who had lipiodol chemoembolisation (lipido plus doxorubicin) were reviewed. Both patient, and tumour characteristics, results of chemoembolization including complications and survival were collected for analysis.

**Results.** A total of 28 patients received 61 TACE procedures with a mean number of treatment of 2 per patient. Tumours were large and multifocal, Okuda score was II and III in 50% of patients. Twenty patients had a repeat TACE (71%), 4 three times (14%) and one five times respectively (4%). All patients tolerated the procedure well. Post TACE, one patient developed liver abscess which was treated with percutaneous drainage and one patient developed acute renal failure treated with dialysis. Mild abdominal pain and fever were common and occurred in 40% of the patients. The mean follow-up time was 17 months (range, 1 - 56 months). Seven patients died of tumour progression (25%), one of acute gastrointestinal haemorrhage from varices (3.6%) Partial Response achieved in 50 % of the patients. The 3-year survival was 68%.

**Conclusion.** TACE is an effective therapeutic option for cirrhotic patients with unresectable HCC.

154 MULTIMODAL TREATMENT OF LIVER METASTASIS FROM GASTROINTESTINAL STROMAL TUMOURS

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**Introduction.** Gastrointestinal Stromal Tumours (GIST) clinical behaviour is unpredictable and surgery alone does not cure GIST. Metastatic liver disease is a major determinant of patient’s survival.

**Methods.** Database and records of patients with liver metastasis from GIST (n=13) treated at our unit between January 2002 and June 2006 were reviewed. Treatment modalities included surgical resection , radio frequency ablation, hepatic artery chemoembolisation , imatinib mesylate, and selective internal radiation therapy using Yttrium microsphres (SIRTEX) .Patient demographics, clinicopathological characteristics of the primary tumour and the extent of intrahepatic and extrathoracic metastatic disease were recorded.

**Results.** There were 6 (46%) males and 7 (54%) females. The mean age at time of diagnosis of the primary tumour was 65.5±9.7 years (range 45 – 80). Five patients (38%) had synchronous metastasis at presentation. The primary tumour site was the stomach in six patients (46%), terminal ileum three patients (23%), duodenum two patients (15%) and the pelvis in two patients (15%). The mean size of the metastatic liver lesions was 8.03cm ± 4.33(SD). In 7 patients liver resections were performed (in 3 patients repeatedly). RFAs were performed in 4 patients, in two patients repeatedly. In two patients trans-arterial chemoembolisation (TACE) was performed and one patients was treated with SIRTEX treatment. 5 patients were treated with imatinib, two patient received repeated series. One patient received 8 therapeutic modalities, 2 patients 7 modalities and another patient received 4 treatment modalities. The more modalities were given the longer survival time was observed. Resection and imatinib treatment significantly improved the survival time in comparison with imatinib treatment alone (p=0.031). Of all patients who underwent hepatectomy , three patients survived more than 5 years (23 %) after the initial hepatectomy. The average survival was 35.14 month.

**Conclusion.** Multimodal approach for patients having liver metastasis from GIST provides better survival rates. Well-conducted prospective studies are needed to further evaluate the different treatment options.

155 TUMOUR PROLIFERATION EVIDENT BY NEOVASCULARISATION FOLLOWING PORTAL VEIN EMBOLIZATION

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**Introduction.** Although Portal Vein Embolization (PVE) proved to be effective in extending the indications for liver resection in patients previously considered with non-resectable liver tumours, the effects of this procedure on tumour growth remain controversial.

**Methods.** Histological specimens were obtained from 21 patients with liver tumours of mean age 63 year and male to female ratio 4:3 who underwent major liver resection between 2001 and 2006. Patients were divided into two groups: PVE group (n=12), and non-PVE group (n=9). Patients in PVE group underwent preoperative PVE prior to liver resection. Of those patients 8 had Colorectal Liver Metastasis (CLM), 1 had Hepatocellular Carcinoma (HCC), 1 had Neuroendocrine Tumour, 1 had metastatic GIST, and 1 had Gall bladder carcinoma. Patients who underwent major hepatic resection without PVE served as control group; 4 of which had CLM, 1 had HCC, 1 had Cholangiocarcinoma, 1 had Neuroendocrine Tumour, 1 had metastatic GIST, and 1 had metastatic Pancreatic cancer.
156 THE EFFECT OF ISCHEMIA INDUCED BY PORTAL VEIN EMBOLIZATION ON TUMOUR PROLIFERATION: IMMUNOHISTOCHEMICAL STUDY

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Introduction. Although Portal Vein Embolization (PVE) proved to be effective in extending the indications for surgery, this potential effect on tumour growth should be taken into consideration.

Methods. Histological specimens were obtained from 21 patients with liver tumours, of mean age 63 year and male to female ratio 4:3 who underwent major hepatic resection between 2001 and 2006. Patients were divided into two groups, PVE group (n = 12), and non-PVE group (n = 9). Patients in PVE group underwent preoperative PVE prior to liver resection. Of those patients 8 had Colorectal Liver Metastasis (CLM), 1 had Hepatocellular Carcinoma (HCC), 1 had Neuroendocrine Tumour, 1 had metastatic Gastrointestinal stromal tumour (GIST), and 1 had Gall bladder carcinoma. Patients who underwent major hepatic resection without PVE served as control group; 4 of which had CLM, 1 had HCC, 1 had Neuroendocrine Tumour, 1 had metastatic Gastrointestinal stromal tumour (GIST), and 1 had metastatic Pancreatic cancer.

The resected livers were examined using immunohistochemical staining of tumour cells. Cell proliferation was determined by over-expression of Ki-67, a protein related to cell proliferation. Cell proliferation was determined by over or under-expression of Ki67 was overexpressed in 50% of patients who underwent PVE and in 42.9% of patients who did not have PVE (p < 0.05). Again VEGF was overexpressed in 75% of the PVE group (56%) (P = 0.03) and 44% in the non-PVE group (P = 0.04). Correlation with clinical findings and radiological progression was made.

Conclusion. We conclude that PVE increases tumor proliferation and overgrowth partly through increasing factors responsible for promoting neovascularisation. Although PVE is effective in extending indications for surgery, this potential effect on tumour growth should be taken into consideration.

157 PROLIFERATIVE ACTIVITY OF LIVER TUMOURS FOLLOWING EMBOLIZATION OF THE PORTAL VEIN

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Introduction. Although Portal Vein Embolization (PVE) proved to be effective in extending the indications for resection in patients previously considered with non-resectable liver tumours, the effects of this procedure on tumour growth remain controversial.

Methods. Histological specimens were obtained from 21 patients with liver tumours, of mean age 63 year and male to female ratio 4:3 who underwent major liver resection between 2001 and 2006. Patients were divided into two groups, PVE group (n = 12), and non-PVE group (n = 9). Patients in PVE group underwent preoperative PVE prior to liver resection. Of those patients 8 had Colorectal Liver Metastasis (CLM), 1 had Hepatocellular Carcinoma (HCC), 1 had Neuroendocrine Tumour, 1 had metastatic Gastrointestinal stromal tumour (GIST), and 1 had Gall bladder carcinoma. Patients who underwent major hepatic resection without PVE served as control group; 4 of which had CLM, 1 had HCC, 1 had Neuroendocrine Tumour, 1 had metastatic Gastrointestinal stromal tumour (GIST), and 1 had metastatic Pancreatic cancer.

The resected livers were examined using immunohistochemical staining of tumour cells. Cell proliferation was determined by over-expression of Ki-67, Vascular Endothelial Growth Factor (VEGF), Hypoxia Induced Factor (HIF) and CD34. HIF was overexpressed in 75% of the PVE group (56%) (P = 0.03) and 44% in the non-PVE group (P = 0.04). Overexpression of HIF and CD34 was also evident in PVE group, HIF was positive in 67%; strongly positive in 2 patients, positive in 6 patients and negative in 2 patients where as in the non-PVE group HIF was positive in 3 patients (33%) and negative in 6 patients, (P = 0.02). As for CD34 marker, in PVE group, it was positive in 10 patients (83%) and negative in 2 patients. Where as in the non-PVE group, CD34 was positive in 4 patients (44%) and negative in 5 patients, (P = 0.04). Correlation with clinical findings and radiological progression was made.

Conclusion. We conclude that PVE increases tumor proliferation and overgrowth partly through increasing factors responsible for promoting neovascularisation. Although PVE is effective in extending indications for surgery, this potential effect on tumour growth should be taken into consideration.

158 ACCURACY OF 1 DIMENSIONAL LIVER IMAGES RECONSTRUCTED FROM CT SCANS USING COMPUTER SOFTWARE: PROSPECTIVE NON-RANDOMISED STUDY

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Introduction. The ability to construct a 3D model of the liver and its structures before hepatic resection could be useful in determining the extent and nature of resection. The accurate assessment of Liver and tumour volume dictates functional liver volume and predicts postoperative liver failure in patients undergoing resection.

Methods. A prospective non-randomized study was conducted on patients scheduled for liver resection following discussion at multi-disciplinary meeting. CT images were constructed using computer software. From these 3D models, total LV , functional LV, and tumor volume were calculated. The resected Liver volume was also calculated and was compared to the resected liver weight.

Results. A total of 37 patients of mean age 63 (31–78), and male to female ratio 2:1 were scheduled for liver resection, mean height was (162.4 ± 9.08cm) and mean weight was (73.87 ± 12.39). Of these patients; 28 had Colorectal Metastasis, 5 had Hepatocellular Carcinoma, 3 had cholangiocarcinoma, and 1 presented with metastatic leiomyosarcoma of the round ligament. Pre-operatively; 9 patients went for volume enhancing embolization, 2 had a non-resectional approach, and 1 patient was subjected to further imaging due to proximity of the tumour to the vessels. 8 patients underwent radiofrequency ablation, 5 underwent extended right hemihepatectomy, 3 had extended left hemihepatectomy, 5 were operated using Habib resection, 4 had right trisectionectomy, and 1 had left medial sectionectomy, 1 had trisegmentectomy, 4 patients were managed by local resection, 1 by central resection, and 2 by typical resection. Postoperative blood tests showed mean bilirubin level (17.3 ± 23.9), Albumin (35.1 ± 4.32), PT (11.06 ± 21.18), and serum creatinine level (86.4 ± 15.22). Incidence of postoperative liver failure was 0%. The mean total liver volume calculated using CT model was (1565 ± 404 ml), mean functional liver volume was (1404 ± 358 ml), and mean tumour volume was (104 ± 142 ml). Four patients underwent resection using 3D reconstructed CT images correlated well with resected liver weight, mean of resected liver volumes was (1402 ± 347 ml) and the mean specimens weights was (415 ± 200.68 g) (p < 0.05).

Conclusion. 3D-CT reconstructed images can accurately predict resected liver volume and future liver remnant volume during liver resection surgeries. It aids the decision on the need for pre-operative portal vein embolization to induce liver hypertrophy.

159 SURVIVAL RESULTS OF NON-SURGICAL TREATMENT MODALITIES FOR MALIGNANT LIVER TUMOURS

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Introduction. Surgical resection provides the best survival for patients with primary and secondary liver cancer. It is only possible in 15% - 20% of patients. Non-surgical treatment modalities remain the only option.

Methods. From November 2004, patients whose liver tumours were not amenable for surgery were considered for chemotherapy, radiofrequency ablation, trans-arterial chemoembolization and yttrium-90 microspheres treatment after discussion at our multidisciplinary meeting. None of the patients had extra hepatic disease.

Results. A total of 123 patients were considered for chemotherapy (n = 27), radiofrequency ablation (RFA) (n = 41) trans-arterial chemoembolization (TACE) (n = 20) and yttrium-90 microspheres treatment (n = 14). They were 71 men and 52 women with a mean age of 57. Among them 58 had colorectal liver metastases (CLM), 27 had Hepatocellular carcinoma (HCC) and the remaining 38 were grouped as others. The mean survival time for those with colorectal liver metastases was 18.8 months and for HCC 17.5 months and 15.1 months for RFA, yttrium-90 microspheres treatment, chemotherapy and TACE respectively. As for type of diseases, patients with colorectal liver metastases had 75%, 56% and 24% survival rates at 1-, 2-, and 3 years respectively, compared with 60%, 43% and 13% for the noncolorectal group. The HCC group had 43%, 18% and 10% survival rates over the same period. As for type of diseases, patients with colorectal liver metastases had 75%, 56% and 24% survival rates at 1-, 2-, and 3 years respectively, compared with 60%, 43% and 13% for the noncolorectal group.

Conclusion. Patient’s survival is more correlated to the tumour histopathological type than the non-surgical treatment modality used. Younger patients survived longer and this we attribute to co- morbidities in the elderly.

160 LAPAROSCOPIC LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA

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Laparoscopic liver resection was developed by a limited number of teams over the past 10 years. We report our experience with this approach in patients with HCC and chronic liver disease as part of a prospective evaluation.
161 POSTOPERATIVE OUTCOME AFTER MAJOR HEPATECTOMY FOR COLORECTAL LIVER METASTASES IN PATIENTS WITH SINUSOIDAL INJURY REQUIRING PREOPERATIVE RIGHT PORTAL VEIN EMBOLIZATION

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Summary background data. Sinusoidal injury is significantly associated with high morbidity after major hepatectomy in patients receiving neoadjuvant chemotherapy. However, it is still unclear whether sinusoidal injury is a risk factor for hepatectomy in patients with initially unresetable colorectal liver metastases.

Objective. To evaluate whether preoperative right portal vein embolization influences the postoperative outcome after major liver resection for colorectal liver metastases in patients with sinusoidal injury.

Patients and Methods. Between March 1997 and April 2006, 99 patients underwent right (n = 65) or extended right (n = 34) hepatectomy for colorectal liver metastases in our institution. Among them, 65 patients considered as initially unresectable due to insufficient future remnant liver volume, underwent a right preoperative portal vein embolization (PVE). Sinusoidal injury and postoperative outcome were analyzed.

Results. Two patients without preoperative PVE died during the postoperative period. One of them had sinusoidal injury. In 55 patients, a sinusoidal injury was observed. Clinicopathologic findings pre-and preoperative PVE were similarly distributed in patients with and without sinusoidal injury. Bilobar distribution and the number of liver metastases were higher in patients who underwent preoperative PVE. A right hepatectomy was performed after preoperative embolization in 43 and 18 patients respectively. Grade 3 and 4 morbidity and liver failure occurred in 43 and 18 patients respectively. Grade 3 and 4 morbidity rate was significantly higher in patients with sinusoidal injury (56.3 % versus 27.2 % respectively, P = 0.003). Moreover, sinusoidal injury is an independent factor associated with an increased grade 3 and 4 morbidity rate (56.3 % versus 27.2 % respectively, P = 0.003).

Conclusion. Our study shows that, in selected patients, laparoscopic liver resection for HCC can be associated with no mortality, minimal morbidity and good survival. In addition, it allows complete histological study and does not compromise potential subsequent transplantation. We believe that it has a place in the therapeutic armamentarium of HCC, either with curative intent or as a bridge to liver transplantation.

162 LONGER WAITING TIME SUCCEEDS IN COMPENSATING IN-SUFFICIENT HYPTERTROPHY AFTER PORTAL VEIN EMBOLIZATION IN INJURED LIVER PARENCHYMA

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Summary and Background. Preoperative portal vein embolization (PVE) is indicated in patients presenting too small future remnant liver (FRL). A prospective study (Ann Surg 2003;237:208–17) showed no benefit of PVE for patients with normal liver parenchyma undergoing right hepatectomy. However, data are lacking about period of time required for adequate liver hypertrophy in patients with injured liver.

Objective. To evaluate whether time for liver regeneration after PVE is longer in injured liver parenchyma.

Patients and Methods. Between January 1997 and March 2006, 146 patients requiring a right or extended right hepatectomy for primary and secondary liver tumors underwent contralateral PVE in our institution. Liver volumes and time required for gain of adequate hypertrophy for safe liver resection were evaluated.

Results. Contralateral PVE was performed successfully in 145 patients. In one patient the procedure was abandoned because of failure to catheterise the left portal branch. One-hundred-fourteen patients (78.6 %) underwent right or extended right hepatectomy and 27 did not because of insufficient FRL hypertrophy (n = 12) and/or disease progression (n = 19). The mean increase of the FRL volume after PVE was 10.8 ± 7.0 %. Pathological type of the liver cancer, existence of cirrhosis, of diabetes mellitus and administration of chemotherapy did not affect liver regeneration. The mean delay between PVE and adequate FRL hypertrophy was 2.2 ± 0.1 months. The mean time for gain of adequate volume in cirrhotic, diabetic and chemotherapy treated patients were respectively 2.9 ± 0.4 months, 2.1 ± 0.2 months and 2.3 ± 0.1 months. The mean time of adequate liver volume gain was significantly longer in patients presenting injured liver (cirrhosis, chemotherapy and diabetes mellitus) compared to patients with normal parenchyma (2.4 ± 1.1 versus 1.8 ± 0.6 months, P = 0.009).

Conclusion. These results show that contralateral PVE is a safe and efficient procedure inducing hypertrophy of the FRL either normal or injured. Moreover, time mitigates insufficient hypertrophy after PVE in injured liver parenchyma.

163 LIVER RESECTION USING HEAT COAGULATIVE NECROSIS. INDICATIONS AND LIMITS OF A NEW METHOD. A SINGLE CENTRE EXPERIENCE WITH 20 CASES

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Abstracts

Introduction. Intraoperative blood loss has long been identified as one of the major morbidity and mortality predictors for liver surgery. A new approach towards achieving a bloodless resection is the use of heat coagulative necrosis in healthy liver tissue creating a zone of necrosis in which resection can be performed with a scalpel. The latest stage of this technique uses a 4-probe array device (Habib Sealer) to induce necrosis—unfortunately there is little but promising data for this new method up to now. We used it for a variety of liver resections ranging from wedge resection to trisegmentectomy to find the best indications and limits of the method in a collective of 20 patients.

Materials and Methods. Between March 2005 and June 2006 we performed 28 liver resections on 20 consecutive patients (m/f ratio 9:11, mean age 65.8 years) with the device.

Conclusions. The most common indication was metastatic colorectal cancer (75%). We treated a heterogeneous patient collective in terms of tumour localisation and extent of resection—resectability was enhanced through downsizing chemotherapy (2 cases) and portal hypothermic induction (1 case). 12 patients with metastatic colorectal cancer had received adjuvant chemotherapy after the primary operation according to histological staging—metastatic liver disease was synchronous in 6 cases and metachronous in 8 cases (mean time to metastasis 25.75 months).

Discussion. Postoperative coagulative necrosis was created at the intended resection plane using a scalpel. The device achieved an area of coagulation of 1cm width in which even larger vessels and bile ducts were safely sealed. Resection with the scalpel left 4mm of the coagulated area behind on the remnant.

Results. Operative spectrum covered parenchyma-saving atypical resections (8), one- or bisegmentectomies at different locations (15), hemipatectomies (1 × left, 3 × right) and an extended right hepatectomy.

With one exception intraoperative blood loss was lower than 100mls. Mean hypothermic coagulative necrosis was performed in 2 cases, mean pre- and postoperative haemoglobin were 13 mg/dl and 10.6 mg/dl respectively. Mean hospital stay was 12.2 days (7 to 26 days). 4 patients (20%) developed an operation related complication comprised of abscess formation at the resection site (2 patients had simultaneous biliary resection). In 3 cases CT-guided drainage was sufficient, one case needed operative revision.

Follow up shows tumour free survival for the first 13 patients with a follow up of 9 months, long-term results are pending.

Discussion. Liver resection using the sealer device seems a safe and time-efficient method though it requires extensive knowledge of intrahepatic vein anatomy. A time saving advantage is that liver mobilisation can be forgone in these cases. Resection itself is achieved rather quickly. In terms of indications in our view the method is good for atypical (deep) resections especially in Segment IV. Resections in proximity of hilar structure or large vessels are not favourable for the fear of thermal damage. Extended resections Hypothermic coagulative necrosis is possible if performed in a hybrid technique with conventional hilar preparation.
164 PERCUTANEOUS SCLEROTHERAPY OR SURGICAL TREATMENT IN THE SIMPLE LIVER CYSTS AND POLYCYSTIC LIVER DISEASE

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Cystic liver lesions comprise a heterogeneous group including the most common, simple liver cysts (solitary and multiple) followed by polycystic liver disease (PLD). Nowadays, management of symptomatic liver cysts encompasses percutaneous aspiration and instillation of a sclerosant (i.e. percutaneous sclerotherapy) or surgical de-roofing. The aim of this study was to assess the treatment of simple liver cysts and PLD using percutaneous sclerotherapy and/or surgical procedures. A total of 54 patients referred for treatment (30 solitary cysts, 20 multiple) and PLD. Between January 1997 and July 2006 were retrospectively analyzed. The criteria for diagnosis of multiple, simple liver cysts was the presence of more than 1 but fewer than 4 cysts, and for PLD, the presence of four or more cysts in the liver.

Simple liver cysts were treated in 41 pts (76%) with a mean size of 12.6 cm. The most common reason for referral was abdominal pain or discomfort (85%). Percutaneous sclerotherapy was performed as initial treatment in 30 pts, showing recurrence in 6 pts (20%). The mean aspirated volume of the cyst was 2223 ml (range 50–5000). Complications were encountered in 2 pts (6.7%), including an intracystic bleed without requiring further treatment and an infected cyst which needed admittance for antibiotic treatment. Only 1 patient (1/30; 3.3%) showed concomitant recurrence of symptoms and percutaneous sclerotherapy was carried out. Surgical treatment was performed in 11 pts with recurrence in 3 pts (27%). Additional percutaneous sclerotherapy was carried out in 2 patients because of concomitant progressive abdominal complaints (2/11; 18.2%). In patients with simple liver cysts, no significant differences were seen in recurrence rate after surgical treatment compared to recurrence after percutaneous sclerotherapy (27.3% (3/11) vs. 20% (6/30), respectively; P = 0.680).

PLD was diagnosed in 13 pts (24%) and all experienced progressive abdominal complaints. The mean cyst size was 13 cm. Percutaneous sclerotherapy was performed in 9 pts. However, only 4 pts had strong recurrence (77.8%) with cyst recurrence required repeat percutaneous sclerotherapy because of progressive abdominal pain. Surgical treatment was undertaken in 4 pts (30.8%) with recurrence in all. Eventually, liver transplantation was required in 2 patients.

Conclusions. The majority of patients with simple liver cysts and PLD are referred for progressive abdominal pain. As initial treatment, percutaneous sclerotherapy is appropriate for predominantly superficially located cysts. Surgical treatment is indicated in cyst recurrence after percutaneous sclerotherapy.

165 CLOSURE OF BILIARY DUCTS AND ADHESIVE STRENGTH OF FIBRINOGEN-COATED COLLAGEN PATCH OR LIQUID FIBRIN SEALANT IN AN EXPERIMENTAL LIVER RESECTION MODEL IN PIGS

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Background. Surgical management of the cut surface after liver resection consists of hemostasis and closure of bile leaks. Several fibrin sealants may be used to attain this goal. No studies have assessed the efficacy of these sealants for prevention of biliary leaks, nor the adhesive strength of these sealants to the resection surface of the liver remnant. The aim of this study was to assess the efficacy of sealing of biliary ducts and the adhesive strength of two types of commercially available sealing agents, i.e. a fibrinogen-coated collagen patch (TachoSil®) and a liquid fibrin sealant (Tissucol®) in a partial liver resection model in pigs.

Materials and Methods. Fibrin sealant is a hemostatic agent composed of fibrinogen and thrombin. The fibrinogen–coated collagen patch TachoSil® (Nycomed GmbH, Breda, Netherlands) was compared with the liquid fibrin sealant Tissucol® (Duo 500, 2 ml, Baxter Hyland Immuno, Uden, Netherlands). Eight pigs (Vendrag, Amsterdam, The Netherlands) weighing 35–45 kg were randomized in 2 groups. Each pig underwent laparotomy and resection of the left medial lobe of the liver. Larger blood vessels in the resection surface were sutured closed, whereas small bile ducts were left unclosed. Thereafter, the tip of a 16 Fr. Silastic catheter was introduced into the common bile duct through a distal incision until the confluence of the hepatic ducts. Pigs were assigned to two groups: application of TachoSil® (n = 4) or Tissucol® (n = 4) on the resection surface of the remnant liver. After 2 hours, pressure in the intrabiliary system was increased gradually by infusing sodium chloride through the catheter. Intrahepatic pressure was continuously monitored using an intraluminal pressure sensor. Results are expressed as mean ± standard error of the mean (SEM). Student’s t-test was used for differences between groups. P < 0.05 was considered significant.

Discussion. No difference was seen in the number of blood vessels closed in the resection surface of the group with TachoSil® compared to the group with Tissucol® (4.0 ± 0.4 vs. 5.5 ± 0.5; P = 0.0677). No difference was observed in the number of bile ducts in the resection surface of the group with TachoSil® compared to Tissucol® (2.5 ± 0.3 vs. 2.3 ± 0.3; P = 0.5416). No bleeding or bile leakage was observed in both groups after application of the sealants on the resection surface of the liver remnant. No significant difference in haemostasis time after TachoSil® or Tissucol® was observed (210 ± 12.9 sec vs. 14 ± 1.2 sec; P = 0.9517). The pressure that could be resisted with Tissucol® was significantly lower compared to that after application of TachoSil® (77.0 ± 8.6 mmHg vs. 131.8 ± 163.3 mmHg; P = 0.0405).

Conclusions. Application of TachoSil® on the resection surface is equally effective in obtaining haemostasis and in sealing of biliary ducts compared to Tissucol®. The adhesive strength of TachoSil® on the resection surface, however, is superior to Tissucol®.

166 IMPACT OF THE HEMORRHAGIC FORMS ON THE MANAGEMENT OF HEPATOCELLULAR ADENOMA

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Introduction. Haemorrhages or malignant transformation are the main complications of hepatocellular adenomas (HCA). The maximal preoperative diameter of the tumour was of 7.7 ± 1.9 cm, the weight of the specimen was 752.0 ± 305 g, the stay in ICU was of 9.0 ± 3.5 days and two patients were transfused. Group 2: there were 7 women and 2 men, mean age 45 ± 4 years old. Abdominal pain was present in 5/9, initial haemoglobin level at admission was 13.2 ± 0.8 g/dl (p = 0.11), had pain in 9/11 (p = 0.11), 6/11 had temperature of 37.6 ± 0.4°C (p = 0.003), tumour diameter was 10.4 ± 1.4 cm (p = 0.023) and specimens weighed 441 ± 83 g. ICU stay was 1.7 ± 0.3 days. None was transfused and morbidity was null. Group 3: women and men, maximum at age 36 ± 13 years old (p = 0.11), had pain in 9/11 (p = 0.18), haemoglobin level was 12.4 ± 1.4 g/dl (p = 0.003), tumour diameter was of 10.4 ± 1.4 cm (p = 0.02) and specimens weighed 800 ± 192 g (p = 0.08). ICU stay was 7.1 ± 3.4 days (p = 0.17). Morbidity was not specific (n = 3).

Discussion. In this short series, haemorrhage complicating an HCA was observed in 61% of the cases. In this group, surgical resections were larger and morbidity was not absent any more. A slight low haemoglobin level could be regarded as a sign of alarm.

Conclusion. In the absence of predictive factor of haemorrhage, we consider symptomatic HCA for resection, irrespective of the size of the tumour, especially in young patients.

167 TEMPORARY LIVER BLOOD-OUTFLOW OCCLUSION INCREASES EFFECTIVENESS OF RADIOFREQUENCY ABLATION: AN EXPERIMENTAL STUDY

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AIM. To evaluate the feasibility of liver blood outflow (LBOF) occlusion and its impact on the effectiveness of radiofrequency ablation (RFA). Methods. The experiment was performed on 10 pigs. The animals were divided into groups A and B according to RFA protocol. In group A (n = 5) the RFA time was that taken to reach the target temperature of 105°C,
Abstracts

whereas group B (n = 5) had a constant RFA temperature of 105°C and constant time of 8 min. The liver blood flow (LBF) was quantified using Doppler ultrasonography before LBOF occlusion and after that. RFA were performed using an expandable 3 cm RF needle. Two liver ablations created in different liver lobes were compared; the first ablation was created before balloon inflation and the second one was created under LBOF occlusion. The time required for RFA procedure, liver ablation volumes, shape and meaningful changes of the thermoablated zones were recorded.

Results. The LBF dropped significantly in all liver vessels after balloon inflation. The volume of the ablated area was 8.2 ± 2.2 cm³ and increased significantly after LBOF occlusion to 17.4 ± 3.8 cm³ (p < 0.001), in group A. A significant enlargement of the ablated area with occluded LBF was registered in group B, it was 6.7 ± 2.8 cm³ versus 19.4 ± 1.8 cm³ respectively (p < 0.01).

Conclusions. Temporary LBOF occlusion led to a significant reduction in liver blood flow, enlargement of the thermoablated area volume and homogeneity of the coagulated zones.

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168 RADIOFREQUENCY-ASSISTED LIVER RESECTION. ANALYSIS OF A GROUP OF CONSECUTIVE PATIENTS TREATED AT A SINGLE CENTER

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Aim. To evaluate clinical experience with radiofrequency (RF)-assisted liver resection in patients with metastatic liver disease.

Methods. A group of consecutive patients who underwent liver resection using the RF-assisted technique were prospectively followed.

Results. Between July 2005 and July 2006, 65 liver resections were performed, among these, 40 procedures were performed using the RF technique for metastatic liver disease. The mean operative time was 141 (range 64–233) minutes, and the mean duration of RF parenchyma coagulation of the resected surface was 17.5 (range 2–32.5) minutes; mean 10, (range 9–12) minutes in the case of right hemihepatectomy. Blood transfusions associated with the operation were administered in 3 patients (7.5%). The mean number of transfusion units of red blood cells administered was 0.2 (range 0–3). Liver resection was complicated by biliary fistula in 1 patient (2.5%) after mesophatetectomy, hepatic abscess was observed in 1 patient (2.5%) and subdiaphragmatic abscess was observed in 2 patients (3%).

Conclusion. This study indicates that RF-assisted resection may have a benefit in decreasing perioperative blood loss and the volume of transfused blood, without a higher incidence of wound or infectious complications. An increased incidence of pleural effusions that required evacuation was noted.

169 NONOPERATIVE AND OPERATIVE MANAGEMENT OF BLUNT HEPATIC TRAUMA

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Background. Liver injuries are the most frequent cause of death in the field of abdominal trauma. The increase in road accidents and sports injuries makes discussion of the treatment modalities increasingly relevant in this area.

Aim. In recent years we have witnessed an evolution in the therapeutic management of such injuries with the increasingly frequent use of non-operative procedures for the management of non-complex lesions.

Methods. A retrospective study was conducted in 111 cases of liver injuries observed in our department over a 20-year period (1985–2005). The mean age of the patients was 31 years. The most frequent causes were road accidents (48%), followed by sports injuries (23%) and occupational accidents (11%).

Results. 82 patients (74%) were treated surgically and 29 conservatively. In 58 cases (35 of which treated surgically), the liver injury was isolated, while in the other 53 cases lesions were also present in other abdominal organs. The liver injuries, classified according to the AAST, were grade I in 47 cases, grade II in 30 cases, grade III in 19 cases, grade IV in 5 cases, and grade V in 10 cases. Thirty-five percent of grade I-II lesions were treated conservatively, while 94% of grade III-IV-V lesions received surgical treatment. The overall operative mortality was 12.5%.

Conclusions. The evolution of the management of liver injuries has witnessed an increase in conservative treatment, particularly for grade I and II lesions. There is no alternative to surgical treatment when the injury involves the major hepatic vessels or substantial amounts of parenchyma. The mortality rate is high compared to that of elective liver surgery, but this is due to the frequent associated lesions in other organs and apparatuses.

170 LIVE CELL CAPTURING (LCC) AND PANCREATIC CANCER CELL CULTURES: A NEW METHODOLOGICAL APPROACH

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Introduction. Setting up of primary cultures from pancreatic adenocarcinoma is a delicate and complex procedure with very low chances of succeeding. One of the major issues is represented by the difficulty to separate epithelial cells from fibroblasts, which are very abundant due to the marked desmoplastic reaction associated to pancreatic adenocarcinoma. Aim of the present study was to expand the epithelial cell population by using laser microdissection on primary cultures derived from pancreatic adenocarcinoma.

Materials and methods. 90 samples from primary pancreatic adenocarcinoma were selected to set up primary cultures. Cells were grown in RPMI 1640 (10% FCS, 1% L-Glu, 1% Antibiotics) at 37°C in 5% CO2 humidified atmosphere. Seven primary cultures (PP78, PP109, PP117, PP147, PP161, PP244 and PP391) were obtained. Primary cell cultures PP244 an PP391 were sown (passage 42 and 3, respectively) on a new support of polyethylene tereftalate (PET) (IBIDI system, Figure 1), specifically designed for the laser microdissection instrument (Leica LMD6000). Very few cells, where microdissected using differential contrast microscopy from both cultures and directly transferred into the under IBIDI support by Live Cell Capturing (LCC) (Figures 1–2).

Results. Microdissected primary cells from PP244 and PP391 cultures grow to form a single layer in the IBIDI support (Figure 3).

Conclusions. Cell growth and migration on the new IBIDI membranes, were comparable to those obtained using standard supports (Figure 3). Furthermore, LCC allowed successful isolation and expansion of cell cultures. This new method could offer several advantages: 1) reduced primary culture time setting, by isolating a target cell type from the original mixed cell population; 2) isolation of different cell populations within a single primary culture; 3) the study of molecular interactions between tumor and stromal cells into a model near to in vivo conditions.

171 THERMAL AND MORPHOPHYSIOLOGIC CHARACTERISTICS OF RADIO-FREQUENCY ABLATION ZONES IN VIVO PORCINE LIVER

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Aim of study. To evaluate morphologic characteristics, thermal conditions and activation of apoptosis within different radio-frequency ablation (RFA) zones in porcine liver.

Methods. Approval of the study protocol was obtained from the Ethics Committee at the State Food and Veterinary Service of Lithuania. Internally cooled monopolar electrodes (exposed tip length – 2 cm) and power output were used during RFA procedures.

Conclusions. The IBIDI system consists in an upper support where cells grow and in an under support where cells are harvested after laser microdissection.
of 25 W were used to produce 30 ablated zones in vivo porcine liver. Tissue temperatures were acquired by type K thermocouple during the procedure at 5 and 10 mm distance from the active electrode. Animals were sacrificed upon completion of the ablation procedure. Macroscopic measurements and histological assessment of H&E stained slides of each ablated zone was performed to characterize the tissue damage. Western blot analyses of caspase-3 expression in lysates from tissue samples were performed to evaluate activation of apoptosis in different RFA zones.

**Results.** Morphologic analysis revealed following zones of tissue destruction: the inner zone of tissue necrosis (central zone) and transition zone. The structureless necrotic masses with damaged structure of hepatic cells were observed in central zone. The transition zone contained apparently undamaged hepatic tissue with signs of subacute hemorrhage – the infiltration of blood cells. The tissue adjacent to the transition zone was morphologically normal.

The mean measurements of central zone was 21 ± 1 mm longitudinally and 11 ± 1 mm transversally. Mean measurements of overall ablated area were 36 ± 3 and 23 ± 2 mm respectively. Temperatures at 5 mm from active probe (within central zone) gradually increased for 5 minutes to reach average temperature of 70°C and stabilized thereafter. At 10 mm point (within transition zone) temperature was gradually increasing for 10 minutes to reach the average temperature of 50°C.

The median concentration of protein in central zone tissue lysates was 38,14 mg of protein per gram of tissue. It was significantly lower when compared to protein concentration in transition zone and normal tissue lysates (60,29 mg/g and 82,23 mg/g respectively) suggesting thermal protein destruction. Western blot analysis detected inactive 32-kDa caspase-3 unit and did not detect the active 17-kDa subunit of caspase-3 either in ablated tissue or in normal liver tissue, suggesting that apoptosis was not induced immediately after RFA.
Conclusion. Our results suggest that non-viable tissue is obtained in central zone of tissue destruction only, whereas there is no evidence of either necrosis or apoptosis in transition zone immediately following radio-frequency ablation procedure.

172 STAGED LIVER RESECTION AND PORTAL VEIN EMBOLISATION: EXPERIENCE AT A SINGLE CENTRE

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Aim. To assess outcome after a 2-stage liver resection combined with portal vein embolization (PVE) in the treatment of patients with unresectable multiple and bilobar metastatic liver disease (BMLD) at a single centre.

Patients and Methods. Between November 2001 and December 2006, 21 patients with unresectable BMLD were selected for a TSLR. A right or an extended right hepatectomy was performed to induce atrophy of the right hemiliver and hypertrophy of the left hemiliver. Finally, a second-stage hepatectomy was planned to resect the right liver metastases.

Results. There was no operative mortality. Post-PVE morbidity was 9.3%; post-PVE mortality was 1.9% and 5.0% after first and second-stage hepatectomy, respectively. TSHP could be achieved in 13 of 21 patients (61.9%). The 2-year overall and disease-free survival rates were 85.0% and 63.4%, respectively, in the 13 patients in whom the TSLR was completed.

Conclusions. In selected patients with initially unresectable BMLD, a TSLR combined with PVE can be achieved safely with long-term survival similar to that observed in patients with initially resectable liver metastases.

173 LAPAROSCOPIC LEFT LATERAL SEGMENTECTOMY FOR COLORECTAL CANCER METASTASES

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Introduction. Laparoscopic treatment should be considered for selected patients with benign and malignant lesions in the left lobe or frontal segments of the right liver. The immediate benefits seem to be those of any miniminvasive surgical technique compared to the abdominal wall, early mobilization, shorter hospital stay, and better cosmetic results.

Case Report. We present a 76-year-old male who underwent colorectal resection for carcinoma 2 years before (pT3N0M0). In subsequent controls CEA elevation was detected. An abdominal CT scan was performed showing two liver metastases in segments II and III. No extra hepatic disease was reported after complete study with thoracic CT scan and PET. The patient underwent surgery on May 2006. A left lateral segmentectomy (segments II and III) was performed by laparoscopic approach. Pathological findings were consistent with metastatic colonic adenocarcinoma in the 2 resected nodules with safe resection margin.

Discussion. The recent rapid developments of innovative laparoscopic instruments and improvements in surgical skill have made laparoscopic-assisted liver resection possible. Obviously, extensive experience in laparoscopic and hepatobiliary surgery is mandatory in carrying out liver resection through the minimal access approach.

In appropriately selected patients, laparoscopic liver resection is feasible and safe, and achieves acceptable survival among individuals with hepatic malignancy. The evolution of laparoscopic hepatectomies probably will depend on the development of new techniques and instrumentation. The use of the haemostatic and sealant materials, widely used in open surgery, presents technical variations in its use in laparoscopic surgery, just as is we show in this video.

174 BILIARY DRAINAGE MORBIDITY AND PORTAL EMBOLISA-
TION MORBIDITY BEFORE CURATIVE SURGERY OF CHOLAN-
GIOCARCINOMA

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Cholangiocarcinoma (CC) is a rare cancer with poor prognosis. Aggressive surgical treatment is the only means of enabling patient survival. The type of resection depends on whether the CC is located in intrahepatic (IHCC), in the hilus or in the distal bile duct (DBDCC). It has been suggested that pre-operative biliary drainage (which remains controversial) and portal vein embolization reduce the risk of post operative complications. The goal of the present work was to evaluate i) the morbidity of the pre-operative therapeutic acts and ii) the results of medical and surgical management for CC patients.

Patients and methods. In this prospective study, we recorded the demographic, clinical, biological, morphological, histological, therapeutic and follow-up characteristics of 58 CC patients treated between November 1st 2002 and June 30 at 2005. In all cases, treatment decisions were taken by a multidisciplinary cancer care team. According to the clinical and morphological parameters, patients for whom surgical resection was thought to be most appropriate underwent primary resection either alone or with a pre-operative, therapeutic act: endoscopic or percutaneous biliary drainage and/or portal embolization. The results of the medical and surgical management were evaluated in terms of morbidity and mortality associated with the pre-operative and surgical acts and in term of survival.

Results. Surgical treatment was recommended to 25 of the 58 CC patients (5IHCCs, 11 HCCs, and 9 DBDCCs). Percutaneous and endoscopic biliary drainage was performed in 9 and 3 patients, respectively, i.e., in 11 (all HCCs and 1 DBDCCs). Complications were observed in 4 of these cases (33%); 1 subcapsular haematoma, 1 biloma, 2 cases of acute pancreatitis). Portal embolization was performed pre-operatively in 6 patients and was complicated by portal thrombosis in one case. The mortality of these pre-operative acts was zero. Nine patients were excluded from surgery: 1 refusal, 4 cases of peritoneal carcinosis (3 of which were revealed by pre-operative coelioscopy), 1 locally advanced CC, 2 cases of complications associated with drainage and 1 with portal embolization. Hence, curative resection was performed in 16 cases: 3 IHCCs (hepatoendoscopic ablation and/or portal embolization), 7 HCCs (hepatoendoscopic ablation and/or portal embolization), and 6 DBDCCs (duodenopancreatectomy, drainage n=4) and 9 DBDCCs (duodenopancreatectomy, drainage n=1). Postoperative infectious complications were observed in 2 patients (HCCs) having undergone pre-operative biliary drainage. No post-surgery deaths occurred. Seven patients received adjuvant treatment (radi chemotherapy or chemotherapy alone). Cumulative survival at 30 months was 40%.

Conclusions. The present results emphasize that pre-operative drainage of CCs for which curative resection is envisaged has a high morbidity rate and is associated with complications that can subsequently rule out surgery. The act’s risk/benefit ratio in CC therapy needs to be evaluated in terms of both its modalities and its indications.

175 RUPTURED HEPATIC ABSCESS CAUSED BY FISH BONE PENE-
TRATION OF THE DUODENAL WALL: REPORT OF A CASE

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Accidental ingestion of foreign bodies into the gastrointestinal tract is not uncommon. However, the development of hepatic abscess secondary to foreign body perforation is extremely rare. We describe herein the case of a ruptured hepatic abscess due to fish bone penetration of the duodenal bulb, resulting in the generalized peritonitis. A 73-year-old man was admitted to our hospital complaining of whole abdominal pain and high grade fever. During the ultrasonography (CUT) scan of the abdomen revealed aseptic and heterogeneously enhanced mass with a less-dense center and a linear dense object. We made a diagnosis of ruptured hepatic abscess caused by a calcified foreign body. Peritoneal lavage, drainage of the hepatic abscess with the removal of the Clive and simple closure of the peptodudal fistula were performed. The patient recovered eventually.

176 INTRAHEPATIC SEGMENTAL BILE DUCT B3 CHOLAN-
GOEINlier BUTTER THE MANAGEMENT OF UNRESECTABLE MALIGNANT HILAR OBSTRUCTION

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Introduction/Aim. Palliating the effects of biliary obstruction is a major goal of therapy in patients with unresectable cancer at the hepatic duct confluence. This study was undertaken to evaluate the effectiveness of intrahepatic holangioenteric bypass to the segmental bile duct B3 in patients with unresectable hilar cholangiocarcinoma or gallbladder carcinoma. Methodology. The confluence pattern and surgical anatomy of the bile duct branch B3 of segment S3 of the liver was studied in 33 liver casts. It is important to understand the detailed anatomy of B3, its confluence patterns and its relation to the segmental portal venous branch P3. We did not register any anatomical variations of segmental biliary ducts B2 and B3.

Results. Since March 2001, we have performed intrahepatic segmental bile duct B3 cholangiojejunostomy by Roux-en-Y fashion utilizing a round-shaped cassette with an appropriate peritoneal fit. The results of the medical and surgical management for 10 cases. There was no postoperative surgical complications (postoperative bleeding, bile leakage, abscess formation) in our series. Operative mortality rate after B3 cholangiojejunostomy was 4.3% (one patient). The palliation of
178 HEPATOBILIARY CYSTADENOCARCINOMA: A CASE REPORT
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Introduction. Hepatobiliary cystadenocarcinoma is a rare neoplasm occurring in middle-aged women. The clinical feature is not marked but abdominal fullness and abdominal mass are the most common symptoms.

Case report. A 49-year old woman was admitted to our clinic with right upper quadrant abdominal discomfort and 6cm-sized unilocular hepatic cystic mass. The medical history was not unusual; laboratory tests were normal. Serum CEA, CA 19-9, and alpha-fetoprotein levels were normal. CT demonstrated a unilocular cyst in Couinaud’s segment S4. The mass was localized on the undersurface of the liver between the round ligament and gallbladder, above the the hilus structures, without communication with biliary tract. Anatomical segmentectomy S4 was performed with curative intention (R0 resection). A unilocular cyst surrounded by a thin fibrous wall was filled with mucinous and gelatinous fluid. Histologically, the inner surface was lined with mucin-producing cuboidal epithelia accompanied by focal papillary growth, which is consistent with cystadenoma. The stromal mass was composed of adenocarcinoma. The postoperative course was uneventful. The patient is doing well 14 months after surgery, without signs of tumor recurrence.

Conclusion. Cystadenocarcinomas usually arise from pre-existing cystadenomas. The treatment of choice is complete surgical resection.

179 ADJUVANT CHEMOTHERAPY USING UFT FOR HEPATOCEL- LULAR CARCINOMA: FINAL REPORT OF PROSPECTIVE, RANDOMIZED STUDY
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Introduction. Liver resection is the best option in the treatment of the metastatic disease. Surgical resection if feasible is the treatment of choice since it produces a 5 year survival rate of about 30%. In order to achieve better results repeated surgical resection, hepatic artery chemoinmobilisation, cryo and thermo surgery, ethanol injection of the tumor and RFA are being investigated as potential treatment option for such patients. Locoregional HAI chemotherapy is of the mayor interest.

Methodology/Results. retrospectively was evaluated the effects of HAI for liver metastases. 20 patients were treated with implantable catheter-port systems with the following non-resectable metastatic lesions: colorectal 6 cases, breast 3, hepatic 4, pancreatic 3, breast 4 and gynecol. 1. Angiography was performed to identify variations in arterial anatomy. Administered dose was 750 mg/b of 5FU, 6 cycles of 5 days per month. Assessment of response to treatment was based on CT and tumor markers CA 19-9, CEA. We had no patient with complete response, partial response-50% of tumor volume CT control had 2 (10%) patients (group 1A) with low TS (<2.43) and low DPD mRNA (<0.63) than that in 8 patients (group 1B) with high TS (72.43) and high DPD mRNA (79.63) values (25% vs 50%) (p = 0.25). The disease free period tended to be longer in group 1A than in group 1B (15.4M vs 7.6M). In group 2, there was no significant difference The results were well according to the CAT Scan, MRI and transrec- tion-PCR assay.

Conclusion. Adjuvant UFT administration was considered effective for preventing early recurrence in patients with low TS and low DPD mRNA values after resection of HCCs. Selective administration of 5-FU is recommended.

180 SYSTEMATIC SUBSEGMENTECTOMY IS AN ADEQUATE PRO- CEDURE FOR PREVENTING RECURRENCE OF HEPATOCEL- LULAR CARCINOMA
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Introduction. Hepatocellular carcinoma (HCC) is characteristic of causing intrahepatic metastasis (im). Systematic (anatomic) subsegmentectomy (SS) was developed to extirpate the total portal area containing a hepatocellular carcinoma (HCC) and im. This study aims to clarify the efficacy of SS by comparing recurrence pattern (RP) of HCC after SS and limited resection (LR).

Methods. 52 SS and 69 LR cases for one HCC were enrolled in this study. Their clinicopathological data and disease-free survival time (DFS) were evaluated retrospectively.

Results. Group characteristics (SS vs LR): Age; 65y vs 69y, ICG15; 14.8% vs 22.4% (p < 0.01), Alb (g/dl); 3.8 vs 3.4 (p < 0.01), Tumor size (cm); 2.7 vs 2.5, LC; 32/52 vs 55/69. Pathological data: portal invasion (vp); 11 vs 9, um; 10 vs 7. RP; (SS) 20 of 52 patients (38%) developed recurrence (LR 60, 1b; 31, 31, 1, 1); 3 of 11 patients with vp and 5 of 10 with im developed recurrence in the liver. 8 of the 18 patients (44%) underwent re-resection, while the remaining 10 received TAE. (LR) 44 of 69 patients (64%) developed recurrence (Liver; 43, Lung; 2). 8 of 9 patients with vp and all 7 patients with im developed recurrence in the liver. 6 of 43 patients underwent re-resection, while the remaining 37 received TAE. Cumulative survival rate at 5 years: 89.8% vs 84% (p = 0.453). DFS at 3 years: 44.5% vs 29.7% (p = 0.042).

Conclusion. In terms of DFS, SS is considered adequate for extirpating single HCC.
operative strategy in very severe cases (damage control surgery). The high level of injury severity score, the characteristic of hepatic injury or multiple trauma of abdominal organs were reasons for more than a half number of surgically treated patients in our group.

182 URGENT RESECTION OF SPONTANEOUSLY RUPTURED LIVER TUMOURS: REPORT OF THREE CASES

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Introduction. The rupture of the tumour is a potentially fatal complication of liver neoplasms. The authors present three cases of urgently operated ruptured liver tumours with different origins.

Methods. Case 1. A 7 years old girl with a positive familiar anamnesis of hepatoblastoma was admitted with signs of severe abdominal bleeding. During the operation a ruptured tumour was removed from the 4th segment of the liver. Histology proved hepatoblastoma.

Case 2. A 51 years old female was admitted with DIC. The origin was an enormous ruptured hemangioma occupying the right hepatic lobe. After an unsuccessful chemoembolisation an urgent right lobectomy was performed. Case 3. An 65 years old male was planned to undergo staging laparoscopy due undetermined neoplasm of the liver suspected to be HCC. During laparoscopy we detected the rupture of the tumour of the left lobe. After conversion a left lobectomy was performed.

Results. The 7 years old girl received chemotherapy. After 27 months she is free of recurrence. The 51 old year old female died after 8 months due to the rupture of lung hemangiomas. The 65 years old male died 13 months after the resection because of recurrence of the HCC.

Discussion/Conclusion. In certain cases when the chemoembolisation is not successful and delayed operation is not affordable urgent liver resection is the treatment of choice. It can result a good survival rate comparable to those undergoing elective surgery although the complication rate is higher and the recurrence of the disease is more common.

183 THE ROLE OF ULTRASOUND TO DETECT RESECTABLE RECURRENCE AFTER HEPATECTOMY FOR COLORECTAL LIVER METASTASES

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Background. Recurrence occurs in the majority of patients following hepatectomy for colorectal liver metastases. Repeat resection offers a feasible treatment for some of these patients. The aim of this study was to evaluate an ultrasound-based follow-up in the detection of resectable recurrent disease.

Methods. All patients undergoing hepatectomy for colorectal liver metastases at a single hepatobiliary referral centre in the UK from January 1999 to January 2005 were identified. Parameters reviewed included rates of recurrence, modality and timing of detection, rates of repeat hepatectomy, and survival.

Results. During the study period 191 patients underwent initial resection of colorectal liver metastases, and of these, 109 patients developed recurrent disease. In total, 21 patients underwent potentially curative intervention (16 hepatic resections, 4 pulmonary resections and 1 staged pulmonary/hepatic resection). Ten patients (13.9%) presenting with recurrent disease prior to 12 months after initial resection were amenable to curative resection compared to 11 patients (29.7%) presenting after 12 months. Sonographic surveillance identified all of the potentially resectable recurrent hepatic disease in this series.

Conclusions. Ultrasonography is effective in the detection of potentially resectable hepatic recurrence after hepatectomy for colorectal liver metastases; however routine chest imaging is needed.

184 MAJOR RESECTION OF HEPATIC COLORECTAL LIVER METASTASES IN ELDERLY PATIENTS: AN AGGRESSIVE APPROACH IS JUSTIFIED

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Introduction. With a progressively ageing population, increasing numbers of elderly patients will present with colorectal metastases and be referred for surgical resection. The aim of this study was to assess the safety of hepatic resection in patients over seventy years of age by comparing outcomes with those of a younger cohort of patients.

Patients and Methods. 49 patients over 70 years old who underwent hepatic resection for colorectal liver metastases were compared to 142 patients less than 70 years of age in terms of pre-, peri-, and post-operative results, as well as long-term survival.

Results. Major resections were performed in 61.2% of the elderly group and 67.6% of the younger group. The two groups were comparable in terms of operative duration, transfusion rate, length of HDU stay and post-operative hospital stay. The elderly group had a non-significant increase in post-operative morbidity. The 30-day and 60-day/patient mortality rates were similar between the two groups (elderly 0% and 4.1%; younger 2.1% and 2.8%). Long-term disease-free survival was similar between elderly and younger patients.

Conclusion. This study confirms that an aggressive surgical policy towards colorectal metastases in elderly patients is associated with low peri-operative morbidity and mortality, as well as good long-term outcomes.

185 REPEAT RESECTION FOR HEPATIC COLORECTAL METASTASES CAN EFFECTIVELY CURE RECURRENT HEPATIC DISEASE

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Introduction. Disease recurs in up to three quarters of patients following hepatectomy for colorectal liver metastases, and is confined to the remnant liver in approximately half of cases. It is therefore potentially amenable to hepatic resection. The aim of this study was to analyse the results of repeat hepatic resection at a single tertiary hepatobiliary referral centre in the UK.

Patients and Methods. All patients undergoing repeat hepatectomy for colorectal liver metastases at a single hepatobiliary referral centre in the UK from January 1999 to January 2005 were identified. The outcome of these patients was analysed and compared with those patients not developing recurrent disease.

Results. 17 patients underwent repeat hepatectomy during the study period, one as part of a staged pulmonary/hepatic procedure, with a mortality rate of 0%. The overall survival was significantly improved in those patients undergoing repeat resection than those with recurrent disease treated by palliative measures only (p = 0.008); 3-year survival rates 66% vs. 25%. The survival of patients undergoing repeat hepatic resection was similar to those patients not developing recurrent disease (p = 0.976); 3-year survival rates 66% vs. 69%.

Conclusion. Repeat hepatectomy for recurrent colorectal liver metastases can be performed with low mortality rates, and can effectively cure patients of recurrent hepatic disease.

186 HEPATIC ADENOMATOSIS: A CASE REPORT

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Hepatic adenomatosis (HA) is a rare disease defined by the presence of multiple hepatic adenomas. The natural history and treatment of HA are not yet well defined, because the potential for intraperitoneal hemorrhage or malignant transformation is difficult to estimate. Furthermore the technical difficulties of complete resection of all adenomas may present unique operative challenges. In contrast to solitary adenomas, HA shows no association with the use of oral contraceptives and increase in size and propensity to rupture during pregnancy is also not known.

We report an atypical case of hepatic adenomatosis associated with a significant increase in size and number of lesions during pregnancy. A 32-year-old woman was found to have two hepatic hypervascular tumors located in the right liver. The patient had history of oral contraceptives. Nodule biopsy suggested focal nodular hyperplasia. After pregnancy she was reevaluated ad it was noticed a marked increasing in size and number of lesions. A new biopsy suggested hepatic adenomas. Segmental hepatectomy was performed along with radiofrequency ablation. Histopathological examination of the surgical specimen confirmed estrogen positive hepatic adenomatosis.

Although lack of estrogen receptors in many lesions described in literature may suggest that estrogen does not play a dominant role, our case shows that analysis of estrogen receptor status may help in the treatment strategy.

187 COMPLICATIONS OF THE HYDATID LIVER CYSTS. HOW DO WE MANAGE THEM

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Abstracts
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The hydatic cyst of the liver is benign, usually uncomplicated disease, but which occasionally may complicate in one of four ways: perforate, become infected, give complications on bile ducts or blood vessels.
1. The perforation of the cyst is rare today, giving an anaphylactic reaction of various intensity and give dissemination from mild to incurable. 2. The infection of the cyst is almost always caused by communication with bile ducts or biliary-tertiate cyst presents a low-grade liver abscess, which may rarely perforate into the pleural cavity, right lung giving biliobronchial fistula, through the abdominal wall in previously operated patients or into the surrounding organs. All are very rare today. 3. Complications on blood vessels are rare and may express as a compression on the inferior vena cava, on portal vein, or cause thrombosis of the portal vein or perforate into the hepatic veins. 4. Complications on bile ducts are the most frequent appearing in up 30% of cases. Cyst over 10 cm, cyst localized in the left lobe and centrally localized cyst are more likely to damage the bile ducts. If rupture of the cyst is not clinically silent, but may cause obstructive jaundice, cholangitis or even pancreatitis. Those cysts are usually infected. The communication may be suspected preoperatively but must be established during the operation. Operative cholangiography is of great importance. It shows extensive infiltration with atypical cells, resembling malignant histiocytosis has not been reported so far. Hepatic cystadenoma is a very rare cystic tumor of the liver and association with malignant histiocytosis has not been reported so far. In a 64-year-old female, with physical examination hepatomegaly (+ 2 cm) was found. After ultrasound and CT scan analyses liver cyst was diagnosed and surgically treated. The whole cyst was removed. The histology of the cyst showed a mucinous cystadenoma. Four months the patient noticed cutaneous changes and systemic lymphadenopathy. Histology and immunohistochemistry of the lymph node and bone marrow specimens showed extensive infiltration with atypical cells, resembling malignant histiocytosis (CD45, CD45RO, CD11c, CD68, lysosome, antiryspin and H& E). Immunohistochemical, CD45, CD68, B-cell and T-cell marker was negative. She was treated with vinblastine, methotrexate and dexametason (3 cycles without response). The therapy was switched to the CHOP (cyclophosphamide, vincristine, doxorubicin, and prednisone) protocol with a good response but without achieving a complete remission. Two months after completion of 6 cycles of protocol CHOP she had headache, vomiting finally lost consciences and become paraparetic. CT scan was normal but in sediment of cerebrospinal fluid histocytes were found. The patient was treated with intrathecal application of methotrexate, prednisone and cytosine arabinoside and systemic therapy with vepesid and cyclophosphamide. Her condition improved but she hasn’t achieved remission.

Conclusion. An association of mucinous cystadenoma of the liver and malignant histiocytosis is unusual. There are some literature data of associations of other malignant tumors and malignant histiocytosis. Prevailing theories on triggering events leading to regeneration include humoral, metabolic and flow-mediated mechanisms, the latter emphasizing the dependence of shear stress mediated nitric oxide (NO) regulation. Recent microarray studies reveal that a multitude of cellular systems are simultaneously activated and repressed following PHx, notably, genes regulating protein, nucleic acid, cytokeskeleton and extra cellular matrix synthesis and genes controlling cell cycle entry and apoptosis. To investigate whether the grade of resection and hence the portal venous pressure, would be reflected in the gene expression profiles in the regenerating liver.

Methods. We employed a global porcine cDNA microarray chip with approximately 23,000 genes represented to explore gene expression profiles in consecutive biopsies from liver remnants after two different grades of resections (Low Poprat venous Pressure Resection (LPPR) and High Portal venose Pressure Resection (HPPR)) in the pig. Analysis of gene function was performed on metastatic samples from sixteen patients undergoing resection of CLM. MMP-2 and -9 expression was measured by zymography. Correlations between biomarker expression levels and clinicopathological characteristics were determined.

Results. HER2p185 and/or HER2p95 fragment were expressed in 14 (88%) samples of liver metastases. In 12 cases, the levels of HER2p95 were significantly greater than the levels of HER2p185. Active MMP2, proform MMP2 and MMP9 were expressed in 81%, 100% and 88% of cases respectively. Increased Her2p185 levels were negatively correlated with MMP2 and MMP9 expression (P = 0.0009 and 0.029 respectively).

Discussion. These results confirm that HER-2 is commonly expressed within CLM, and demonstrate that the dominant form of the protein is the truncated intracellular fragment HER2p95. These findings suggest that, in the context of CLM, agents targeting the tyrosine kinase domain of HER2 may have more clinical utility than monoclonal antibodies directed solely against the extracellular domain.

191 THE RELATIONSHIP BETWEEN SYSTIMIC INFLAMMATORY, SOCIOECONOMIC DEPRIVATION AND CANCER-SPECIFIC MORTALITY IN PATIENTS WITH MINIATURABLE COLORECTAL LIVER METASTASES

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Introduction. The HER2/ErbB2 oncoprotein, combined with ErbB4, is prognostic in the context of primary colorectal cancer and is overexpressed in 80% of colorectal liver metastases (CLM). Cleavage of the HER2p185 receptor, possibly due to matrix metalloproteinase (MMP) activity, results in a soluble extracellular domain and an intracellular activated HER2p95 kinase domain. The importance of this latter form has not been investigated. The aim of this study was to examine expression of these two forms of HER2 in colorectal liver metastases and to determine their association with clinicopathological characteristics and with matrix metalloproteinase (MMP) activity.

Methods. Quantitative analysis of protein expression using Western blotting was performed on metastatic samples from sixteen patients undergoing resection of CLM. MMP-2 and -9 expression was measured by zymography. Correlations between biomarker expression levels and clinicopathological characteristics were determined.
Introduction. Socioeconomic deprivation has previously been demonstrated to be independently associated with decreased cancer-specific survival in patients undergoing resection of primary colorectal cancer. This association was proposed to be due, in part, to increased systemic inflammation in deprived patients. The aim of this study was to determine the prognostic potential of socioeconomic deprivation and systemic inflammation (measured by peripheral neutrophil count and serum albumin) in the context of resectable colorectal liver metastases (CLM).

Methods. Data on patients undergoing resection of CLM between January 1999 and December 2004 were reviewed. Pre-operative clinicopathological variables, including the Memorial Sloane-Kettering Clinical Risk Score (CRS), neutrophil count and serum albumin were recorded. Deprivation was measured using the Carstairs deprivation index, which has been extensively used in cancer patients. Variables were compared to cancer-specific survival by entry into a Kaplan-Meier model and application of the log rank test. Significant variables were entered into a forward stepwise regression analysis in order to determine independent prognostic significance.

Results. 174 patients underwent hepatic resection for CLM over the study period and were eligible for inclusion. Median pre-procedure neutrophil count was 6.5 × 10^9/L (range 3.0–12.8) and median Carstairs score was 1.35 (range –4.3 to 12.22). By univariate analysis, significant variables for decreased cancer-specific survival included increasing CRS (P = 0.008), increasing neutrophil count (P < 0.001) and decreasing serum albumin (P = 0.009). Deprivation showed a non-significant trend towards poorer survival (P = 0.1) and no significant association with systemic inflammation. On multivariate analysis, significant variables for decreased cancer-specific survival were increasing neutrophil count (P < 0.001), decreasing serum albumin (P = 0.004) and increasing CRS (P = 0.007). When combined with the pre-operative neutrophil count identified five patient groups with progressively poorer cancer-specific survival (P < 0.001).

Conclusion. Systemic inflammation, but not socioeconomic deprivation, is associated with decreased cancer-specific survival following resection of CLM.

192 EXPRESSION OF CYCLO-OXGENASE-2 (COX-2) CORRELATES WITH EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) IN RESECTED COLORECTAL LIVER METASTASES (CLM) AND PREDICTS SHORTENED DISEASE-FREE SURVIVAL

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Introduction. Epidermal growth factor receptor (EGFR) and the prostanoid endoperoxidase COX-2 are implicated in the pathogenesis of colorectal cancer (CRC) and are key targets for novel molecular therapies. Cooperation between the EGFR and COX-2 pathways in carcinogenesis has been demonstrated in other malignancies, suggesting that combining targeted therapy against EGFR and COX-2 may further improve anti-cancer efficacy. The aim of this study was to examine expression of EGFR, COX-2 and the prostaglandin metabolising enzyme prostaglandin dehydrogenase (PGDH) in resected CLM, determining their correlations with each other and prognostic and clinical characteristics.

Methods. Quantitative analysis of protein expression using Western blotting was performed on metastatic samples obtained from sixteen patients undergoing resection of CLM. Correlations between biomarker expression levels and clinicopathological characteristics were determined.

Results. EGFR, COX-2 and PGDH expression was detected in 44%, 63% and 100% of CLM respectively. Increasing EGFR expression was significantly associated with increasing COX-2 expression (P = 0.004), whilst PGDH expression was associated with neither EGFR nor COX-2 expression. No association between COX-2 or EGFR expression and tumour number, tumour size or Memorial Sloane-Kettering Clinical Risk Score was demonstrated. Increasing COX-2 expression was, however, significantly associated with both decreased disease-free survival (P = 0.03) and decreased hepatic recurrence (P = 0.027) following metastasectomy, whilst increasing EGFR showed a non-significant trend towards decreased disease-free survival (P = 0.18).

Discussion. These findings support a biological link between EGFR and COX-2 in metastatic colorectal cancer akin to that demonstrated in other malignancies, and suggest a role for COX-2 in the development of an aggressive tumour phenotype. These findings confirm the potential for COX-2 inhibition with or without concomitant EGFR inhibition in the treatment of metastatic colorectal cancer.

193 INTEGRATED CT-PECT DETECTS EXTRAPHEPATIC DISEASE WHEN IT GAINS SENSITIVITY THAN CT/MRI IN PATIENTS WITH POTENTIAL RESECTABLE LIVER METASTASES

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Introduction. Integrated computed-tomography/positron emission tomography (CT-PET) is increasingly being advocated for the evaluation of intra- and extra-hepatic disease in patients with colorectal liver metastases (CLM). To date, however, few studies have evaluated the accuracy of CT-PET in the context of potentially resectable CLM. In this paper we evaluate the sensitivity and specificity of CT-PET in the context of potentially resectable CLM, and report the first comparison of this technique with a CT and magnetic resonance imaging (MRI)-based imaging protocol (CT/MRI).

Methods. All patients who, due to diagnostic uncertainty following standard imaging, required CT-PET between June 2004 and June 2006 were eligible for inclusion. Results of CT/PET and our standard imaging protocol (contrast-enhanced CT scanning of the abdomen/pelvis/thorax and MRI of the liver) were compared with actual disease distribution (determined by laparotomy/intra-operative ultrasound (IOUS), laparoscopy/IOUS and/or formal CT scanning).

Results. Over the study period 37 patients underwent CT/PET and were eligible for inclusion. CT/MRI and CT-PET showed comparable sensitivity in detection of the number/distribution of intrahepatic metastases (< 3 unilobar vs. 4+ unilobar vs. bilobar), with sensitivities of 89% and 92% respectively (P = 0.3) and CT/PET demonstrated non-significant trends towards decreased sensitivity in the detection of pulmonary metastases. CT-PET was, however, significantly more sensitive in the detection of non-pulmonary extrahepatic disease than CT/MRI. Non-pulmonary extrahepatic disease was missed by CT/MRI in 44% of cases, whereas CT-PET failed to detect such disease in only 14% of cases (P = 0.02). Both CT/MRI and CT-PET demonstrated high specificity in the detection of non-pulmonary extrahepatic disease, with false-positive rates of 9% and 4% respectively (P = NS).

Conclusion. This is the first study to compare integrated CT-PET with a CT/MRI-based imaging protocol in the context of potentially operable CLM. CT-PET was found to provide similar information to CT/MRI regarding the intra-hepatic distribution of CLM, but demonstrated significantly superior sensitivity in the detection of non-pulmonary extra-hepatic disease, without any corresponding loss of specificity.
Results. Number of metastases who were treated was 65. Wedge resection was performed in 27 cases (LA:2), segmentectomy in 16 (LA:1), right hepatectomy in 2 and RF ablation in 20 cases (LA:12). Hepatic resection only was performed in 18(71.5%) pts. and 6(28.5%) underwent wedge resection and radiofrequency ablation. In all cases the mean blood loss was 125±65ml. Post-operative bleeding was occurred in 1 case, bile leakage in 1 and pleural effusion in 2 cases. Patients were followed during a mean period of 25±30 months and the cases of recurrence were 3(14.3%). Died are 8(38%) pts., 13(62%) still alive with 11 of them free disease symptoms. Mortality rate during first 30 post-operative days was 0%.

Conclusions. Hepatic resection is the treatment of choice for colorectal liver metastases. The use of RF in the management of liver metastases, especially in hepatocarcinoma, seems to offer advantages but require a greater number of studies to be confirmed in order to improve the survival and quality of life in patients with colorectal liver metastases.

196 REPEATED LIVER RESECTIONS FOR MALIGNANT TUMOURS

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Key words. repeated liver resection

Aim. Demonstration of the liver surgery capabilities in the treatment of the recurrent hepatic malignancies

Seven hundreds sixteen hepatic resection have been performed in the Department of hepatopancreatobiliary surgical oncology, Cancer Research Clinic, State institution N.N. Blokhin Cancer Research Center for primary and secondary liver malignancies since 1990. One hundred eight (14.6%) patients developing intra- and extrahaepatic recurrences underwent the varying repeated procedures: hemihepatectomies – 19, segmentectomies and wedge liver resections – 37 (including 9 third liver resections), radiofrequency ablation – 87, cryoablation – 47, cryoablation –8 and hepatic lymph node dissection – 3.

The metastatic lesions originated from the following primary malignancies:
- the colorectal carcinoma – in 35, the hepatocellular carcinoma – in 16, the gall-bladder carcinoma – in 4, the pancreatic head carcinoid tumour – in 4, the adrenal gland carcinoma – in 4, the stomach carcinoma – in 1, the cervix carcinoma – in 1, the sex cord tumour – in 1 and the embryonal carcinoma in 1 patient.

Twenty three patients developed the recurrences within six months after the first liver resection, 25 patients – in a term of six to twelve months and the rest ones later than one year. Three patients with isolated hilar lymph nodes metastases had undergone the liver resections for hepatic artery thrombosis in 3 to 10 years prior to the second procedure. The repeated liver resections appeared much more challenging comparing with the primary ones due to the prominent ablational adhesions and the altered anatomy. They also demonstrated the higher morbidity rate – 45% versus 29% for the first liver resections. The mortality rate after re-resections was 2.9%.

The actuarial 5-year survival rates were 36.5, 49.5 and 52.2% in patients undergoing repeated liver resections for colorectal metastases, non-colorectal metastases and intrahepatic recurrences of primary hepatic tumors, respectively. The repeated liver resections can pronoucedly improve survival in the accurately selected patients.

197 REGIONAL CHEMOTHERAPY IN THE TREATMENT OF GASTRIC CARCINOMA METASTATIC TO THE LIVER (GCM): LONG-TERM RESULTS

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Purpose. To evaluate survival of pts with GCM after hepatic artery infusion (HAI) and transcatheter artery chemoembolization (TACE).

Materials and Methods. Between 1992 and 2002, 28 pts with advanced unresectable GCM received transcatheter treatment. Of them, 19 pts underwent 52 cases HAI with 5-FU, Doxorubicin and Giplatin. In the remaining 9 cases 18 cases TACEs with 60 – 80 mg Doxorubicin in 10 – 20 ml Lipiodol plus Gelfoam were performed.

Results. At present all pts died. In group of HAI, one complete and four partial tumor response are seen. Stabilization was noticed in 6 pts, while 8 pts showed tumor progression. The mean survival for HAI was 12.4±1.9 mo, with 1-, 2- and 3-year survival 47%, 11% and 5%, respectively. After TACE, stabilization developed in 4 and progression in 5 pts. The mean survival was 8.4±2.2 mo (p<0.05 if compared with HAI), and 1-, 2- and 3-year survival were 22%, 11% and 0%, respectively.

Conclusion. For the pts with unresectable GCM HAI is more effective palliation than TACE.

198 COMPLICATIONS AFTER PERCUTANEOUS TRANSFEMORAL IMPLANTATION OF A CATHETER-PORT SYSTEM FOR INTRAARTERIAL CHEMOTHERAPY OF COLORECTAL LIVER METASTASES

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Purpose. To evaluate the complications in patients who underwent percutaneous transfemorally implantation of a permanent catheter-port system for intraarterial hepatic chemotherapy and to determine their clinical relevance and specific management.

Methods. Catheter-port systems were placed in 18 patients with colorectal liver metastases. Under fluoroscopic guidance, infusion catheter was positioned so that the tip was placed in the distal part of the right gastroepiploic artery and a side hole in the common hepatic artery. Intraarterial oxalipatin plus 5-fluorouracil and systemic leucovorin were administered.

Results. No complications occurred during the implantation procedures. The mean number of intraarterial chemotherapy cycles was 8 (1–18). During the follow-up period (27–590, mean 234) days, complications occurred in 9 patients (50%) and included: hepatic artery thrombosis (n = 4), exposure of the port due to skin defect (n = 3), gastroparesideluodenal misperfusion (n = 2), catheter dislocation, broken catheter, and broken port reservoir (each one). Surgical (plastic of skin defect, remove and change reservoir) or interventional radiological (local thrombolysis, coil embolization, arterial supply, replacement catheter) corrections were performed successfully, and no discontinuation of intraarterial therapy was needed.

Conclusions. Percutaneous implantation of implantable catheter-port system for intrahepatic chemotherapy is relatively safe procedure. Technical and pharmacologic complications are common, but can be effectively treated by minimally invasive approaches.

199 INTRAARTERIAL CHEMOTHERAPY USING IMPLANTABLE CATHETER-PORT SYSTEM IN THE TREATMENT OF PATIENTS WITH COLORECTAL LIVER METASTASES: FURTHER EXPERIENCE

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Purpose. To evaluate initial clinical results of catheter-port based continuous hepatic artery infusion chemotherapy (HAI) in the treatment of colorectal liver metastases.

Methods. Since December 2001 to December 2006, thirty five patients with colorectal liver metastases were treated with HAI, using implantable catheter-port system. Laparotomic approach was used in 17 and percutaneous transluminal approach in 18 patients.

Results. No complications occurred during the implantation procedures. The mean number of chemotherapy cycles per patient was 6 (1 to 18). The mean follow-up period was 241 (27–730) days. At present, 24 patients are alive within 3 and 29 months and continue to receive HAI, while 11 patients died in 4 to 22 months due to tumor progression. The common 1-year survival is 77%.

Conclusion. Initial results showed that HAI using catheter-port system is feasible and potentially effective for the treatment of unresectable colorectal liver metastases.

200 CYTOREDUCENT OPERATIONS COMBINED WITH HEPATIC ARTERY INFUSION PUMP PLACEMENT FOR TREATMENT OF UNRESECTABLE LIVER TUMOURS

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Purpose. To evaluate the initial results of treatment protocol for unresectable liver tumors with combination of cytoreductive surgery: resection and/or radiofrequency ablation (RFA) of tumor nodules with hepatic artery infusion pump placement (HAIP) followed by chemotherapy.

Methods. Since April 2003 to April 2006 this protocol was used to treat 14 pts with unresectable liver tumors. 12 pts were operated for colorectal metastases, one for hepatocellular carcinoma and one for metastatic carcinoid.

Results. The mean size of tumor nodules was 2 (1–5) and mean tumor size was 66 (34–186) mm. Of 14 pts, seven received RFA+HAIP, four resection+RFA+HAIP and three resection+HAIP. All patients get chemotherapy via implanted HAIP postoperatively.

Results. No serious complication was observed. The mean follow-up period was 428 (126–1012) days with mean number of chemotherapy cycles 6 (2 to 11) per patient. At present, 8 pts are alive within 6 to 37 mo and continue to receive chemotherapy, while 6 patients died 4–21 mo due to tumor progression. The common 1- and 2-year survival was 85% and 55%, respectively.

Conclusion. The combination of cytoreductive surgery with HAIP seems to be a perspective protocol for the treatment of unresectable liver tumors.
OVER CHEST X-RAY (CXR) IN PATIENTS WITH POTENTIALLY RESECTABLE COLORECTAL LIVER METASTASES

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Introduction. The 2006 UK guidelines for PRCLM recommend CCT to exclude PMs, but positive CCT yield following normal CXR is <5%. PRCLM patients are increasingly referred for pneumonectomy. It is unclear whether this influences PRCLM survival. We reviewed outcomes with regard to detection methods of co-existing PMs, subsequent developments of PMs, and long-term outcome among PRCLM patients undergoing hepatectomy.

Methods. Retrospective analysis of a prospectively collected consecutive cohort of 268 PRCLM patients, referred between 01/01/2004 and 31/12/2005, all with ≥12 months post-hepatectomy follow up. 52 were deemed unresectable; 9 of 28 given chemotherapy became resectable with curative intent. The 188 deemed resectable at time of referral are the subject of this study. All patients had CXR and CT lung bases (included in CT abdomen). CCT was only performed following suspicious CXR or CT lung bases. Post-hepatectomy, CCT was performed at six monthly intervals for a minimum of 12 months.

Results. 13/188 (6.9%) CXRs were suspicious for PMs, confirmed in 12/188 (6.4%). 12/13 were among 18/188 (9.6%) abdominal CTs suspicious for PMs, 14/188 (7.4%) confirmed; 4/188 (2.1%) lesions radiologically benign. Of 170 with both negative CXR and abdominal CT, 2/188 (1.1%) developed PMs within 12 months of hepatectomy. Overall 37/188 (19.7%) presented with, or developed PMs: 28/37 (77%) had unresectable chest disease; 9 (23% of all PMs, 4.8% overall of patients undergoing hepatectomy) underwent pneumonectomy.

Conclusions. The purpose of chest investigations of PRCLMs is to exclude hepatectomy because on the basis of unresectable PMs, or detect potentially resectable PMs. Despite advances in CT technology over the last decade, our CXR yield [14/188 (7.5%)] over CXR [12/188 (6.4%)] was <1%, and detection of resectable PMs <5%, no better than a decade ago. Our data suggest that the yield of CCT over CXR to detect potentially curable PMs may not be clinically significant.

References

202 SIMULTANEOUS LAPAROSCOPIC RECTAL AND LIVER RESECTION

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Background. The optimal surgical strategy for the treatment of resectable synchronous liver metastasis from rectal cancer remains controversial. The optimal surgical strategy for the treatment of synchronous resectable colorectal liver metastasis has not been defined. Simultaneous rectal and liver resection has been associated with increased postoperative morbidity.

Methods. A 59 years old man was admitted to our Department for liver resection performed simultaneously to the laparoscopic low anterior resection. Laparoscopic liver resection was performed at time of operation.

Results. Postoperative courses were uneventful. Intraoperative blood losses were 350 ml and length of operation was 450 minutes. The patient was discharged on post operative day 8 and he is disease free at 6 months after surgery.

Conclusions. Laparoscopic liver resection performed simultaneously to the laparoscopic low anterior resection is feasible and safe.

203 USE OF RECOMBINTANT ACTIVATED FACTOR VII AS ADJUNCTIVE THERAPY TO CONSERVATIVE MANAGEMENT IN SEVERE BLUNT LIVER TRAUMA

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Introduction. Hepatic trauma occurs in approximately 5% of all admissions in emergency rooms. The anatomic location and the size of the liver make the organ even more susceptible to trauma. Major liver injuries continue, despite technical advances, a challenge to surgeons and the last decade there has been an increasing interest in the conservative management even in the severe liver injury.

Because of the excellent results in patients with haemophilia, it has been suggested that rFVIIa (recombinant activated factor VII) might have a place in other acquired clinical conditions characterized by incoercible bleeding despite appropriate blood component therapy.

Aim. Two case severe blunt liver trauma report (grade V) in which was used rFVIIa to avoid continuous bleeding and to get a conservative management.

Results. The first case was a 27 years old male, 90 kilograms with traffic trauma. He was admitted in Trauma ICU with liver injury grade V (giant central haematoma) and spleen haematoma.

The second case was a 43 years old male, 67 kilograms with traffic trauma. He was admitted in Trauma ICU with multiple fractures and liver injury grade V (intrahepatic middle and right hepatic vein injury and haematoma that affected segments VII, VI, VI, and V). The haemoglobin level on ICU was 10.0 and 5.2 g/dl, arterial tension 100/67 and 110/70 mmHg, Glasgow score 15 and 15, respectively. We decided conservative management with appropriate blood component therapy and alone dose rFVIIa (60 microg/kg and 50 microg/kg, respectively).

Conclusion. The outcome of the first case, suffered hepatic insufficiency and two haemobilia episode.

Both of them were discharged without abdominal surgery.

204 ERITROPOETIN AND FACTOR YIIA DURING HPB-SURGERY

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Introduction. Erythropoietin is a drug that stimulates the production of erythrocytes. Recombinant factor VIIa (rFVIIa) is a complex factor that activates coagulation. Its application in some clinical investigations showed encouraging results.

Unfortunately by now there are no works evaluating the use of these two active substances in general surgery and especially in HPB surgery, with significant hemorrhage as place.

The aim of this study is to estimate the initial results of application of erythropoietin and recombinant factor YIIa with patients with extended operations on liver and pancreas accompanied with significant hemorrhage.

Materials and methods. In the work under the “planning” of perioperative hemorrhage, which we have been carrying out in our clinic since 1998 and that is drawn up in the form of clinical trial since 2005, we used erythropoietin (Eopcin, Russia) and recombinant factor YIIa beginning from August, 2005. Eopcin was taken into investigations because it most resembles clinical.

Results and preliminary conclusions. By now there are estimated results on 12 patients only. But now it is clear enough that with extensive hepatectomy (right-side and left-side lobectomy and trisecrectomy as well as hemihepatectomy) without autotransfusis and allogenic blood is decreased from 3 to 1 units.

The expedience of the use of these two medicines is dictated by the fact that the use of erythropoietin in perioperative period is accompanied with the marked intraoperative bleeding sickness of tissues. And input of recombinant factor YIIa into the treatment regimen lessens this negative feature of erthropoietin stimulator.

205 CARCINOID LIVER METASTASIS WITH THE USE OF OCTREOTIDE BEFORE AND AFTER SURGERY

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Introduction. Carcinoid tumor is a rare tumor. The diagnosis before surgery is difficult before surgery, especially when the main tumor is localized in small intestine and there are multiple liver metastases. Usually the diagnosis confirmation is very controversial (even to use such new modalities as PET and Octreoscan). Sometimes the clinic data are much more important than other investigations. According to basic data octreotide is very effective for such kind of tumors.

Aim. The purpose of this study was to present the opportunity using of octreotide as diagnostic and treatment test in the course of carcinoid disease.

Methods. During 2 years period (2005–2006) we treated 5 patients with carcinoid tumors located at the upper part of jejunum and in the last part
of ileum with the development of carcinoid syndrome with multiple liver metastases. All conventional tests before surgery confirmed the presence of multiple liver tumors with primary origin. Because of suspicion of carcinoid syndrome we used high doses of octreotide for prophylactic treatment.

**Results.** We had got the decline of symptoms before surgery for all patients. These results confirmed the diagnosis of carcinoid. The surgery confirmed our preoperative diagnosis and the praesens of tumors in above mentioned part of bowel. After intestine resection (in all cases) we made citoextraoperative surgery of liver tumor nodules and the implantation of catheter into hepatic artery. Postoperative patients received high doses of octreotide and Sandostatin LAR. Carcinoid syndrome resolved completely and the lost metastases in liver were reduced dramatically.

**Conclusions.** Our results confirmed that the use of octreotide is an effective treatment of carcinoid tumors and carcinoid syndrome before and after surgery and could be use as diagnostic modalities for these patients.

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**COMBINED OPERATIONS ON THE ADVANCED CANCER OF STOMACH WITH LIVER RESECTION**

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**Introduction.** According to our data the advances of stomach cancer into liver is in 5% of all operated patients. 10% of them have solitary or isolated dissemination by one lobe of liver metastatic affection.

**The Aim of the Study.** The aim of our study is to estimate of the nearest and follow up results of treatment of patients with stomach cancer with resection of hepatic metastases in liver.

**Materials and Methods.** During the period from 1984 till 2007 181 patients with cancer of stomach and dissemination of the process into liver have been operated in our clinic. There were 73 patients with direct growth into liver, the other ones with isolated by one lobe of liver metastatic affection. The volume of gastric resection and lymphatic system dissection were standard. The volume of resections of liver: 32 patients with left-side or right-side anatomic lobectomy of liver, 67 patients with anatomic sector- and segmentectomy, the other patients were with non-anatomic resections. In the postoperative period 80 patients got different regimens of chemotherapy.

**Results.** Every year it is marked demographically the decrease of the number of such operations. It is caused by the improvement of preoperative diagnostic. The lethality during the postoperative period is 11% (0.08%), the number of complications - (34.25%). There is no dependence on the volume resection of liver. The follow up results: 1 year – 42 patients (23.2%), 3 years – 42 patients (6.08%), 5 years – 2 patients (1.1%). All the patients observed during 1 year and more received chemotherapy.

**Conclusion.** It is necessary to perform operations on stomach cancer with involving of liver. The lethality and the number of complications after such operations are relatively small. All the patients should receive chemotherapy.

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**REPEATED LIVER RESECTION FOR RECURRENT HEPATO- CELLULAR CARCINOMA**

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**Aim.** We evaluated the role of repeat liver resection for recurrent hepatocellular carcinoma (HCC).

**Material and Methods.** We performed 244 cases of liver resection for HCC from April 2000 to March 2006. One hundred and 9 of 244 cases had recurrent HCC, and 34 of 109 cases underwent repeat liver resection. We divided into 3 groups as follows: repeat resection group (A), no-repeat resection group (B) and none recurrent group (C). We analyzed the over all survival of these groups. According to Makuski criteria, surgical resection and procedure were determined.

**Result.** There were 29 males and 5 females in the Group A, 25 cases had hepatocarcinoma, 5 cases had hepatoblastoma and 2 cases had hepatoblastoma and hepatocarcinoma, and two had unknown etiology. Six cases need to 2 times or more repeat resection (up to 3 times). Surgical procedure were as follows: partial resection: 26 cases, subsegmentectomy: 5, anterior resection: 1, lateral segmentectomy: 1 and right lobectomy: 1. The average of blood loss, Pringle's time and operative times were 626 g, 41 min. and 5 hr 34 min., respectively. Two cases died of HCC after repeat resection. The mean survival time was 18.9 months and the mean disease-free survival time was 11.6 months after first operation. Five year overall patient survival rate for each group were, 92% for A group, 42% for B group and 78% for C group. A group showed significantly better survival than B group (P<0.001). There was no significantly difference between A and C group in patients survival (p = 0.277).

**Conclusion.** Repeat liver resection for recurrent HCC had favorable survival rate in this study. This survival rate was almost similar number for none recurrent of HCC cases. The aggressive repeat liver resection is suggested to be a most effective treatment for recurrent HCC.

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**SHORT-TERM AND LONG-TERM RESULTS OF LAPAROSCOPIC OPERATIONS ON THE LIVER AT NON-PARASTIC CYSTS**

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Ninety nine patients with 169 non-parastic liver cysts were operated in A.V.Vishnevsky Institute of Surgery from February, 1992 till December, 2006. Ninety one were females and 8 – males; their age varied from 32 till 78 years (middle age was 63 years). Fifty seven patients had chronic calculous disease, 15 patients had chronic disease, 36 patients had liver cirrhosis, 9 patients had hepatitis B, 2 – cysts gastroesophageal reflux disease, and 1 patient – cysts, gastroesophageal reflux disease and chronic calculous cholecystitis. Plural cysts were found at 32 patients and solitary – at 67. The cyst sizes exceeded 5 cm at 45 patients, that at presence of clinical semiology was the sufficient indication for the surgical treatment, independently from any accompanying surgical pathology. The size of liver cysts at this group of patients varied from 5 up to 18 cm (average size - 10.6 ± 2 cm (±SE). Complications occurred at 6 patients: 5 of them were postoperative infection and 1 – haemorrhagic. There were no cases of cystostomy fistulas in our supervision.

Cyst fenestration with wide excision of its walls was performed for subcapsular and superficial intraparenchymal cyst. The intraparenchymal part of a cyst was deepiizelised by various methods. Deep intraparenchymal cysts depending on their size were underwent partial or functional puncture-drainage sclerization. Atypical liver resections with wide excision of cystic walls with doubtful blood supply was done for large superficial intraparenchymal cysts in one or several segments.

The long liquid leakage on drainages within 5 - 7 days was marked in the postoperative period at 11 patients. The bile leakage from 300 up to 100 cc per day occurred in one case after atypical liver resection for the big cyst of 2, 3 and 4th segments and resolved spontaneously within 1 month. Average duration of the postoperative period was 9 days (from 4 days till 1 month).

Long-term results from 1 to 10 years were observed at 45 patients, at whom cysts exceeded 5 cm. Residual cysts at the operation cite were found in two cases 1.5 and 2 years after the operation in dorsal segments of the right lobe of a liver, but their sizes were essentially less in comparison with preoperative. Considering the absence of clinical signs the repeated intervention was not performed.

Our experience shows, that laparoscopic treatment of non-parastic liver cysts is accompanied by good results with small quantity post-operative complications and low rate of recurrences. Wide excision of protruding cystic walls with deepiizelisation of a residual cavity is the most widespread and effective operation. Laparoscopic atypical liver resections with excision of thin, partially sclerotic functionally defective sites areas of parenchyma is indicated at big and giant liver cysts. Laparoscopic puncture and puncture-drainage methods of treatment are auxiliary in addition to cystic excision. They provide radicalism of intervention at patients with plural liver cysts with intraparenchymal or dorsal location.

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**METHODS OF PARENHIMAL DISSECTION AND THE HEMOS-TASIS AT LAPAROSCOPIC OPERATIONS ON THE LIVER**

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Today laparoscopic technologies are one of actively developing directions of surgical hepatology, reflecting general tendencies of development of Surgery. World experience shows, that similar operations for small size local lesions are radical enough, possess all advantages of miniminvasive interventions and usually are accompanied by non-complicated postoperative period. The basic role of operation is prevention of the possible bleeding which is realized by precise manipulations with application of consecutive or simultaneous various methods of dissection of hepatic tissue and their compression on the incisions sites. The variety of techniques of dissection of hepatic tissue described in the literature (usage of ultrasonic scissors, destructor-aspirator, clips, vascular endostapler, equipment as LigaSure, TissueLink, supplemented by mono-, bipolar, or argonplasmag coagulation etc.) does not allow to choose a unique optimal way of a resection, and once again specifies a necessity of their effective combination.

Superficial liver areas (2-3 cm from a capsule) usually do not contain large vessels. Optimal tools to incise the parenchyma are ultrasonic scissors which are used for the additional hemostasis is achieved using various kinds of electrocoagulation. Methods of contactless coagulation (argonplasmag, hydrothermal, spray) have obvious advantages. Safe dissection of deep liver areas means topical diagnostics and marking of large vessels by dynamic laparoscopic ultrasound for their precise allocation and their crossing after their clearing or sewing. The sufficient for correct dissection of vessels from parenchyma is performed by destructor-aspirator, water-jet dissector, instruments or devices as Tissue-Link. The hemostasis is made using various variants of contactless electrocoagulation.

Large veins are crossed with vascular staplers. Veins of moderate diameter (up to 3 – 4mm) can be crossed after processing by the device as LigaSure or clipping.
Vascular isolation of a liver is not an obligatory stage of laparoscopic operations. Pringle method can be applied if uncontrolled bleeding occurs at any time. The results of the maintenance of the reliable hemostasis. The experience of laparoscopic liver resections on 29 patients shows, that the combination of various techniques of parenchymal dissection and hemostasis allow to perform safe laparoscopic resections even at patients with a cirrhosis.

210 LAPAROSCOPIC VERSUS OPEN HEPATIC RESECTIONS FOR BENIGN AND MALIGNANT NEOPLASMS – A META-ANALYSIS

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Background. Laparoscopic surgery for hepatic neoplasms aims to provide curative resection while minimizing complications. The present study compared laparoscopic versus open surgery for patients with hepatic neoplasms with regard to short-term outcomes.

Methods. Comparative studies published between 1998 and 2005 were included. Evaluated endpoints were operative, functional, and adverse events. A random-effects model was used and sensitivity analysis performed to account for bias in patient selection.

Results. Eight nonrandomized studies were included, reporting on 409 resections for benign and malignant neoplasms, of which 165 (40.3%) were laparoscopic and 244 (59.7%) were open. Operative blood loss (weighted mean difference = –123 ml; confidence interval = –179, -67 ml) and duration of hospital stay (weighted mean difference = –2.6 days; confidence interval = –3.8, –1.4 days) were significantly reduced after laparoscopic surgery. These findings remained consistent when considering studies matched for the presence of malignancy and segment resection. There was no difference in postoperative adverse events and extent of oncologic clearance.

Conclusions. Laparoscopic resection results in reduced operative blood loss and earlier recovery with oncologic clearance comparable with open surgery. When performed by experienced surgeons in selected patients it may be a safe and feasible option. Because of the potential of significant bias arising from the included studies, further randomized controlled trials should be undertaken to confirm these findings and assess long-term survival rates.

211 EARLY ENTERAL NUTRITION AFTER LIVER RESECTION

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Type of nutritional support in patient after liver resection is still controversial. Early enteral nutrition most probably should decrease incidence of postoperative complications. The aim of our study is investigate the impact of early postoperative enteral nutrition on convalescence after liver resection.

Methods. Between January 2000 and April 2005, 63 patients who underwent hepatic resection for colorectal metastases at the Department of hepatobiliary surgery, National Research Center of Surgery were identified. Factors associated with morbidity and mortality, demographic and clinical data were collected and analyzed. Recorded biochemical values included serum glutamic oxaloacetic transaminase (AST), serum glutamic pyruvic transaminase (ALT), alkaline phosphatase, serum urea nitrogen, gamma-glutamyltransferase, serum albumin, white blood cells and total lymphocyte counts. The patients were divided into two groups: 29 patients (EN group) received oral enteral nutrition. It was started on postoperative day 1 by giving 200 kCal/d with increase to 600–800 kCal/d from day 2 or 3. The second (control) group (34 pts) received parenteral nutrition.

Results. The two groups of patients were similar in sex, age, type and volume of hepatic lesion and other preoperative indices. The proportion undergoing major hepatectomy and other important intraoperative factors were similar between groups. No significant difference in postoperative hospital stay occurred between groups. However, a significant beneficial effect of EN on length of intensive care unit stay was observed in group 1. The difference was mainly due to a significant reduction in infectious and non-infectious (cardiac and respiratory failure) complications (EN 7% vs control 21%; p = 0.0428 and EN 7% vs control 27%; p = 0.0492, respectively), and period of the recovery of intestinal motility (EN 15 ± 4.3 vs control 18 ± 6.1; p = 0.03). There were no differences between groups in serum albumin, urea nitrogen, lymphocyte counts and liver-specific biochemical parameters.

Conclusions. We conclude that early enteral nutrition after hepatectomy is helpful for recovery of intestinal motility, decreasing consequences of hypercatabolism, preventing septic complications, induced by surgical stress.

212 LAPAROSCOPIC LIVER SURGERY: A NINE-YEAR CASE SERIES

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Objective. This case series aims to describe a developing experience in laparoscopic liver surgery and presents results from 40 procedures including major hepatectomy, left lateral lobectomy and microwave ablation therapy.

Methods. Forty patients undergoing laparoscopic liver surgery between September 1997 and November 2006 were included. The data set was collected from medical records and included: operative procedure and duration, intraoperative blood loss, conversion to open operation rates, length of hospital stay, complications, mortality, histology of lesions/ resection margins, and disease recurrence.

Results. The mean age of patient was 59 years, 17/40 were male, 23/40 of lesions treated were benign and 17/40 malignant. Operations included: laparoscopic anatomical resections n = 15, non-anatomical resections n = 11, microwave ablations n = 8 and deroofing of cysts n = 7. Median anaesthetic time was 120 minutes (range 40–240 minutes), mean blood loss 78 ml and 1/40 operations were converted to open (due to equipment failure). Median resection margins were 10 mm (range 1–14 mm) and median length of stay 3 days (range 1–10). Operative and 30-day mortality were zero and there has been no local disease recurrence.

Conclusion. Laparoscopic liver surgery appears safe, effective and is associated with reduced hospital stay. Larger studies are required to confirm it is oncologically sound.

213 CHANGES OF SERUM REDOX STATE DURING EXTENDED LIVER RESECTIONS WITH ISCHEMIC PRECONDITIONING

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Background. The purpose of this study was to determine the changes of oxygen-derived free radicals (ODFR) levels, and to compare the I-R damage on the liver with, or without ischemic preconditioning (IP) prior to portal clamping of the liver during major hepatectomies.

Materials and Methods. Hundred patients were randomly divided into three groups: with (n = 45; preconditioning group), or without (n = 45; no preconditioning group) 5 minutes of portal triad clamping and 10 minutes of reperfusion in 2 cycles before major hepatectomy under vascular exclusion of the liver preserving the caval flow. In the third group (n = 10; control group) only exploratory laparotomy was performed. Serum free radicals and antioxidants concentrations such as aspartate transferase, alkaline phosphatase, alcalic phosphatase, gamma-glutamyl transferase, bilirubin and prothrombin levels were measured. Morbidity and mortality were determined in both groups.

Results. The amount of serum ODFR and antioxidants were correlated with the tumor size and the length of the ischemia. The levels of serum ODFR, AST, ALT, ALP, GGT and bilirubin levels, morbidity, mortality rates and lengths of ICU and hospitalization stays were significantly lower in the two first groups only without ischemic preconditioning (p < 0.05). It significantly increased the level of serum antioxidants. Beside the previous, serum ALP, GGT and bilirubin levels, morbidity, mortality rates and lengths of ICU and hospitalization stays were significantly lower in the patients with liver steatosis, fibrosis or cirrhosis especially in patients with longer duration of ischemia (>25 minutes).

214 NEW AND INNOVATIVE USE OF THE GYRUS PLASMAKINETIC BIPOLAR COAGULATION DEVICE FOR LIVER RESECTION IN CIRRHOTIC AND NON-CIRRHOTIC LIVERS

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Introduction. Performing liver resection for a cirrhotic liver can be a challenging undertaking. We report the use of a novel pulsed bipolar coagulation device which has proved to be useful in performing parenchymal transection through both cirrhotic and non-cirrhotic livers.

Methods. A retrospective study of 30 consecutive liver resections from July 20, 2005 to November 1, 2006 was undertaken. The surgical technique did not differ for cirrhotic versus non-cirrhotic livers other than the fact that a Pringle maneuver was avoided for the cirrhotic livers. The Gyrus PlasmaKinetic pulsed bipolar coagulation device was used for liver parenchymal transection. Argon beam coagulation as well as clips and sutures were used as necessary.

Results. There were 18 males and 12 females. Six patients had histopathological confirmation of cirrhosis in the adjacent liver. 16 patients (53.3%) did not require any blood transfusion. There was no difference in the proportion of patients receiving a blood transfusion between the cirrhotic and non-cirrhotic patients (p = 0.46). The average age was 54.8 ± 13.8 years, with a range of 29 to 87 yrs. There were 27 open procedures and 3 laparoscopic procedures. Of these, there were 13 major resections (73 segments) and 17 minor resections (< 3 segments). Average operation time was 263 ± 117.2 min. Length of stay had a median of 9 days. There were no post-operative deaths. 6 patients (20%) had significant post-operative complications. These included two bile leaks early in
the study which appeared to be remedied by alteration of the power setting on the generator.

Conclusion. The novel technique of using the Gyrus PlasmaKinetic pulsed bipolar coagulation device coupled with Argon beam coagulation and other traditional haemostatic and biliostatic modalities for liver resection is safe and reliable. In particular, cirrhotic livers could be resected without the risk of greater blood loss or complications.

215 BREAST CANCER LIVER METASTASES—IS SURGICAL TREATMENT INDICATED?

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Aim. Metastasizing of the breast carcinoma to the liver has been considered the sign of the disease process generalization with a poor therapeutic prognosis. Therefore, the aim of this study was to assess the results of liver resections and/or radiofrequency ablations (RFA) in patients with breast cancer liver metastases (BCLM).

Patients and methods. 358 patients with liver tumours were operated on at our Department between January 2000 and December 2006.17 patients with primary breast carcinoma were operated on for liver tumours. BCLM were diagnosed in 15 patients (4.2%), in two patients benign tumours were found (local nodular hyperplasia, chronic liver abscess). The average age of patients with BCLM was 48.5 years (33–71). The average period of time from the date of the primary surgery for the breast carcinoma till the BCLM appeared, was 8.2 years (from 0.45 years to 9 years). BCLM were solitary in 12 cases and in three cases the metastases were multiple. Four right hepatectomies, two segmentectomies, three left lobectomies, five RFA, one combined procedure—liver resection and RFA were performed. In 10 cases, the histological examination proved a ductal carcinoma and in six cases a lobular carcinoma. Following surgery, all female patients underwent curative chemotherapy.

Results. There was 0% postoperative (30 days) mortality. The morbidity was 6.5% (iatrogenic injury of biliary tree during complicated hepatectomy in one patient). The data were statistically evaluated according to the Kaplan-Meier analysis (patients survival, disease free interval). 12 months and 30 months survival rate were 100%, and 66.7%, respectively. A disease free interval was 0% and 71.5%, respectively for the same periods of time following the liver surgery and RFA for BCLM.

Conclusion. Based on our own results and in conjunction with the current literature data, it is clearly evident that liver resections and/or RFA followed by chemotherapy is the therapeutic method of choice in patients suffering from BCLM.

The study was sponsored by Grant IGA MZ NG 8301–3.

216 REPEATED LIVER PROCEDURES FOR COLORECTAL LIVER METASTASES RECURRENCE

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Background. Recurrence of colorectal liver metastases (CRLM) after primary liver surgery develops in 60–80%. Of those 30% of recurrences are localised to the liver. The aim of this study was to evaluate the long-term results of repeated liver procedures for recurrent CRLM.

Method. Total of 205 patients with CRLM were operated on from January 1, 2000 to December 31, 2006. Repeated procedures (liver resection, and/or radiofrequency ablation) were performed in 117 patients (57 procedures) in the interval of 6–38 months after primary liver surgery. A total of 57 procedures were performed (16 liver resections, 34 radiofrequency ablations and 7 combined procedures). Two patients had staged liver and lung resections for CRLM. The average age of patients was 62.3 ± 9.6 years. The statistical analysis was performed using S.A.S. software 8.02.

Results. 30 days post-operative mortality was zero. Four patients (13.8%) suffered from wound infection or bile leakage in the postoperative period. 82.3 ± 65.1, 36.5% of patients survived 1, 2 and 3 years after the repeated procedures. Disease free interval (DFI) was 33.1%, 6.3% and 0.6% for 1, 2 and 3 years.

Conclusion. Repeated liver procedures are fully indicated in patients with good life expectancy. These procedures don’t increase postoperative morbidity and mortality of patients and significantly prolong patients life.

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217 99MTc-GSA SCINTIGRAPHY WITH SPECT FOR THE ASSESSMENT OF HEPATIC FUNCTION AND FUNCTIONAL VOLUME DURING LIVER REGENERATION IN A RAT MODEL

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Small animal models are crucial in order to gain insights in the complex recovery mechanisms of liver function during liver regeneration. Many qualitative liver function tests require repetitive blood samples, and are therefore difficult to use in small animals. 99mTc-mebrofenin hepatobiliary scintigraphy (HBS) has been introduced for non-invasive assessment of liver function in the clinical setting as well as in experimental research. However, HBS is restricted to planar modalities in small animals because the kinetics are generally too fast for SPECT acquisition. 99mTc-GSA scintigraphy is an alternative, receptor mediated, non-invasive liver function test. After hepatic uptake, 99mTc-GSA remains trapped in the liver enabling additional SPECT for the assessment of both liver function and liver functional volume within one test.

In this study, we evaluated the use of 99mTc-GSA scintigraphy combined with SPECT for the assessment of liver function and liver functional volume in normal and regenerating rat liver. Reproducibility of 99mTc-GSA scintigraphy and SPECT was investigated by repeated measurements within the same rat. For the assessment in a regenerating liver, liver function (99mTc-GSA uptake), liver functional volume by 99mTc-GSA SPECT and conventional liver volume was assessed on 1, 3, 5 and 7 days (n = 6 per time point) following 70% partial hepatectomy (PH).

The correlation between repeated 99mTc-GSA measurements was significant and strong (r = 0.754, p = 0.019). In normal rat livers, there was a strong and significant correlation between functional volume assessed by 99mTc-GSA SPECT and conventional liver volume (r = 0.93, p < 0.001). Correlation between 99mTc-GSA uptake and conventional liver volume was moderate (r = 0.62, p = 0.043). The mean liver functional volume and conventional liver volume was significantly decreased 1 day after 99mTc-GSA SPECT and compared to baseline (12.14 ± 0.20 ml and 12.38 ± 0.32, respectively) compared to baseline (12.14 ± 0.20 ml and 12.38 ± 0.32, respectively), after which it regenerates to normal liver volume at day 5 (11.82 ± 0.39 ml and 12.15 ± 0.45 ml) and day 7 (11.80 ± 0.37 ml and 11.76 ± 0.50 ml). There was a significant correlation between the functional volume and conventional volume in the regenerating liver (r = 0.86, p < 0.001). One day after 70% PH, the 99mTc-GSA uptake (8.01 ± 0.62 %/min) significantly decreased compared to baseline (27.08 ± 1.82 %/min), after which it slowly increased to baseline level at day 7 (21.71 ± 1.94 %/min). During the regeneration process 99mTc-GSA uptake was significantly lower compared to both conventional volume (p < 0.001), and functional volume (p < 0.001), when expressed as a percentage of baseline levels (fig. 1).

99mTc-GSA scintigraphy combined with SPECT is a feasible, non-invasive method for the assessment of hepatic functional volume in normal, as well as in regenerating rat livers. However, the hepatic 99mTc-GSA uptake as a liver function test seems to underestimated the hepatic regeneration.

218 RADIOFREQUENCY THERMAL ABLATION OF 195 PATIENTS WITH COLORECTAL CANCER LIVER METASTASES

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The aim of this study is to report our results of 195 patients treated with percutaneous radio-frequency thermal ablation (P-RFTA) due to colorectal liver metastases. Between 2001 and 2006 three hundred thirty-four treatments were performed in 195 patients (112 M, 83 F) with a mean age of 63 years (range 24–81). 74% of this number of metastases was 1.8 (3 days) after patient and the mean maximum diameter was 4.9 cm (1.5–12). In all patients the ablation was performed using “Cool-Tip” equipment (Tyco Healthcare) in total intravenous anaesthesia (TIVA). All patients had been rejected for surgical resection. In 146 patients chemotherapy with 5-FU and Leucovorin as the only adjuvant regimen was given, 20 patients received no chemotherapy. The median follow-up time was 18 months (0–66.7 mo). During this time 126 patients developed new metastases in the liver and/or extrahepatic spread. In 3 patients liver foci were successfully resected due to tumor downsizing and no signs of extrahepatic disease, in 3 patients – without recurrence in the liver – resection of solitary lung metastases were performed. The median survival time is 17.6 months, which is better as expected in such
chemistry regimen. In this group of patients 9 major and 13 minor complications occurred (2.6% and 3.89% of all treatment sessions). P-RFTA is a promising method in the treatment of colorectal liver metastases.

219 RADIOFREQUENCY ABLATION IN THE TREATMENT OF HEPATOCELLULAR CARCINOMA

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One hundred and four life patients (57M, 48F) aged 20–86 years (mean 63) were treated in our institution due to hepatocellular carcinoma (HCC) using radiofrequency thermal ablation between 2001 and 2006. In all patients, except one, the cause of HCC: liver cirrhosis, in one-intoxication with undefined toxin. 209 thermal ablation sessions were done, 205 of them percutaneously (mean 2 sessions / patient – 1 to 11). This treatment was combined with transarterial chemoembolization (TACE) in 6 patients. 196 percutaneous ablations were performed, 12 of them US guided. In 9 patients lesions were indetectable in US, so combined approach US/CT was used. Total number of RFTA treated lesions was 209 (mean 2.0/patient), mean maximum diameter was 6.8 cm (2–12 cm), in three patients treated ablation after fourth ablation for 12 cm HCC – patient was treated outside of our center. 5 major local complications occurred (twice a subcapsular hematoma, three liver abscesses), treated conservatively. Mean follow-up time is 16 months (0–52), mean survival time since the first ablation is 13 months (1–52). Two patients with borderline match to Milano criteria were transplanted after 13, 16 and 48 month after RFTA, one is still alive. Conclusion. RFTA is a promising method in the treatment of HCC and gives the patient a chance for prolonged survival.

220 FEASIBILITY, SAFETY AND EFFICIENCY OF LAPAROSCOPIC LIVER SURGERY: THE SOUTHAMPTON EXPERIENCE

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Background. Experience in laparoscopic liver surgery (LLS) is increasing in liver surgery. We report up 3 year experience in 22 patients.

Methods. Between August 2003 and January 2007, 45 patients (20 male, 25 female; median age 66 (range 21–88) years) were put forward for LLR. Two surgeons were involved (NWP and MAH). The indication was malignancy in 20 patients (79.4%), trauma in 3 patients (13.3%) and incidental or metastatic disease in 2 patients (8.9%). 8 patients LLS was not performed; 5 were converted and 3 were abandoned due to peritoneal disease diagnosed at laparoscopy.

Results. In 20 patients LLS was not performed; 5 were converted and 3 were abandoned due to periportal disease diagnosed at laparoscopy. Thirty seven patients had LLS; left lateral sectionectomy (17) wedge resection involving 2 liver abscesses, treated conservatively. Mean follow-up time is 12 months (0–48 months) and median hospital stay 3 (1–8) days. Negative resection margins were obtained in 36 patients. Six patients had resection margin involvement (8–30 mm). Performing analysis of variance (ANOVA) across different resection types showed blood loss and resection margin achieved were not significantly different. As expected single wedge resections were associated with a shorter operation (p = 0.040) and hospital stay (p = 0.037) compared with resections involving two or three or more wedges. Only five (11%) complications were encountered with only one (bile leak) being major. Three patients (7%) experienced new recurrence one of which died at 8 months post treatment. Survival rate at 10 years is 10 (2–41) months.

Conclusion. Technical expertise in LLS is growing, such that high standards of operative care may be achieved. Larger prospective studies are required to assess the equivalence to the open technique in short and long term results.

Posters – Pancreas

PP-02
Abstract Numbers 221–275

221 INTRATUMORAL INJECTION OF MACROPHAGE-ACTIVATING LIPOPOLYPEPTIDE IN PATIENTS WITH PANCREATIC CARCINOMA: A PHASE I/II TRIAL

Objective. This phase I/II trial examined safety and efficacy of the toll-like receptor 2/6 agonist MALP-2 in combination with gemcitabine in patients with incompletely resectable pancreas carcinomas.

Methods. Men and women with incompletely resectable pancreas carcinomas were eligible while patients with R0 or R1 resections or with peritoneal carcinosis were excluded. Ten patients were injected intratumorally with a median of 1 session of RFTA surgery with 20–30Å,Äug MALP-2 followed by postoperative chemotherapy. Samples were taken from peripheral blood and wound secretion, and assayed for cell content, cytokine and CRP levels, and NK activity.

Results. A MALP-2 dose of 20 ÅÄug given to 5 patients was well tolerated. In two out of three patients treated with 25ÅÄug MALP-2 and in one out of two patients treated with 30ÅÄug serious adverse events occurred (asystole, myocardial infarction and endotoxin-like shock). They recovered completely. Clear signs of local MALP-2 effects were: influx of lymphocytes and monocytes in wound secretions, and abolition of inhibition of NK activity. The actual mean survival is 16.3 ÅÄug ± 3.8 months; the median survival being 9.3 months. Three patients are still alive after 26 months.

Conclusions. Up to 20ÅÄug MALP-2 were well tolerated, and no systemic effects were noted. The mean survival of 16.3 months is remarkably high. 222 FEASIBILITY AND SAFETY OF LAPAROSCOPIC DISTAL PANCREATICECTOMY AND LAPAROSCOPIC PANCREATICODUODENECTOMY

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Background. Advances in operative techniques and technology have facilitated laparoscopic distal pancreaticectomy (LPD) and laparoscopic pancreaticoduodenectomy (LPD).

Methods. All distal pancreaticectomies were attempted laparoscopically, while selected patients underwent LPD.

Results. Eleven patients with a median (range) age of 64 (32–79) years underwent LPD with (n = 3) and without (n = 4) splenic preservation and LPD (n = 4). All procedures were completed laparoscopically. The median operating times for LPD and LPD were 315 and 675 minutes respectively with a median blood loss of 300 and 400 ml respectively. The morbidity, pancreatic fistula, re-admission, re-operation, and mortality rates were 30%, 20%, 20%, 0% and 0% respectively. The median (range) postoperative hospital stay after LPD and LPD was 8 (4–14) and 13 (9–23) days respectively. Tumours were 1.0–10.5 cm in diameter and included endocrine (n = 5), adenocarcinoma (n = 4), cystadenoma (n = 1) and pseudopapillary tumour (n = 1). At a median (range) follow up of 5 (2–50) months, one patient has died of brain metastases, while the remainder remain disease-free.

Conclusions. The laparoscopic approach to distal pancreatectomy and pancreaticoduodenectomy is feasible and safe. The pancreatic fistula rate is equivalent to that observed with open surgery. Growth of experience, technique refinements and long-term follow up data are needed.

Introduction. Material and Methods.


Results. The analysis was performed using the software package SPSS 10 (Chicago, Illinois, USA). Results were expressed as medians and interquartile ranges (IQR). Comparison between groups was performed using the Mann-Whitney U test and the t-test as appropriate. Significance was accepted at the 5% level.

Conclusions. Univariate analysis was performed utilising the t-test for categorical variables and the Mann Whitney U test for continuous variables. Results were expressed as number (per cent) and as mean (SD) respectively. Stepwise logistic regression analysis was used to identify independent predictive factors. Statistical analyses were performed using SPSS for Windows version 11.0. Statistical significance was accepted at p < 0.05. The positive and negative predictive values for independent predictive factor were calculated. The sensitivity, specificity, positive (PPV) and negative (NPV) predictive values, positive (PLR) and negative (NLR) likelihood ratios for APS and APACHE II scores at 24 hours, peak serum CRP and the intestinal permeability index for severe abdominal aortic aneurysm were calculated using MedCalc 6.12 for Windows 98 software (MedCalc Software, Mariakerke, Belgium), and the best cut-off levels were identified. Receiver operator characteristic (ROC) curves were constructed and areas under the curve and their 95% confidence intervals (95% CI) were calculated. An area under the ROC curve of 1 indicates 100% sensitivity and specificity while an area of 0.5 indicates no discriminatory power (Zweig 1993). The areas under the curve were statistically compared using MedCalc software.

223 MANAGEMENT OF PANCREATIC PSEUDOCYSTS IN A DISTRICT GENERAL HOSPITAL: TEN YEARS EXPERIENCE

Background. Pancreatic pseudocysts can cause prolonged morbidity and mortality. No management protocol was found in literature. This study aims towards suggesting a guideline for their management in hospitals other than centres of excellence.

Methods used. This is a retrospective study based upon computer database of 42 patients (median age 58 yrs) with pancreatic pseudocyst treated over 10 yrs in our DGH. In the absence of a protocol, treatment was empirical.
Results. 12 pseudocysts resolved spontaneously on conservative management (mean cyst size 4 cm, range 3–15 cm). Endoscopic Internal drainage (EID) and Percutaneous drainage (PD) were tried in 3 and 13 cases respectively. Including 1 case of failed EID and 7 cases of failed PD, 21 patients underwent laparotomy of which 11 patients had complications (mean cyst size 10 cm, range 4–20 cm).

Discussion. All treatment options had certain advantages and limitations. The best possible plan of management is summarised below:

1. Pseudocyst size < 6 cm: following acute pancreatitis – wait and watch.
2. Pseudocyst size > 6 cm: perform ERCP to see pancreatic duct. If duct pseudocyst communicates, observe.
3. Pseudocyst > 6–10 cm: following acute pancreatitis, no complication image guided PD.
4. Pseudocyst > 6–10 cm, no complications, following acute pancreatitis, if fails to resolve after one attempt at aspiration, plan surgical or endoscopic internal drainage after cyst maturation. ERCP findings will guide treatment option in chronic pancreatitis.
5. All else, uncomplicated – endoscopic or surgical dependent internal drainage.

224 BIOMARKERS OF PROGNOSIS AND RESPONSE TO OPERATIVE RESECTION FOR PANCREATIC CANCER

Andrew V. Biankin1, James G Kench2, Davendra Segara3, David A. TIVE RESECTION FOR PANCREATIC CANCER

225 SURGICAL TREATMENT OF THE PANCREATIC CANCER

Dragoljub Bilanovic1, Tomislav Randjelovic, Darko Zdravkovic, Borislav Boskovsk, Srdjan Dikic, Natasa Ristic, Natasa Stanisavljevic

Background. Pancreatic cancer is a highly lethal disease and the most frequent histology is adenocarcinoma. The advances in therapy do not improve the prognosis significantly. The new methods of exploration have not improved its detection at an earlier stage of the disease.

Method. The authors analyzed the resectability rate, treatment, morbidity, mortality and follow up of 196 pts (118 male and 78 female) with pancreatic cancer treated and prospectively monitored at the Medical Centre “Bezanijska kosa” from January 2000 to December 2001.

Results. Tumor localization: head (128 pts or 65.3%), head and body (20 or 11.7%), body (4 or 2.05%), body and tail (17 or 8.7%), tail (4 or 2.05%) and multicentric (4 or 2.05%). Histology was: ductal adenocarcinoma (186 pts. or 94.9%), mucinous cystadenocarcinoma (3), malignant neuroendocrine tumor (5) and Frantz tumor. The ductal adenocarcinoma (87.5%), mucinous cystadenocarcinoma (3), malignant neuroendocrine tumor (5) and Frantz tumor.

Oncological resection was performed in 2 pts and lateral PV excision in 3 pts. The operative treatment of pancreatic head cancer in the group of patients that underwent palliative procedures in most cases (97 pts) involved biliary enteric bypassing (hepaticojejunostomy) and prophylactic or therapeutic GEA as a standard procedure. Operative mortality in radically treated was 5 pts (7.9%) and the most serious complication in this group was pancreatic fistula. In the group of patients that were subjected to palliative procedures mortality was 8 pts (6%) largely due to very poor condition of patients. The average survival in the group that underwent palliative treatment was 13.5 months (followed up 68 pts who were operated from January 2000 to December 2004). In the
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group of radically treated pts 23 have died to date and their average survival time was 26 months.

Conclusion. All surgical resection is not efficient in the long-term, it is currently the only procedure for extending the lifetime and provide with the hope of total cure. The quality of life can be significantly improved within the group of patients with non-resectable tumors with adequate palliative procedures (biliodiagnostic bypass and GEA).

226 CARCINOMAS OF THE PANCREATIC HEAD INFILTRATING MAJOR BLOOD VESSELS: IS IT WORTHY TO OPERATE?

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Background. Evidence is growing that carcinomas of the pancreatic head infiltrating major blood vessels (portal vein, superior mesenteric vein, hepatic or splenic vein) can be safely managed by pancreaticoduodenectomy with en-bloc resection of the infiltrated vessels. Proposal of these patients is a matter of debate.

Methods. Morbidity, mortality, and long-term survival in patients undergoing pancreaticoduodenectomy with or without vascular resections (VR) were investigated. Between 1994 and 2005, 524 pancreatic-duodenectomies were performed for malignancies. One-hundred patients (19.1%) had additional VR. 58 patients underwent venous resection with tangential excision with divided major vessels, partially resected patients tangential excision with patch, 14 patients with venous resection with end-to-end anastomosis, 14 segmental resection with graft interposition and 6 patients different arterial resections. Additionally, 20 patients had vascular resections for benign and borderline malignancies.

Results. Our study was analyzed in 77 patients with pancreatic cancer, in 12 patients with ampullary and in 11 patients with distal bile duct cancers using univariate (log-rank) and multivariate (Cox regression) methods. In 68 among 100 patients with VR, histopathology showed true tumor involvement of the complete study group, negative resection margins (R0) were obtained in 85 of patients with VR and in 86% of patients without VR. No statistical difference was detected between both groups when comparing median operative time (350 VR versus 360 minutes w/o VR), and median volume of intraoperatively transfused blood units (3 units in both groups). Postoperative surgical complications/mortality occurred in 26% (7 VR) versus 31% (5) (no VR, n.s.). Analysis of long-term survival in all 424 patients without VR revealed five-year survival probability of 16% compared to 4% in patients with VR (median overall survival 14 vs. 13 months; p = 0.27). In multivariate modeling, resection margin and histological grading significantly influenced survival.

227 DIFFERENTIAL GENE EXPRESSION IN HUMAN PANCREATIC CELL LINES L3.6PL (METASTATIC) AND FG (NON-METASTATIC)

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Background. Our model consists of two pancreas carcinoma cell lines: parental FG cell line and L3.6pl generated from FG via three cycles of in vivo selection in nude mice.

Methods. Nude mice were injected orthotopically with 1 x 106 human pancreatic tumor cells L3.6pl or FG, respectively. Body weight and tumor parameters were continuously monitored.

In vitro production of VEGF was determined by ELISA and cell proliferation by MTT-Assay. RNA from 3 biological replicates of the both cell lines was hybridized with human gene chips (Affymetrix).

The results were validated by RT-PCR and by western blotting. Expression of the genes investigated in pancreatic cancer tissues isolated from patients and compared with healthy tissue from the same pancreas using RT-PCR and immunohistochemistry. Protein-protein interactions were investigated by immunoprecipitation and Western blotting.

Results. The volume of L3.6pl tumors at day 37 after injection was 15-fold larger than the volume of FG-tumors. The body weight of L3.6pl-injected mice was 71% of the body weight of FG-injected mice. Primary L3.6pl-tumors were very well vascularized and liver metastases were detectable at the time of sacrifice. In vitro, we measured 9-fold more VEGF protein content in conditioned media of L3.6pl cells as compared to conditioned media of FG cells. Proliferation rate of L3.6pl cells was 1.5-fold higher as compared to FG cells.

The analysis of differential gene expression has revealed 38 genes transcriptionally up-regulated in L3.6pl compared to FG. We have chosen for further investigations the 6,4-fold upregulated EFEMP1 gene (EGF-containing fibulin-like extracellular matrix protein 1). By RT-PCR we confirmed the upregulation of the following transcripts in L3.6pl cells: IFNAR1, NFBP, IFT3, EFEMP1 and PLAU. Interestingly, L3.6pl cells did not only express a higher amount of NFBP, but also a higher amount of the phosphorylated protein.

We have immunoprecipitated EFEMP1 protein using anti-EGFR antibody. The yield of this immunoprecipitation was inversely proportional to concentration of EGF in cell culture.

Conclusion. So far we can conclude that the upregulation of IFNAR1, NFBP, EFEMP1 and PLAU in L3.6pl is associated to metastasis and angiogenesis in pancreatic cancer. We have demonstrated that the EGF-homologous protein EFEMP1 binds to EGF-receptor and therefore might activate EGF-signalling and influence proliferation and metastasis of the cancer cells. (Supported by KFO128/1-1, TP1, Bruns DFG)

228 ISOLATED ROUX LOOP PANCREATICOJEJUNOSTOMY TO PREVENT ANASTOMOTIC LEAK IN PANCREATICODUODENECTOMY

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Introduction. A pancreatic fistula can be the source of considerable morbidity and can contribute to mortality after pancreaticoduodenectomy. The purpose of this study was to evaluate the hypothesis that isolated Roux loop pancreatocystejejunostomy is safer than pancreatocystojejunostomy in a single jejunal loop.

Methods. From January to June 2006, data from 17 consecutive patients who underwent pancreatocystojejunostomy in a separate jejunal loop, were entered into a prospective database (group A). These patients were compared, regarding postoperative mortality and morbidity, length of hospital stay, operative time, blood transfusions, to a homogenous group of 17 patients in which the treatment of the pancreatic remnant was performed using an isolated Roux loop pancreatocystejejunostomy (group B).

Results. Group A: 12 male, 5 female, median age (A˜,Aˆ) 64.7 (A˜,Aˆ ± 9.8) years. Histological examination: 7 pancreatic cancers, 4 ampullary cancers, 2 chronic cystic pancreatic tumors, 1 chronic pancreatitis, 1 metastasis from renal cancer and 1 inflammatory lesion. Surgical procedure: 3 PD with distal gastrectomy, 14 pylorus-preserving PD. Mean operative time (A˜,Aˆ ± SD) 322 ± 67.2 min., blood replacement in 7 patients. Length of hospital stay (A˜,Aˆ ± SD): 16.4 ± 9.0 days. No postoperative deaths and 2 pancreatic fistulas (11.8%). Group B: 21 male, 6 female, median age (A˜,Aˆ ± SD) 60.5A± ± 9.1 years, 6 pancreatic cancers, 5 ampullary cancers, 2 neuroendocrine tumors, 2 chronic pancreatitis and 2 bile duct cancers. 2 PD with distal gastrectomy, 15 pylorus-preserving PD. Mean operative time (A˜,Aˆ ± SD) 339 ± 61.8 min., blood replacement in 8 patients. Length of hospital stay (A˜,Aˆ ± SD): 17.6 ± 12.1 days. One postoperative death and 5 pancreatic fistulas (29.4%).

Conclusions. Isolated Roux loop pancreatocystejejunostomy after PD is simple and safe. Regarding operative time, blood replacement and length of hospital stay there is no differences with pancreatocystojejunostomy in the same loop. In our study isolated Roux loop pancreatocystejejunostomy decreased the incidence of pancreatic fistulas.

229 NEOADJUVANT CHEMORADIOThERAPY IN BORDERLINE RESECTABLE PANCREATIC CANCER: A CASE-REPORT

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Introduction. Pancreatic cancer resection represents the only chance of cure but it can be performed only in localized cancer. Herein we report the case of a patient with locally advanced pancreatic cancer who underwent neoadjuvant chemo-radiation therapy followed by surgical resection with no residual tumour (R0).

Case report. A 50-year-old man was referred to our team for the presence of jaundice. A CT showed a mass in the head of the pancreas with an encasement of at least 50% of the circumference of the superior mesenteric vein (SMV). The involvement of the SMV was considered a relative contraindication to surgery. The patient underwent an ERP and a biliary stent was left in the common bile duct. Diagnosis of pancreatic ductal adenocarcinoma was done after a trans-abdominal US-guided fine-needle aspiration. PET showed an high metabolic activity area in the pancreatic head region. The patient started 8 cycles of chemotherapy with gemcitabine and oxaliplatin then he underwent a chemio-radiation treatment of 6 week. A re-staging was then performed. CT revealed a decrease of the size of the...
tumour. There was no involvement of the SMV. PET showed a completely resection of disease.

In relation to these changes the patient was considered for surgical R0 resection. A pylorus-preserving pancreaticoduodenectomy with transgastric resection of the SMV was performed. Postoperative course was uneventful. Histological examination of the resected specimen showed microscopic ductal adenocarcinoma of the pancreas without neoplastic involvement of the lymph nodes; resection margins and vein wall tissue were cancer free (R0).

At 27 months from diagnosis the patient is alive and well, and he remains free of disease or metastatic disease.

Conclusions. According to the evidence of our and other cases we suggest to perform neoadjuvant chemo-radiation treatment in all patients affected by “borderline resectable” pancreatic cancer.

230 SURGICAL TREATMENT OF PANCREATOBLASTOMA IN ADULTS: RESULTS AFTER RADICAL RESECTION IN OUR EXPERIENCE AND LITERATURE REVIEW

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Introduction. Pancreatoctblastoma (PB) occurring in adults is extremely rare and could mimic others solid pancreatic tumors. Methods: We describe SC, a 26-year-old man with a PB of the head of pancreas, and MU, a 69-year-old man with a PB localized in the body-tail of pancreatic gland. SC presented upper abdominal pain related with the meal and was found on abdominal ultrasound (US). Computed tomography (CT) and magnetic resonance (MR) scans to have a well delineated, vascularized 5 cm celiac mass which was adherent to superior mesenteric vein. Tumor markers (alfa-AFP, CEA, CA19.9, e CA 125) were normal excepted Cromogranin A (272 ng/mL). A positron emission tomography (PET) scan showed a low grade neoplastic epithelial process, suspicious for neuroendocrine tumor (NET). Octreoscan® was negative The patient underwent successful pancreaticoctoabdomenectomy. On pathologic examination the tumor formed acinar and glandular structures and contained many squamoid corpuscles, a defining feature of PB. The second case, MU, presented a solid mass of 6 cm in diameter involving the body of the pancreas, revealed by US with contrast, CT and MR scans. The mass was loculated and vascularized. No symptom was reported and serous tumor markers were normal (CEA, Ca19.9 and CA 125). In the suspicion of a cystic NET a distal pancreatectomy was performed. Definitive histologic report demonstrated a PB. Results: An extensive review of the literature avoidance only 20 patients affected by this pancreatic system (NET-PB) presented with appropriate symptoms of hormonal excess. CT scan correctly localized the tumor in 39 (90.7%) of 43 patients. 07 of 39 patients (18%) were incidentally detected, 29 of 39 patients (76.9%) had a positive NET biopsy diagnosis. Most common operative procedures were 12 pancreaticoctoabdomenectomies, 08 distal pancreatectomies and 04 tumor enucleation. Of the 32 patients who underwent surgery, 27 (84.3%) underwent curative resection, 04 (12.5%), underwent palliative resection, while 01 (3.1%) had only negative cytoreduction. Conclusions.

231 THE ROLE OF TUMORSUPPRESSOR GENES IN Pancreatic CANCERS

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Ductal adenocarcinoma of the pancreas (DPC) is not a single entity, but could include others solid pancreatic tumors. Methods: We describe SC, a 26-year-old man with a PB of the head of pancreas, and MU, a 69-year-old man with a PB localized in the body-tail of pancreatic gland. SC presented upper abdominal pain related with the meal and was found on abdominal ultrasound (US). Computed tomography (CT) and magnetic resonance (MR) scans to have a well delineated, vascularized 5 cm celiac mass which was adherent to superior mesenteric vein. Tumor markers (alfa-AFP, CEA, CA19.9, e CA 125) were normal excepted Cromogranin A (272 ng/mL). A positron emission tomography (PET) scan showed a low grade neoplastic epithelial process, suspicious for neuroendocrine tumor (NET). Octreoscan® was negative The patient underwent successful pancreaticoctoabdomenectomy. On pathologic examination the tumor formed acinar and glandular structures and contained many squamoid corpuscles, a defining feature of PB. The second case, MU, presented a solid mass of 6 cm in diameter involving the body of the pancreas, revealed by US with contrast, CT and MR scans. The mass was loculated and vascularized. No symptom was reported and serous tumor markers were normal (CEA, Ca19.9 and CA 125). In the suspicion of a cystic NET a distal pancreatectomy was performed. Definitive histologic report demonstrated a PB. Results: An extensive review of the literature avoidance only 20 patients affected by this pancreatic system (NET-PB) presented with appropriate symptoms of hormonal excess. CT scan correctly localized the tumor in 39 (90.7%) of 43 patients. 07 of 39 patients (18%) were incidentally detected, 29 of 39 patients (76.9%) had a positive NET biopsy diagnosis. Most common operative procedures were 12 pancreaticoctoabdomenectomies, 08 distal pancreatectomies and 04 tumor enucleation. Of the 32 patients who underwent surgery, 27 (84.3%) underwent curative resection, 04 (12.5%), underwent palliative resection, while 01 (3.1%) had only negative cytoreduction. Conclusions.

232 SPECTRUM OF GEP-NET TUMORS

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Background. Neuroendocrine tumors of the pancreas and peripancreatic area are rare entities with a wide spectrum of clinical presentation. The prognosis for non-functional tumors is poorer than that of functional tumors. Methods. Forty three patients (26 males, 17 females) of Neuroendocrine tumors were treated over the period from July 2003 - Dec 2006 were analyzed. Tumors were classified as per functional status, cells of origin and WHO classification system. The following factors were evaluated for disease-specific mortality: age, sex, primary tumor location, functional status, type of surgical resection, presence or absence of liver metastases, Surgical procedure, pathological characteristics, complications, mortality rates, and disease-free survival.

Results. The mean age of patients was 52.5 years. 21patients (48.8%) had non-functional tumors, whereas 22 patients (51.2%) who had functional tumors: {13 insulinomas, 04 gastrinomas, 02 glucagonomas, one calcitonin-secreting tumor and one functional carcinoid} presented with appropriate symptoms of hormonal excess. CT scan correctly localized the tumor in 39 (90.7%) of 43 patients. 07 of 39 patients (18%) were incidentally detected, 29 of 39 patients (76.9%) had a positive NET biopsy diagnosis. Most common operative procedures were 12 pancreaticoctoabdomenectomies, 08 distal pancreatectomies and 04 tumor enucleation. Of the 32 patients who underwent surgery, 27 (84.3%) underwent curative resection, 04 (12.5%), underwent palliative resection, while 01 (3.1%) had only negative cytoreduction. Conclusions. This single-institution experience documents zero surgical mortality and low morbidity for patients treated surgically for pancreatic and peripancreatic neuroendocrine tumors. Surgery is the mainstay of management, potentially curative in locally confined disease and useful for palliation by possible cytoreduction.

233 NON FUNCTIONAL PARAGANGLIOMA OF THE PANCREAS: CASE REPORT

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Background. Paraganglioma of the pancreas arise from paraganglia and is histologically akin to chemoectodermomas. Paragangliomas are neural cells that have separated from developing autonomic ganglia... Like autonomic ganglia... Paragangliomas are also found with organs. A paraganglioma arising from a visceral organ is exceedingly rare.

Paraganglioma arise from paraganglia and are histologically akin chemoectodermomas. Paraganglia are neural cells that have separated from developing autonomic ganglia. Like autonomic ganglia paraganglia are also found within organs. A paraganglioma arising from a visceral organ is exceedingly rare.
tumor like paranglioma with immunohistochemical reaction positive for GFAP, chromogranine, synaptophysine and NSE. Laboratory-confirmed the radiological findings. The mass was highly vascular and the frozen section interpretation was a neuroendocrine tumor. Patient underwent total gastrectomy with D2 lymphectomy however pancreatic tumor was not removed for three reasons: a Wipple procedure and not a mesenteric root, followed by intestinal auto-transplantation, was carried in 7 of these 163 patients (4.3%). This analysis focuses on the six patients (5 women and 1 men) diagnosed with ductal adenocarcinoma of the pancreas. The decision to proceed with surgical treatment was based only on histopathological grounds (n = 3) and on multiple distant sites of our experience (1987–1998) (group 1), while subsequently only patients (n = 3) showing a positive response to neoadjuvant treatments were considered (1999–2006) (group 2).

**Results.** Five patients (83.3%) underwent total splenopancreatectomy and one (16.7%) pancreaticoduodenectomy. A total of 16 vascular segments were resected: in 4 patients (66.7%), besides superior mesenteric vessels, the celiac trunk and/or hepatic artery were also resected. Two patients (33.3%) had left gastric artery and post-operative (2) and right hepatic vein thrombosis, respectively that were either treated conservatively. There were no post-operative deaths. At pathology tumor infiltration of the superior mesenteric vein was confirmed in none of the patients from group 1 and in all patients from group 2. Two patients from group 1 (2/3) and in none from group 2. Overall, 1-year survival was 75% (65% in group 1 vs. 100% in group 2; p = NS). All patients from group 1 died from liver metastasis after a mean survival of 26.3 ± 5.3 months. Two patients from group 2 are still alive, and seemingly disease free at the time of this writing. The remaining patient died from tumor recurrence at multiple distant sites 16 months after resection.

**Conclusions.** En-bloc resection of superior mesenteric vessels and mesenteric root, followed by intestinal autotransplantation, can be done with an acceptable operative risk in appropriate candidates. The sometimes striking efficacy of newer neoadjuvant medical treatments might constitute an incentive to proceed with this formidable operation. In this perspective, our prospective results, although promising, clearly need to be verified in a larger and well-standardized study, possibly including patients randomized as controls without extended resection.

### 237 ABSTRACT: NEOADJUVANT CHEMORADIOThERAPY (GEOX) PHASE II TRIAL FOR NOT RESECTABLE PANCREATIC CANCER PATIENTS. PRELIMINARY RESULTS

**Andrea Gardini,** Carlo Milandri, Alessandro Passardi, Alberto Zaccaroni*, Rolando Poloico, Garcea Domenico*, Dino Amadori

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### 237 ABSTRACT: NEOADJUVANT CHEMORADIOThERAPY (GEOX) PHASE II TRIAL FOR NOT RESECTABLE PANCREATIC CANCER PATIENTS. PRELIMINARY RESULTS

**Andrea Gardini,** Carlo Milandri, Alessandro Passardi, Alberto Zaccaroni*, Rolando Poloico, Garcea Domenico*, Dino Amadori

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**Conclusions.** En-bloc resection of superior mesenteric vessels and mesenteric root, followed by intestinal autotransplantation, can be done with an acceptable operative risk in appropriate candidates. The sometimes striking efficacy of newer neoadjuvant medical treatments might constitute an incentive to proceed with this formidable operation. In this perspective, our prospective results, although promising, clearly need to be verified in a larger and well-standardized study, possibly including patients randomized as controls without extended resection.
pancreatectomy, other patients are died for distant metastases after 7 and 6 months of surgical procedure.

Conclusions. These preliminary data are promising and confirm the importance of neoadjuvant treatment to improve operability in unresectable pancreatic cancer patients. Due to the small number of patients is necessary re-evaluate these results after increase of study population.

238 CHANGING TRENDS IN DISTAL PANCREATECTOMY DURING 21-YEARS: A SINGLE INSTITUTION EXPERIENCE WITH 232 CONSECUTIVE RESECTIONS

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Aim. To examine trends in patient characteristics, surgical indications, surgical technique and postoperative outcomes in patients undergoing distal pancreatectomy at a single institution during a 21-year period.


Results. Nineteen DP were performed in period 1, 50 in period 2 and 163 in period 3. Over time, the volume of DP performed increased from an annual average of 3.5 in year (period 1) to 73 per year (period 2). A decrease in the incidence of cystic dilation of the main pancreatic duct (11% to 4%, P < .001) and lesions resected were increasingly smaller in size (median size, 108 (10–240) mm to 45 (1–240) mm, P < .001). Patients undergoing DP had increasing ASA scores, P = .014. Operation time, blood loss and requirement for perioperative blood transfusions remained unchanged.

Conclusions. DP are increasingly performed for incidental and smaller lesions. Although patients with increasing ASA scores are undergoing resection, morbidity and mortality remains unchanged and the length of hospitalization and need for intensive care unit stay are decreasing.

239 OUR EXPERIENCES IN POSTOPERATIVE COMPLICATIONS OF CEPHALIC DUODENOPANCREATECTOMY

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Methodology. In a retrospective study in our department during the period from 2000 to 2005 we have operated on 206 patients for different peripancreatic malignancies. Standard Whipple's procedure was done in 72 (35%), radical Whipple's procedure in 80 (39%) and PDPD in 54 (26%).

Results. Complications were observed in 81 patients among whom 26 patients required relaparotomy with 9 postoperative lethal outcomes. Pancreatico-jejunal anastomotic leaks (pancreatic fistula) occurred in 40 patients resulting in 4 deaths. Postoperative bleeding as a complications was seen in 12 patients. In 4 patients we manage to control bleeding with endoscopic methods while 8 patients underwent reoperation which result in 1 postoperative death. Two patients developed biliary fistula which responded well on conservative treatment.

Conclusion. Control and treating of the complications require adequate preoperative care sometimes including endoscopic transpapillary decompression, precise and standardized surgical technique and continued postoperative observation in intensive care unit. All this should lead to an early detection of complications and early reoperation if necessary which significantly improve the outcome of this patients.

240 SURGICAL THERAPY FOR PSEUDOCYSTS OF THE PANCREAS

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Background/Aims. A pancreatic pseudocyst is an encapsulated collection of pancreatic juice, enclosed by non epithelial elements, containing a high concentration of pancreatic enzymes, bicarbonates and necrotic detritus. It is a common complication of acute pancreatitis and trauma of the pancreas.

Methodology. In the period between 2000 and 2005, 70 surgical procedures were performed for pancreatic pseudocyst at the Institute for Digestive Diseases (First Surgical University Hospital) 49 male (73%) and 21 female patients (30%) underwent surgery.

Results. In 52 (74%) patients the method of choice was cystojejunostomy by Roux, 7 (10%) distal pancreatectomy for pseudocyst localized within the pancreatic tail, 3 (4.3%) complete pseudocyst excision, 3 (4.3%) complete pseudocyst excision combined with cystojejunostomy. 3 (4.3%) cystogastrostomy and drainage and 2 (3.1%) partial cystectomy and drainage.

Conclusion. Surgical internal drainage is the method of choice for the treatment of pancreatic pseudocysts, involving low morbidity and mortality rates.

241 CAN WE PREDICT RISK FACTORS OF SERIOUS PANCREATIC FISTULA AFTER PANCREATICODUODENECTOMY?

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Background. Pancreatic fistula (PF) is a major complication following pancreaticoduodenectomy (PD). The purpose of this study was to evaluate risk factors of serious (Grade B and C) (1) PF after PD which require interventional procedures.

Methods and patients. From 2003 to 2005, 56 patients were undertaken in CHU of Amiens for pancreaticogastrostomy following pancreaticoduodenectomy. Patients with PF were divided in group 1 (grade A PF without clinical impact) and group 2 (Grade B and C PF). Each group was compared regarding preoperative (aetiology, loss of weight, BMI, jaundice, prosthesis, tobacco), intraoperative (consistency of pancreas), and pathological (inflammation, fibrosis, fatty involution, chronic pancreatitis) outcomes.

Results. 22 patients (39%) had Pf: 11 group 1 and 11 group 2. Mortality was 3.8%. Among patients of group 2, 81% needed percutaneous drainage and 13% needed a reintervention. Univariate analysis found that preoperative loss of weight is a risk factors of pancreatic fistula grade B or C (p < 0.05). Major chronic pancreatitis lesions on pancreatic stump are a factor protecting from PF: none patients from group 1 and 22 patients from group 2. Others outcomes were not significantly different.

Conclusion. Serious (Grade B and C) PF after PD require interventional procedures and are responsible of a significant increase in length of stay. The knowledge of risk factors of serious (Grade B and C) PF after PD would help to optimize management of patients at risk. Although a small number of patients in our study, loss of weight seems to be a risk factors of serious PF. 1. Bassi C et al, Postoperative pancreatic fistula: an international study group (ISGPF) definition. Surgery 2005.

242 CLINICAL ANALYSIS OF 34 CASES SOLID-PSEUDOPAPILLARY TUMORS OF THE PANCREAS

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Introduction. Solid-pseudopapillary tumors of the pancreas have been reported as rare lesions with low grade malignant potential and usually found in young women. The prognosis of this lesion is reported to be much more favorable than other pancreatic neoplasms.

Methods. A retrospective review and analysis of 34 patients who had SPTs from January 1996 to December 2005 were done. The clinical characteristics and surgical strategy on 34 cases of SPT of the pancreas in Daegu area are discussed. Despite an increase in recognition of the disease, there is still lack of detailed reports about its surgical treatment.

Results. Of the 34 patients, 31 were female and 3 were male and their mean age was 30.1 years with the range between 12 and 66 years of age. The median size of the lesions were 7.4cm and tumors were located in the head 9 patient, body 9 patients, tail 14 patients and combind body and tail 1 patient.

Correct diagnosis was 22 cases (64.8%) out of 34 cases. PDDPD was done in 5 cases and distal pancreatectomy was performed in 26 cases. Cystic nature was 17 cases and solid nature was 17 in gross appearances. Five cases (14.7%) were confirmed as malignant tumors by pathology.

Conclusions. SPT occurs predominantly in female with relatively young age group. Surgical resection is the most favorable in the treatment of SPT, which has excellent prognosis. The choice of the local tumor resection depend on the judgment of the tumor’s boundary, whereas operative types in radical resection depend on the tumor position of the pancreas. SPT that has infiltrated contiguous vessels, organs, even with local liver metastasis should not be regarded as operative contraindication.

243 SCORING SYSTEM FOR THE PREDICTION OF THE PROGNOSIS OF INFECTED PANCREATIC NECROSIS

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Background. In infected pancreatic necrosis (IPN), it is important clinically to predict the prognosis at the time of admission. Most scoring systems for severity of acute pancreatitis consist of multiple factors and are complicated.

Aim. This investigation aimed to propose a scoring system for the prediction of the prognosis of IPN.

Patients and Methods. Prognostic factors were evaluated by receiver operating characteristic curve analyses, multivariate analysis and artificial neural network from data that were obtained on admission of 291 patients with severe acute pancreatitis. A simple scoring system with 12 most useful factors was made, and its usefulness was investigated in comparison with conventional scoring systems.

Results. Twelve prognostic factors were selected: 1) type of hospitalization in a hospital: transfer from other hospital or hospitalization on first aid; 2) age of the patient >55 years; 3) body mass index >25 kg/m2; 4) temperature >38.0°C; 5) heart rate >90 beats/min; 6) respiratory rate >20 breaths/min; 7) White blood cell count >14 × 109/L; 8) amylase level determined at admission >1476 IU/L; 9) serum blood urea nitrogen collection determined within the first 24 hours from the beginning of disease; 10) glucose level >11 mmol/L; 11) glucose >7 mmol/L; 12) abnormal heart rhythm.

Conclusion. This scoring system that comprised 12 items is simple, is feasible for the prediction of prognosis and conventional scoring systems, and is useful for the selection of the extremely severe patients with prognosis of IPN on admission.

244 PERCUTANEOUS DRAINAGE FOR ACUTE FLUID COLLECTION AND PANCREAS ABSCESSES IN SEVERE ACUTE PANCREATITIS

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Background. Percutaneous drainage is a possible therapy for the treatment of peripancreatic fluid collection (PFC) and pancreatic abscess (PA) in severe acute pancreatitis.

Aim. To assess patient’s selection, techniques and results of PFC and PA treatment using ultrasound guided percutaneous catheter drainage (PCD).

Patients and Methods. We treated 291 patients (222 male, 69 female) with severe acute pancreatitis. The most common cause of the pancreatitis were alcohol abuse and gallstone disease (62.5% and 20.6%). Besides antibiotic prophylaxis, selective gut decontamination, early naso-jejunal feeding was executed and delayed operations for at least 14 days after the admission were preferred. Percutaneous drainage was used for those patients, whose amylase level exceeded 544 IU/L (normal value is 100 IU/L). PCD was executed in the later period of the disease (day 24 hours from the beginning of the disease), when the abdominal symptoms disappeared. Multivariate regression analysis determined predictors of PCD success. Variables entered into the analysis included: type, diameter, and localization, complexity of PFC and PA, and drainage technique (Seldinger or Trocar).

Results. No complications were found related to this intervention. Fifty patients with PFC (69.4%) were recovered without surgery after a 14.8 days average time of drainage. The remaining 22 patients with PFC underwent a late (14-30 days of admission) operations. Twelve patients with PA were recovered without surgery.

Conclusions. We suggest the percutaneous peripancreatic drainage as a first intervention for acute fluid collection or pancreatic abscess in patients with severe pancreatitis necrosis. If septic symptoms or MOF developed in spite of drainage operation is mandatory. In these cases the advantage of the drainage is to avoid the early operation. PCD should be considered as the initial therapy in selected patients with PFC and PA, and as a staging method for the resolution of sepseus prior to surgery.

245 CURCUMIN AS A POTENTIAL CHEMOTHERAPEUTIC AGENT FOR THE TREATMENT OF PANCREATIC ADENOCARCINOMA

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Background. Curcumin is a polyphenol derived from Curcuma Longa present in the spice turmeric. It has been shown to have antiproliferative and proapoptotic effects in a variety of human malignancies. The aim of this study was to assess the effects of curcumin on human pancreatic adenocarcinoma cell lines.

Methods. The effects of curcumin (0.1–300μM) on two human pancreatic adenocarcinoma cell lines were studied in vitro. BxPC-3 is a cell line derived from a patient with primary pancreatic adenocarcinoma, and AsPC-1 is derived from ascites of a patient with metastatic pancreatic adenocarcinoma. The effects of curcumin on apoptosis were assessed using Western Blot analysis.

Results. Curcumin resulted in a reduction in viable cells after 24 hours of treatment. 50% reduction in viable cells was seen with 20μM in BxPC-3 and 5μM in AsPC-1. Apoptosis was seen with doses as low as 0.1μM. At doses exceeding 5μM in BxPC-3 and 10μM in AsPC-1, the majority of cells were necrotic. The effects were more pronounced after 48 hours of treatment.

Conclusion. Curcumin induces apoptosis in human pancreatic adenocarcinoma cells. The chemotherapeutic in pancreatic cancer warrants further consideration.

246 HYPERAMYLASEMIA FOLLOWING CARDIAC SURGERY IS NOT USUALLY DUE TO ACUTE PANCREATITIS

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Background. Hyperamylasaemia has been reported as a common finding following cardiac surgery although its aetiology and clinical significance has been debated. The prevalence of acute pancreatitis is less well documented with a recent study of 8709 patients reporting a prevalence of 0.05%. The aim of this study was to document the prevalence of hyperamylasaemia following cardiac surgery and to determine its clinical relevance.

Methods. The study group consisted of all patients undergoing cardiotoraciac surgery during the period 2004-2006. A cohort of patients with hyperamylasaemia consistent with a diagnosis of acute pancreatitis (serum amylase >400 IU/L), were identified from the biochemistry department database. Patient demographics were determined and details of the operative and postoperative course obtained from review of a prospectively maintained database.

Results. 46 patients were identified with a serum amylase >400 IU/L consisting of 30 males and 16 females with a mean age of 67.9 years. The most common procedures were valve replacement (n=28) and coronary artery bypass grafting (n=27), with some individuals undergoing combined procedures. The median amylase level was 891 IU/L with a range from 409–4000 IU/L. The elevation in serum amylase was noticed on day 2 and persisted for a period of 2–15 days postoperatively. There was no relationship between the development of hyperamylasaemia and the use of cardiopulmonary bypass, use of inotropic support or the requirement of haemofiltration. All patients were assessed clinically and 6 underwent radiological investigation consisting of ultrasound (n=3) or computed tomography (n=3), the later identifying the presence of acute pancreatitis in 2 cases. Both patients were managed conservatively. One patient with confirmed acute pancreatitis on day 12, whilst ventilated in the intensive care unit as a result of multi-organ failure died on the 21st postoperative day. The second patient, whose amylase level peaked on day 24, died on day 32, 55, and 81 days following surgery. We suggest the percutaneous peripancreatic drainage as a first intervention for acute fluid collection or pancreatic abscess in patients with severe pancreatitis necrosis. If septic symptoms or MOF developed in spite of drainage operation is mandatory. In these cases the advantage of the drainage is to avoid the early operation. PCD should be considered as the initial therapy in selected patients with PFC and PA, and as a staging method for the resolution of sepseus prior to surgery.

247 PATIENTS WITH NON-DIAGNOSTIC HYPERAMYLASEMIA BUT APPROPRIATE CLINICAL SIGNS SHOULD BE INVESTIGATED AND MANAGED AS PER ACUTE PANCREATITIS

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Background. The identification of hyperamylasaemia insufficient to afford a diagnosis of acute pancreatitis poses a clinical dilemma. If the clinical presentation is consistent with acute pancreatitis, the reasons for the sub-diagnostic amylase may simply be that there has been a delay in presentation, but if not, other causes of hyperamylasaemia will have to be considered. The aim of this study was to identify a cohort of patients with hyperamylasaemia together with appropriate clinical features and to determine the aetiology of their elevated amylase.

Methods. The biochemical definition of acute pancreatitis was based on that extended by the British Society of Gastroenterology guidelines namely a serum amylase >400 IU/L. All patients admitted through the emergency surgical intake of the University Hospital of Wales during 2003 and found to have a hyperamylasaemia of <400 IU/L (normal range: <100 IU/L) were identified from the biochemistry department database. In all cases, demographic characteristics were collected and case notes were reviewed as were results of all subsequent radiological and biochemical investigations.
Results. 25 patients were identified consisting of 21 men and 4 women with a mean age of 46.7 years. The median amylase level was 230 IU/L with a range from 102–358 IU/L. Twenty two patients underwent transabdominal radiography at the time of admission with gallstones identified in 9 cases. The remaining 3 patients were known to have gallstones and were awaiting elective surgery. Of the 13 patients with no evidence of cholelithiasis, 6 patients were taking medications that cause pancreatitis (statins (n=3); simvastatin (1); atazanavir (1); and prednisolone (n=1)). Seven patients underwent diagnostic CT scans which identified chronic pancreatitis in 3 cases and in 4 they were non-diagnostic. These 4 patients underwent endoscopic ultrasound evaluation of the biliary tree to exclude mimic pathology. None were positive in 1 instance. Patients with gallstones were managed by ERCP/cholecystectomy. None of the patients without a diagnosis have represented with abdominal pain during the subsequent 3 years. 6 of 25 patients had a Glasgow score of 3 or more consistent with a severe attack of pancreatitis including 3 of 13 with confirmed cholelithiasis. Conclusions. A survival exceeding 2 years was observed only among resected patients. At multivariate analysis, positive smoking status and admission with acute pancreatitis were significant variables, but neither was independently predictive of survival. 3-year overall survival was 24% (95% CI 10%-45%) in patients with confirmed gallstones. The median survival for confirmed gallstones was 21 months (95% CI 1–48) versus 4 months (95% CI 1–12) for those with no evidence of cholelithiasis. A survival exceeding 2 years was observed only among resected patients. At multivariate analysis, positive smoking status and admission with acute pancreatitis were significant variables, but neither was independently predictive of survival. 3-year overall survival was 24% (95% CI 10%-45%) in patients with confirmed gallstones. The median survival for confirmed gallstones was 21 months (95% CI 1–48) versus 4 months (95% CI 1–12) for those with no evidence of cholelithiasis.

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248 PROGNOSIS OF BORDERLINE RESECTABLE PANCREATIC CANCER IN THE ERA OF MULTIDISCIPLINARY APPROACH

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Aim. To evaluate prognostic factors for survival of locally advanced borderline resectable pancreatic cancers (BRPC) treated with chemoradiation with or without surgical resection and to compare them with resectable (RPC) and locally advanced unresectable (UPC) cases respectively observed in the same time period.

Patients and methods. From 6/1999 to 6/2005, we treated 89 patients with non-metastatic biopsy proven pancreatic ductal cancer. According to the pattern of vascular involvement on pre-treatment CT scan, they were classified as 25 BRPC and 16 UPC. BRPC and UPC cases were enrolled for institutional phase II protocols of chemoradiation based on gemcitabine alone or in combination with oxaliplatin. Patients showing PR or SD with normalisation of CA19.9 were surgically explored. RPC were managed by ERCP/cholecystectomy. None of the patients without a diagnosis have represented with abdominal pain during the subsequent 3 years. 6 of 25 patients had a Glasgow score of 3 or more consistent with a severe attack of pancreatitis including 3 of 13 with confirmed cholelithiasis. Conclusions. Only resection retained significance. Median and 3-year overall survivals were 39 months and 22% respectively in BRPC; 31 months and 20% respectively in UPC; and 15 months and 16% respectively in RPC. At multivariate analysis, pain at diagnosis, ECOG PS at diagnosis, objective response (p<0.05) and resection (p<0.01) resulted significant prognostic factors for BRPC. At multivariate analysis, only resection retained significance. Median and 2-year overall survivals were 25.2 months and 57% for BRPC successfully resected (p=0.23 vs RPC). Median and 2-year disease-free survivals were 13 and 8.2 months and 25% and 23% for successfully resected BRPC and RPC, respectively (p=0.37).

Conclusions. Patients presenting with a locally advanced pancreatic cancer (either RP/PC or UPC) and enrolled for multidisciplinary treatment protocols experienced the same median survival as RPC. Nonetheless, only patients successfully resected could survive beyond 2 years. Pancratic resection was the most powerful predictor of survival for BRPC. Patient resected after chemoradiation had at least the same overall and disease-free survival than RPC.

249 CHYLOUS ASCITES AFTER PANCREATODUODENECTOMY

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Introduction. Chyle leakage or chylous ascites is a well-recognized complication following thoracic and abdominal surgery. Chylous ascites (CA) is usually recognized after provocation by enteral feeding and characterized by its milky appearance and raised triglyceride (TG) level (>1.2 mmol/L). The incidence, management, impact on outcome and possible predisposing factors of CA after pancreatoduodenectomy (PD) for a suspected periampullary malignancy is unclear and has never been described before.

Objective. The aim of this study is to evaluate the incidence and management of CA after (PP)PD, to evaluate the impact on patient outcome and to perform a retrospective analysis of patients.

Methods. Data was collected from a consecutive series of 518 patients who, in the period 1996 – 2005, had undergone a PD for a suspected periampullary malignancy. Routinely a silicone drain was placed dorsally of the PJ anastomosis. Patients who died within 12 months, with milky appearance and a raised triglyceride (TG) level (>1.2 mmol/L), were included for analysis (group A). They were compared with patients without significant drain production or a low TG level (group B). Patients with (concomitant) anastomotic leakage were excluded for analysis. Management of patients with isolated CA was reviewed.

Results. Fifty-eight patients (11%, 58/518) had isolated CA (group A), 383 patients did not have CA (group B) and 77 patients were excluded for analysis. CA was almost always diagnosed between the 3–9 postoperative days. Patient resection of a pancreatic lesion (Low Chain Triglyceride diet provoked the occurrence of CA. Patients with CA were in 83% of the cases successfully treated with a Medium-Chain Triglyceride (MCT) diet. An expectative approach was followed in 17%. None of the patients required Abdominal Drainage. At median follow up of 3 days (range 16) CA had resolved. Isolated CA was an independent variable for a prolonged hospital stay (p<0.002). No differences between groups or possible predisposing factors for CA development could be identified.

Conclusion. Isolated CA patients after PPPD. This rather high rate might be due to the increasingly employed concept of fast track surgery, which encompasses early introduction of enteral feeding. However, CA poses a relatively mild complication, which can be adequately managed with a MCT-diet. Isolated CA is an independent variable for a prolonged hospital stay. No predisposing factors could be identified.

250 SURGICAL TREATMENT OF CHRONIC CEPHALIC PANCREATITIS

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Background. Chronic abdominal pain, weight loss, obstruction of biliary and pancreatic ducts, duodenal obstruction, stenosis and thrombosis of peripancreatic blood vessels, and other complications of chronic pancreatitis, occurred consequently of invariable morphological changes, such as pseudocysts, fibrosis, calcification, is an indication for surgical treatment.


Methods. Authors posses personal experience of 177 proximal resections of pancreas for treatment of chronic cephalic pancreatic (CCP); 38 gastropancreatoduodenal resection (Whipple), 46 – pyloruspreserving pancreateoduodenal resection (PD)/PR. Partial resections of head of pancreas have been recently: local resection of head of pancreas combined with longitudinal pancreaticojjunostomy (Frey) – 35, subtotal resection of head of pancreas combined with terminolateral pancreaticojjunostomy (Beger)-31, atypical resection (usually one of segments of head of pancreas) of head of pancreas combined with pancreaticojjunostomy-18, atypical resection of head of pancreas without pancreaticojjunostomy-9. Under the obligatory intraoperative and following morphological investigation traditional and immuno-gistochimical methods of research including the special study of pancreatic intraepithelial neoplasia (PanNiN) (HER-2/neu, MUC1, MUC2, MUC5A, p16, p53, Ki-67, PCNA) were used.

Results. The most informative operative method of diagnostics was CT with bolus contrast enhancement and 3D reconstruction, which gives a possibility to differentiate changes with tumors and contrast perfoming of surgery. Postoperative morbidity after PD – 4.8% (4), mortality – 1,9% (1); after partial resections of head of pancreas suitable output 3,2% (3) 0%. In 6 cases of special morphological investigation the changes are revealed which should be considered as PanNiN 3 (carcinoma in situ).

Conclusion. Partial resections of head of pancreas for treatment of CCP are preferable to any reconstructive organpreserving procedures. The required condition of performing these operations is accurate preoperative diagnosis and morphological identification.

251 PANCREATOGENIC ASCITES AGGRAVATED THE CLINICAL COURSE OF NECROTIZING PANCREATITIS

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Multiple-organ dysfunction syndrome (MODS) often determined the mortality in patients with necrotizing pancreatitis. Pancreatogenic ascites and pancreatitis-associated fluid accompanied the clinical course of necrotizing pancreatitis in 30–50% of patients. Experimental studies confirmed the role of pancreatitis-associated fluid in aggravation of MODS. Unfortunately, the studies about the influence of pancreatogenic ascites on clinical course of necrotizing pancreatitis in humans are limited. Results of treatment of 127 patients with confirmed necrotizing pancreatitis were evaluated. All patients were divided on two groups: 1st group compiled
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37 patients without removing pancreatic ascites, in the 2nd group included 90 patients in the complex management of whom the removing of fluid or the evacuation of the necrotic or fluid collections was performed within 48 hours after admission. Patients of both groups received the identical conventional treatment. Using the ELISA technique levels of interleukins 1, 6, 8, and 18 in plasma and ascites were measured in 69 patients. Severity of MODS determined according SOFA score.

Serum levels of cytokines did not differ in both groups at the time of admission. At the same time, increased levels of all cytokines were noted in all patients. Levels of interleukins in ascites exceeded its levels in plasma (p < 0.05). The gradual elevation, up to the seventh day, of interleukins’ level was noted in the second group of the first group what correlated with the MODS progression. Evacuation of ascites or fluid collections determined the decrease of interleukins’ concentration in systemic circulation started at the third day after fluid removing with the improving of clinical course. Progression of MODS was observed only in 7.8% patients of the first group. The further spreading of necrotic process was noted in 45.9% patients of the control group, while in 63.3% patients of the second group the necrotic process was stabilized and in 24.4%-was noted the diminish of the necrotic changes.

Thus, the evacuation of pancreatic ascites and acute fluid collections improve the clinical course of necrotizing pancreatitis.

252 N-ACETYL-CYSTEINE IN THE COMPLEX MANAGEMENT OF NECROTIZING PANCREATITIS

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Multiple-organ dysfunction syndrome (MODS) is characterized by generalized inflammation and tissue damage, and often determines the mortality in severe acute pancreatitis. Pro-inflammatory mediators (cytokines and reactive oxygen species) play an important role in the development and progression of MODS. The theoretical intervention points for MODS therapy directed at inflammatory mediator reduction and cell adhesion retardation.

The aim of this study was to determine the place of N-acetylcysteine (NAC) in the complex management MODS in necrotizing pancreatitis.

In this study enrolled 105 patients with severe pancreatitis who admitted in clinic not later than 48 h after onset of the symptoms. All patients were divided on two groups: 1st – 40 patients, which received standard therapy and 2nd – 65 patients who besides conventional therapy received intravenous NAC. Levels of interleukins (IL) 6, 8, 17, 18 and adhesion molecules – E-selectin, ICAM-1 were measured in all patients. Increased levels of all mediators were noted in all patients at the time of admission. During first week, mediators’ concentration significantly raised in patients of the first group what correlated with the worsening of clinical course (elevation of APACHE II score and increased CRP level). Insignificant increase of mediators’ level was noted in patients of the second group and started from the third day its levels decreased in 56.9% of them. Accordingly, the decrease of APACHE II score and improving of CT picture was observed in these patients. Mediators’ level stabilized in 26.2% of patients and only in 16.9% – further elevation of mediators’ concentration was noted.

Thus, our study shown, that applying NAC, which has plural potential action, in the complex management of necrotizing pancreatitis, decreased circulating levels of cytokines and improved clinical course of severe pancreatitis.

253 REGIONAL INTRA-ARTERIAL THERAPY IN THE MANAGEMENT NECROTIZING PANCREATITIS

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Despite recent advances in intensive care management, the mortality rate of severe necrotizing pancreatitis remains high. Prophylactic antibiotics given intravenously have been demonstrated to be beneficial in reducing the rate of pancreatic infection, but their survival benefit remains unclear. The goal of this study was to compare the results of the traditional intravenous and regional intra-arterial infusions in the complex management severe necrotizing pancreatitis.

Results of treatment of 78 patients with necrotizing pancreatitis was analyzed. All patients were divided on two groups: 1st group-38 patients with traditional regional intra-arterial therapy and the 2nd – 40 patients with, besides intravenous infusions, the intra-arterial administration of remedies (antibiotics, and proteases’ inhibitor) was applied. Ranson, APACHE II, and Balthazar score had no significant differences in both groups of patients at the time of admission. Subsequently, the further spreading of the necrotic process was established in 36.8% of patients of the first group and 22.5% – of the second group. Started at the fifth day the gradually decrease of necrotic foci was observed in 26.3% patients of the main group. The early contamination was noted in 15.8% patients of the control group, while among patients of the second group there were no cases of early contamination. In general, the total contamination level among patients, which treated by intravenous infusions, was higher than in patients treated by intra-arterial antibiotic administration. Accordingly, mortality in the second group was lower than in first group.

Conclusions. The early contamination is the effective for the controlling of the necrotic process and prevention of septic complications in patients with necrotizing pancreatitis.

254 ORAL REFEEDING IN ACUTE PANCREATITIS: A REVIEW OF LITERATURE

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Introduction. The acute pancreatitis is a relative common disease with incidence of between 5 and 80 people per 100000 of the population. The number of new cases in the last years has steadily increased. The two main ethiological factors are alcohol and cholelithiasis. The incidence of alcoholic pancreatitis is higher in male, and the incidence of gallstone pancreatitis higher in female.

Goals. The aim of this study is to summarise the difference between the clinical course of biliary and not biliary type of severe acute pancreatitis by analysing the data of these patients.
Patients and Methods. The 139 patients treated with severe acute pancreatitis were divided in two groups: biliary and non-biliary in origin. The age range was compared on the basis of sex and age, mortality, morbidity, number of surgery and hospital stay. I'H probe was used for the statistical analysis.

Results. The complications in the biliary group were more serious. The mortality was 15.1% in all cases and was 17.8% in the group A and 13.8% in the group B. The mortality rate of the female were significantly higher in the group A.

Conclusion. There are higher morbidity and mortality rate by the female patients compared to the severe biliary acute pancreatitis. Therefore in old female patients with serious comorbidity and gallstones, before developing the complications an elective cholecystectomy is suggested.

Key words. severe acute pancreatitis, gallstone pancreatitis, elective cholecystectomy

257 ROLE OF D-DIMER IN EARLY PREDICTION OF SEVERITY IN ACUTE PANCREATITIS

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Introduction. Clinical studies in acute pancreatitis (AP) suggest activation of haemostatic system. Early, accurate and reliable prediction of severity in AP is very important in the clinical practice. Aim of this prospective study was to assess whether early haemostatic abnormalities play a role in prediction of severity in AP.

Methods. From January 2004 until April 2005 a total of 91 patients with AP treated in our Institution were included. Measurement of coagulation, anticoagulation and fibrinolysis parameters: prothrombin time, activated partial thromboplastin time, fibrinogen, d-dimer, plasminogen activator inhibitor-1, d-dimer, alpha2-antiplasmin and plasminogen were done on admission and 24 h after. The severity of AP was defined according to the Atlanta classification system. At the end of study, groups of 33 patients with severe and 58 patients with mild form of disease were compared.

Results. On admission, the mean d-dimer concentration was 682 g/l (sd.460) for severe and 258 g/l (sd.182) for mild disease (p<0.001). On first day after admission respective values were 835 g/l (sd.428) and 336 g/l (sd.130). The senstivity, specificity, positive predictive, and negative predictive values of the test to show severe AP compared with mild AP on admission (>510 00,0 g/l or 1,7 fold higher than upper limit), were 73 %, 91 %, 83 %, and 82 % respectively, and 24 h after admission (>525,50 g/l or 2,1 fold higher than upper limit), were 76%, 82%, 72.8% and 82 %. The levels of all other measured parameters were significantly different between the patients with severe and mild AP, but all values were within physiological limits.

Conclusions. Prediction of severity is already possible on patients admission to the hospital with high sensitivity and specificity. D-dimer as single test is the best diagnostic parameter in the early phase of the disease.

258 THE USE OF ENFORCEMENT MATERIALS FOR WHIPPLE PROCEDURE

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Background. The pancreatico-jejunostomy anastomosis is most weak milestone of the Whipple procedure. There are many different techniques and materials used to stabilise this anastomosis safer and warrant it. One of the prospective methods is to use intraoperative adhesive materials like fibrin sealant and TachoComb.

Aim. The purpose of this study was to assess the use of these two vey close materials for the enforcement of pancreatico-jejunostomy anastomosis during Whipple procedure.

Methods. From December 1998 till October 2006 39 patients had Whipple procedure with the use of fibrin glue or TachoComb in the site of pancreatico-jejunostomy anastomosis (15 and 24 patients respectively). All patients had different primary diagnoses. The mean age, sex ratio, disease history and concomitant diseases, and the technique of pancreatico-jejunostomy anastomosis (end-to-side, two layers) in the both groups were similar. During surgery were used 5 ml of sealant or 1 large fleece of TachoComb.

Results. The intraoperative time for additional manipulation was high for sealant group (1,5 times in comparison to TachoComb). The intraoperative adhesion and sealing was better for sealant group (in 12 cases of TachoComb the material was not fixed to the line of anastomosis; in 2 cases in the sealant group). There were 2 cases of pancreatico-jejunostomy anastomosis leakage in the TachoComb group, and the absence in the fibrin glue group. The first postoperative day of mean amylase level from the site of surgery (drainage fluid from the abdominal cavity) was 3 times high for TachoComb (6600 IU for TachoComb and 21500 IU for fibrin glue).

Conclusion. We have found that if the surgeon decided to use any adhesive materials (as TachoComb or fibrin sealant) for the enforcement of pancreatico-jejunostomy anastomosis during Whipple procedure, the use of sealant is more preferable because its plasticity and temporary-time liquid condition, which help this material to penetrate to any deep layers of anastomosis.

259 CLINICAL VALUE OF DYNAMIC CONTRAST ENHANCEMENT CT, PANCREATIC TOMOGRAPHY IN MANAGEMENT OF NECROTIZING PANCREATITIS

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Background. The results of treatment of necrotizing pancreatitis (NP) are still unsatisfactory, despite the use of modern principals of conservative and surgical treatment. It’s obvious that timely and precise assessment of character and degree of pancreas and parapancreatic fate damage plays the leading role in determination of medical approach, which consequently influence on the outcome.

Aim. We have put the task to assess the role of Dynamic Contrast Enhancement Computed Tomography (DCECT) in combination with ultrasound (US) monitoring in defining the surgical management.

Materials and Methods. 246 patients with PN, which were presented of two groups, have been retrospectively analyzed during the period from 2002 to 2005. All patients had the same clinical data(Ranson >3, APACHE >9) and all cases were underwent different kind of surgery. Group 1 consisted of 125 patients (2002–2003), group 2 – of 121(2004–2005). In group 1 the main role in diagnostic algorythm played US monitoring and native CT, basically at the late period of treatment. All patients from group 2 were performed, in case of contraindications absence, DCECT on 3 – 5 days from the onset of disease or on the admission in case of delay hospitalization with following CECT monitoring every 7 – 10 days. The choice of way and kind of surgery based on clinical data and results of CECT. We assessed the results of CECT in accordance to Balthazar. Patients which had CT index of C and D and volume of necrosis (VN).<30% were underwent endoscopic surgery US-guided percutaneus drain, VN >30% but <50% – primary drainage with additional local US-guided drain, VN >50% – surgical management.

Results. Endoscopic surgery and US-guided drain were performed as a first and final stage of treatment in 56 (44,8%) cases of group 1 and in 98 (81,1%) of group 2. Endoscopic surgery and US-guided drain with following open surgery were performed in 23 (18,4%) cases of group 1 and in 14 (11,5%) of group 2. Open surgery, as a single surgical method, was performed in 45 (36,8%) cases of group 1 and in 9 (7,4%) of group 2. The mortality rate in first group was 35,2% and 16,9% – in second (p =0.005). Conclusion. DCECT is one of the most effective diagnostic methods that plays the leading role in management of necrotizizing pancreatitis and allow for perform flexible approach.

260 PANCREAS HEAD CANCER WITH WERNERS SYNDROME: A CASE REPORT

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A 60-year-old woman with Werner’s syndrome (WS) was admitted to our department with a complain of jaundice. In a patient with WS was reduced life-span of her fibroblasts in vitro. The genotype of this patient was heterozygote with mutation 1 in the WS gene, suggesting to be a compound homozygote. The patient had a history of chronic pancreatitis and a subcutaneous cancer of the lower bile duct. Under a diagnosis of lower bile duct cancer, the patient successfully underwent pancreatic-duodenectomy. Histological findings showed that main tumor was well-differentiated adenocarcinoma of the pancreas. Ten per cent of all patients with WS develop some forms of malignant disease, half of them sarcomas. Here we report a first successful resected case of WS with pancreas cancer.

261 INTERFERON-ALPHA ENHANCES ANTI-TUMOUR EFFECT OF CHEMOTHERAPY IN AN ORTHOTOPIC MOUSE MODEL FOR PANCREATIC ADENOCARCINOMA

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Abstracts

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Conclusions. IFN-alpha significantly improves chemo- and radiotherapy.

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Abstracts

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Objectives. Data from a phase II trial combining chemoradiotherapy with IFN-alpha (CapRI scheme) for adjuvant treatment of pancreatic carcinoma are very encouraging. Here, we try to evaluate the effect of IFN-alpha in this combined treatment scheme.

Design. Mice were inoculated with syngeneic cells in the pancreas. After 5 days animals were treated with 5-FU, CDDP, radiation and IFN-alpha. Tumour growth and immune responses were determined and adoptive cell transfer was performed. The impact of IFN-alpha on leucocyte-endothelium interactions was assessed by intravital microscopy.

Results. Addition of IFN-alpha to chemo- or radiotherapy had a significant life-prolonging effect (22 days CI 21; 23 for control animals compared to 32 days CI 24; 40 for 5-FU+IFN-alpha animals). Regimens including IFN-alpha demonstrated 70% less metastases than monotherapy. T cells and dendritic cells infiltrated tumours significantly more in 5-FU+IFN-alpha animals and these T cells secreted IFN-gamma tumour-specifically (p<0.02). Anti-tumour response could be transferred by injection of leucocytes from treated animals into treated mice (p<0.02). The transferred cells homed to the tumours and proliferated there. Furthermore, significant more leucocytes were rolling and sticking to the endothelium (p<0.01).

Conclusion. Combination therapy significantly improves chemo- and radiotherapy. This is mainly mediated by immunomodulation with improved adherence of leucocytes to the endothelium, infiltration and lysis. Although IFN-alpha acts unspecifically an additional specific immune response could be demonstrated.

262 INTRATUMORAL INJECTION OF MACROPHAGE-ACTIVATING LIPOTROPE IN PATIENTS WITH PANCREATIC CARCINOMA: A PHASE II TRIAL

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Objective. This phase II trial examined safety and efficacy of the toll-like receptor 2/6 agonist MALP-2 in combination with gemcitabine in patients with incompletely resectable pancreas carcinomas.

Summary Background Data: MALP-2 acts an immunological adjuvant and has been described recently to prolong survival in a mouse model of an orthotopic, syngeneic pancreas tumor.

Methods. Men and women with incompletely resectable pancreatic carcinomas were eligible. Patients with R0 or R1 resections or with peritonial carcinosis were excluded. Ten patients were injected intratumorally during surgery with 20-30ug MALP-2 followed by postoperative chemotherapy. Samples were taken from peripheral blood and wound secretion, and assayed for cell content, cytokine and CRP levels, and NK activity.

Results. A MALP-2 dose of 20ug given to 5 patients was well tolerated. In two out of three patients treated with 25ug MALP-2 and in one out of two patients treated with 30ug serious adverse events occurred (asystole, myocardial infarction and endotomol-like shock). They recovered completely. Clear signs of local MALP-2 effects were: influx of lymphocytes and monocytes in wound secretions, and abolishment of inhibition of NK activity. The actual mean survival is 16.3 ± 3.5 months; the median survival being 9.3 months. Three patients are still alive after 26 months.

263 INTERFERON-ALPHA IN COMBINATION WITH CHEMOTHERAPY HAS POTENT ANTI-ANGIOGENIC PROPERTIES IN AN ORTHOTOPIC MOUSE MODEL FOR PANCREATIC ADENO-CARCINOMA

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Objectives. There are clinical data showing encouraging results for combining chemoradiotherapy with IFN-alpha (CapRI scheme) for treatment of pancreatic carcinoma.

Design. Here, we try to evaluate the anti-angiogenic effect of IFN-alpha in combination therapy. Mice were inoculated with syngeneic cells in the pancreas and treated with 5-FU+IFN-alpha. Tumour growth, VEGF serum levels, VEGF-R expression, vessel density and mRNA levels of RGS-5, an angiogenic pericyte marker were analyzed.

Results. Addition of IFN-alpha to 5-FU treatment decreased tumour volume, serum level of VEGF and expression of VEGF-Receptor significantly. Furthermore, we observed a decrease in vessel density in animals treated with combination therapy. RGS-5 a protein involved in angiogenic tumour vasculature was down-regulated in animals treated with combination therapy.

Conclusions. IFN-alpha significantly improves 5-FU-therapy for pancreatic carcinoma. This is at least partly mediated by anti-angiogenic properties.

IFN-alpha together with 5-FU acts on the VEGF system, vessel density and on RGS-5 expression in pericytes.

264 THE INDICATIONS AND RESULTS OS PERCUTANEOUS DRAINAGE OF STERILE FLUID COLLECTIONS IN SEVERE ACUTE PANCREATITIS

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Aims. The percutaneous drainage of sterile fluid collections in severe acute pancreatitis is not a widely recognized treatment. The authors present their experiences of this therapeutic possibility.

Patients and methods. In a 12 year period 137 patients (67.8% male, 32.2% female, mean age of 49.2 years) were treated with severe acute pancreatitis. Besides naso-jejunal feeding, preventive antibiotics and delayed surgery in 22 cases percutaneous drainage was performed because of advanced, sterile peripancreatic fluid collection.

Results. Of the 22 patients 6 (27.3%) were recovered without surgery. The remaining 16 (72.7%) underwent one or more operations after unsuccessful drainage. The initially sterile fluid collection was turned into infected collection in 6 (27.3%) cases. The overall mortality rate in the 137 patients was 14.6% and it was 9.1% in the patients who underwent percutaneous drainage of sterile fluid collection.

Conclusions. The percutaneous drainage of sterile fluid collections in severe acute pancreatitis plays a big role in the delaying of operation. 27.3% of the drained patients recovered without surgery. The rate of superinfection was 27.3%.

265 PERSISTING ELEVATION OF C-REACTIVE PROTEIN AFTER PANCREATIC RESECTIONS INDICATES INFECTIOUS COMPLICATIONS

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Background. Serum C-reactive protein (CRP) is an established discriminating factor for necrotizing pancreatitis. In this study the CRP response with respect to infectious postoperative complications (IPCs) was examined in a large homogeneous series of pancreatic resections in order to define a relevant clinical parameter for early detection of IPCs.

Methods. 688 consecutive pancreatic resections with jejunal anastomosis were screened for IPCs based on a prospective database. 89 patients had at least one IPC and were compared to subgroup of 60 consecutive patients with uneventful postoperative courses.

Results. In the postoperative setting following pancreatic resection, CRP peaked on postoperative day (POD) 3 with a median serum CRP of 132 mg/L and gradually declined thereafter in uncomplicated cases. In complicated cases (e.g. the exception of cholangitis), CRP elevation was significantly higher, peaked on POD 3 (median CRP 173 mg/L), and persisted thereafter, whereas white blood cell (WBC) count and body temperature did not differ significantly from uneventful courses until POD 6. The median day of diagnosis of IPCs was POD 9. A cutoff CRP value of 140 mg/dL on POD 4 yielded a positive predictive value of 89.1% (adjusted to the prevalence of IPCs: 48.7%) with a specificity of 87.1% and a sensitivity of 69.5% for IPCs.

Conclusion. Persistence of CRP elevation above 140 mg/dL on POD 4 is predictive of IPCs and should prompt an intensive clinical search for major infectious processes (e.g. pancreatic fistula or abscess) if pneumonia and wound infection are unlikely or excluded.

266 EXPRESSION AND POTENTIAL FUNCTION OF THE TWO NOVEL CHEMOKINES CXCL14 AND CXCL16 IN PANCREATIC CANCER

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Background. CXC chemokines and their receptors have been shown to influence angiogenesis, growth, and metastatic potential of a variety of malignant tumors.

Aim. To evaluate the expression and functional role of CXCL14 and CXCL16 in pancreatic cancer (PaCa).

Methods. For expression analysis in human tissue and serum of patients with PaCa, PCR, immunohistochemistry, and ELISA were used; healthy donors served as controls. Human PaCa cell lines were used for in vitro studies. Effects on cell viability were tested by exposure to CXCL14 and CXCL16...
OPERATIVE PROCEDURES FOR CHRONIC PANCREATITIS: ARE WE DOING THE RIGHT THING?

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Objective. We aimed to review all the operative procedures performed for chronic pancreatitis at a single, tertiary unit between 1995–2005 inclusive. Methods. Patients undergoing these procedures were sought from hospital electronic data sources, ERCP and histopathology reporting. A retrospective case note review was performed.

Results. Forty-eight patients (median age 50 yrs, range 13–82 yrs, 37 male) underwent an operative procedure. The median number of hospital admissions for chronic pancreatitis prior to an operation was 2 (range 0–25). 37 patients underwent ERCP pre-operatively, 15 of these had either CBD/pancreatic duct stent insertion, (10 successfully) and 1 a PTC with drain insertion to relieve biliary obstruction. A wide range of indications for operation were noted. Pain alone (16), obstructed jaundice (4), pseudocysts (11), inflammatory mass in the pancreatic head (9), CBD (8), CBD (14), and gastric outlet (4). Others – pseudocyst (3), indeterminate mass (3), weight loss (2), recurrent pancreatitis (1) & persistent inflammatory mass (2). Twenty-one bypass procedures were performed, various forms of pancreatic resection, +/- pancreaticojunostomy (17) transduodenal splenunculoplasty & transampullary septectomy (4), cystogastrostomy (2), cyst excision (1) and cholecystectomy & T-tube insertion (1). 22 patients were admitted to Intensive Care post-operatively (median stay 3 days). 19 patients developed post-operative complications, 18 being major, (2 requiring relaparotomy –small bowel perforation & bleeding respectively). In hospital post-op mortality was 4.2% (30-day mortality-2.1%). 2 others died within 12 months from previously undiagnosed carcinoma. As a consequence of operation, 7 patients required insulin replacement, 21 required pancreatic enzyme supplementation (Creon) and 7 increased analgesia. At follow up, 36 patients claimed they had improved symptoms, with 4 claiming they were symptomatically worse off.

Conclusion. 75% of this selected group of patients with chronic pancreatitis undergoing surgery after primary and salvage procedures had good selection and attention to operative and general management.

CARCINOMA OF THE PANCREATIC HEAD INFILTRATING MAJOR BLOOD VESSELS: IS IT WORTHY TO OPERATE?

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Background. Evidence is growing that carcinoma of the pancreatic head infiltrating major blood vessels (portal vein, superior mesenteric vein, hepatic or celiac) can be safely treated with pancreatoduodenectomy in a ‘gate-bloc’ resection of the infiltrated vessels. Prognosis of these patients is a matter of debate.

Methods. Morbidity, mortality, and long-term survival in patients under- going pancreatoduodenectomy with or without vascular resections (VR) were investigated in a retrospective review of 1994 to 2005, 524 cases. Pancreatoduodenectomies were performed for malignancies. One-hundred patients (19.1%) had additional VR. 58 patients underwent venous resection with tangential excision with direct suture, 8 patients tangential excision with patch, 14 segmental resection with end-to-end anastomosis, 14 segmental resection with graft interposition and 6 patients different arterial resections. Additionally, 20 patients had vascular resections for benign and borderline dignities.

Results. Long-term survival was analyzed in 77 patients with pancreatic, in 12 patients with ampullary and in 11 patients with distal bile duct cancers and in 68 among patients with VR, histopathology showed true tumor involvement. In the complete study group, negative resection margins (R0) were obtained in 85% of patients with VR and in 86% of patients without VR. No statistical difference was detected between both groups and a comparison of median survival time (300 VR versus 360 months w/o VR), and median volume of intraoperatively transfused blood units (3 units in both groups). Postoperative surgical complications/mortality occurred in 26%/7% (VR versus 31%/5% (no VR, n.s.). Analysis of long-term survival in all 424 patients without VR revealed five-year survival including M+R of 16% compared to 4% in patients with VR (median overall survival 14 vs. 13 months; p = 0.27). In multivariate modelling, resection margin and histological grading significantly influenced survival.

269 SALVAGE AFTER PRIMARY TREATMENT FAILURE OF SURGERY FOR TREATMENT OF CHRONIC PANCREATITIS

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Background. Pain relief is the primary goal of surgery for chronic pancreatitis. Salvage in case of inadequate relief, persistence or recurrence of pain after surgical treatment include both ‘redo’-surgery and non-surgical interventions. We report on our institutional experience with respect to this salvage procedures.

Methods. Between 1992 and 2005, among 702 patients treated surgically for chronic pancreatitis, 27 presented with pain recurrence and subsequently underwent different redo-procedures depending on individual pathologies detected in a standardized diagnostic workup including M+R and PET-CT scanning. For measurement of quality of life, a validated EORTC-questionsnaire including a pain score was used. The number of re-operations varied between 2 and 5 operations. Follow-up ranged from 12 to 126 months after the redo-operations.

Results. The entire cohort of 27 patients had primarily undergone duodenum-preserving pancreas head resection in different modifications (‘Frey’, ‘Beger’ procedure or extended drainage procedure). After primary surgery, median global pain score did not adequately decrease. Imaging evaluation showed at least one of the following pathologies: recurrence of inflammatory mass in the pancreatic head (n=20), stenosis or stones in the pancreatic duct remnant (n=15), and parenchymal calcifications and pseudocysts in the body and tail (n=9). In 22 patients organs preserving pancreatic redo-resections preserving adjacent organs were carried out, while in 5 patients classical resectional procedures and in 3 patients stepwise near subtotal pancreatectomy had to be performed. No perioperative mortality was recorded. Following redo-operation, surgical morbidity accounted for 22% (6/27), while medical morbidity accounted for additional two patients suffering 5%. No statistical difference in morbidity was detected between the index and redo-procedures. Endocrine insufficiency impaired in one patient after redo-resection. Median pain score decreased significantly after redo-procedures from 86 median (range: 62–100) to 25 (range10–46; p = 0.0001; t-test) compared to the status before index operation.

Conclusion. Therapeutic nihilism after failure of primary surgical treatment in chronic pancreatitis patients is not justifiable. Based on the individual complaints and morphological findings in imaging investigations, surgical salvage procedures offer reasonable chances to achieve pain relief as the eventual success parameter of any treatment for chronic pancreatitis.
crine tumors, pancreatitis and secondary metastasis in 43 patients. The rest of 31 patients were treated with CRP.

Recurrence-related mortality was registered in the 43 patients with OSPPR unlike to CRP with a mortality rate of 3%. Thirty day-morbidity was 23.2% (18.6% Surgical; 4.6% non-surgical) in OSPPR, compared to 41.9% in CRP (32.2% surgical and 9.6% non-surgical). After a median follow up of 60 months, 33 patients (83.7%) with OSPPR are free of recurrence compared to 24 (80%) patients in the CRP after a median follow up of 24 months.

Conclusion. OSPPR in focal pancreatic lesions of borderline dignity is a valuable alternative with good results, and even lower morbidity and mortality rates and in the same time not compromising pancreatic function and above all showing comparable recurrence rates and survival.

271 DEEP MYCOSIS AFTER THE PANCREAS SURGERY
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Objective. In this study, we retrospectively evaluated whether deep mycosis affect the clinical course after pancreas surgery.

Method. Between January 2005 and December 2006, 60 patients underwent pancreatic surgery at our department. There were 38 males (63.3%) and 22 females (36.7%) with a mean age of 64.2 years. Diagnosis included cancers of papilla of Vaters (n=9), pancreas head cancers (n=16), pancreas tail cancers (n=3), bile duct cancers (n=14), duodenal cancers (n=5), and others (n=15). Procedure included Pancreatico-duodenectomy (PD) (n=38), PD with portal vein resection (n=7), heptao- PD (n=4), distal pancreatectomy (n=7), total pancreatectomy (n=2), and Puestow procedure (n=2). Patients who were positive for any of CAND-TEC, 7-D-glucan, bacterial culture for mycosis, were classified into G1 (n=10) and G2 (n=50). Perioperative and postoperative data were compared between G1 and G2. The antifungal drug was given to G1 patients.

Results. Operation times in G1 and G2 were 486.0 min and 520.0 min, respectively (p=0.65), and intraoperative blood losses in G1 and G2 were 579.5 ml and 524.0 ml, respectively (p=0.38). Postoperative complications included pneumonia, pleural effusion, ascites, and pancreatic juice leak. All the G1 patients were treated the antifungal drug was given for 7.8 days. Postoperative hospital stays in G1 and G2 were 39.0 days and 37.0 days, respectively (p=0.97), and mean survival time in G1 and G2 were 7.5 months and 8.0 months (p=0.75).

Conclusions. The deep mycosis still occurs after pancreas surgery, but early diagnosis and accurate antifungal therapy enabled to minimize morbidity.

272 THE SAFETY OF PANCREATICO-DUODENECTOMY IN ELDER PATIENTS
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Objective. Pancreatico-duodenectomy (PD) is a standard method to remove pancreatico-biliary tumor. However, it carries considerable risk due to extensive resection, especially in elderly patients. In this study, we retrospectively evaluated whether deep mycosis affect the clinical course after pancreas surgery.

Method. Between April 2000 to December 2006, 70 PD were performed for patients over 65 years at our department (G1). Diagnosis included cancers of papilla of Vaters (n=11), pancreas head cancers (n=19), bile duct cancers (n=22), gall bladder cancers (n=2), duodenal cancers (n=7), and others (n=10). Operative data (time, blood loss), and postoperative data (complications, hospital stay, survival months) were compared with those under 64 years (G2n=45).

Risk Index (RI) for postoperative death, postoperative death was defined as occurring within ninety days after operation.

Results. Eight patients underwent pancreaticoduodenectomy; nineteen patients had left sided pancreatic resections. They had a median of 2 (range 1-5) additional organs resected. There was one post-operative death, 5 patients had a major complication and in 11 patients, 23 minor complications were observed. There was no correlation between the number of organs resected, operative time, intra-operative blood loss, and number of complications. Median hospital stay follow up was 18 months (1-150) months, seven patients have died (5 of recurrent disease) and two patients are alive with recurrent disease, one patient with recurrent neuroendocrine tumor was lost from follow up after 30 months. Median overall survival was 56 months, and disease free survival was 34 months.

Conclusion. En bloc multi-visceral resection for selected locally advanced malignancy involving the pancreas is technically feasible and in specialist centers can be achieved with low mortality and acceptable morbidity, offering good disease free and overall survival.

275 RESECTION MARGIN INVOLVEMENT AND SURVIVAL AFTER PANCREATICO-DUODENECTOMY FOR ADENOCARCINOMA OF THE HEAD OF THE PANCREAS
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Objectives. For a long time, the status of resection margins (RM) has been considered an important prognostic factor following pancreaticoduodenectomy (PD) for resectable pancreatic adenocarcinoma. Recently, Verbeke et al suggested that closer histopathological re-examination of the tissue samples increases significantly the number of positive resection margins putting the impact of negative RMs on survival following PD under discussion.

Aims. To examine the relationship of involved pancreaticoduodenectomy (PD) resection margins to survival.

Methods. We reviewed records of patients who had PD for adenocarcinoma between 1995 and 2005. Data were collected for the age, sex, maximum tumor diameter, differentiation, number of nodes, resection margins, perineural and perversal invasion, tumour type, operation date, post-op chemotherapy and last recorded clinical encounter. Median and 1-year
survivals were calculated and compared using the log-rank test or with Cox proportional regression modeling.

Regarding 92 patients undergoing PD for pancreatic intraaducal adenocarcinoma in this period (50 males (54%) and 42 (46%) females), median age was 65 (IQR 58 – 73) years and median diameter of tumor was 30 (IQR 20 – 35) mm. Median survival was 579 days (IQR 415 – 743), with a one year survival rate of 83%. Using Kaplan-Meier analysis there was no difference in median survival for patients with clear (665 days) or with involved margins (501 days); p = 0.152, log-rank test). Multivariate analysis of survival in the PA group including age, sex, tumour size, perineural or perivascular involve-
ment, lymph node status and adjuvant chemotherapy as covariates confirmed that margin status did not influence surgery (p =0.65).

Conclusion. No significant survival difference was found between patients with positive or clear resection margins. This supports doubts about the significant importance of resection margin involvement as a prognostic factor for PD for pancreatic adenocarcinoma.

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276 IS T-TUBE DRAINAGE AFTER CBD EXPLORATION NECESSARY?

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Aim. To review the complications associated with T-tube drainage after common bile duct (CBD) exploration and to determine whether primary closure reduces postoperative morbidity.

Methods. A retrospective audit was performed on patients undergoing CBD exploration between July 1997 and August 2006, identified from the hospital theatre database. Intra-operative findings and postoperative complications were recorded from the clinical notes.

Results. During the study period 140 (88 female) patients with a median (range) age of 65 (25–90) years underwent CBD exploration. A T-tube was inserted in 80 patients (Group I) and the CBD was closed primarily in 60 (Group II).

One or more biliary complications occurred in a total of 25 (18%) patients: 19 (24%) in Group I and 6 (10%) in Group II (p = 0.04). In Group I, 12 had a biliary leak, (3 were re-explored), 6 had peri-tubal infection, 2 had access to the duct by the tube (open), and 2 a trapped T-tube which was (re)avaged after 3 months (after absorption of the sutures). In Group II, 6 patients had biliary leakage, 2 of whom were re-explored. There were 4 deaths, 3 in Group I (1 T-tube related) and 1 in Group II.

Conclusion. Bile duct exploration is associated with significant morbidity. Primary bile duct closure is associated with a decreased morbidity when compared with insertion of a T-tube.

277 SURGICAL AMPULLECTOMY : A SURE TREATMENT OF PRE-SUMED BENIGN AMPULLOMAS

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Aim. Presumed benign ampullomas (PBA) can be treated either by pancreatecoduodenectomy (PD), endoscopic ampullectomy, or surgical ampullectomy (SA). SA needs previous assessment to eliminate invasive carcinoma and must obtain tumor-free margins. The aim of this work was to evaluate feasibility and results of SA.

Methods. From 1995 to 2006, 31 patients (age : 38 – 79 years) underwent SA for PA determined by biliary pain / cholangitis (n = 10), 12 with a personal history of a familial adenoma (n = 4), fortuitously (n = 16) or during postoperative follow up after SA performed elsewhere. Preoperatively, all 31 patients underwent duodenoscopy with biopsies (11 after endoscopic sphincterotomy) and endoscopic ultrasound (EUS). Biopsies had revealed: adenoma with low-grade dysplasia (LGD; n = 11); papilla of Vater with high-grade dysplasia (HGD; n = 4), or inflammatory/normal mucosa (n = 6). At EUS, the ampulla was always classified as an uT1N0 lesion. Frozen section was routinely done, on the only resection margins. All patients were informed of the need for PD in case of invasive carcinoma.

Results. From 1995 to 2006, 31 patients underwent PD to PIPD (95% underwent endoscopic sphincterotomy) or pancreatic (n = 2) margin was tumoral in 7 patients but all had additional ductal resection with tumor-free margin at the second examination ; all duodenal margins were tumor-free. PBA size ranged from 8 to 65mm (mean : 20 mm). There was no mortality. Postoperative course was uneventful in 22 patients (73%). Main complications were: 2 cholangitis, one fistula of the cystic duct (reoperation), one upper GI bleeding (this patient was the only one transfused), one abdominal abscess without fistula, and one mild onset of pancreatitis (in the patient with pancreatic divisum). On histology, there was 19 adenomas (12 LGD, 7 HGD), 5 microinvasive intra-ampullary carcinomas (not extending through the Oddi’s muscle, therefore without risk of lymph node metastasis), one carcinoma invading the duodenal submucosa (PD contra-indicated to due poor general condition), and 5 other benign lesions (including 3 adenomyomas). All margins were tumor-free. With a 22 months median follow-up (range: 3– 72), 3 (10%) patients had complications: cholangitis (n = 2) or epigastric pain. Tumor recurrence was observed in 3 (10%) patients: one presumed ductal cephalic adenocarcinoma, one distal cholangiocarcinoma, one LGD ade-

Conclusions. SA combined with frozen section can treat PBA with acceptable morbidity (less than observed after PD) and tumor-free margins, particularly on the common bile duct. After complete endoscopic assessment the probability to perform immediately or secondarily a PD is less than 10%.

278 APPLICATIONS OF LAPAROSCOPIC HEPATOCOJEUNOSTOMY

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Background. Hepatocojejunostomy (HJ) is conventionally constructed at laparotomry either to bypass benign or malignant biliary strictures, or following hepatobiliary or pancreatic resections. The role of the laparoscopic approach to HJ, however, remains under evaluation.

Methods. The feasibility and safety of the laparoscopic approach to HJ were prospectively evaluated.

Results. Between 2002 and 2006, 10 selected patients with a median age of 67 (range: 48 – 81) years underwent laparoscopic Roux-en-Y HJ (end-to-side), n = 6; side-to-side; n = 4). The HJ was constructed to bypass benign (n = 1) and malignant (n = 4; three combined with gastrojejunostomy) biliary strictures, and following laparoscopic Whipple’s procedure (n = 4) or excision of a biliary cyst (n = 1). All procedures were completed laparoscopically. The median operative times for bypass surgery and for pancreaticobiliary resections were 320 and 600 minutes respectively. One patient developed a pancreatic fistula. There were no biliary leaks or stricture, no re-operations, and no perioperative deaths. The median postoperative hospital stay after hepaticojejunostomy and choledochal surgery was 6 days and after Whipple’s was 13 days. No biliary strictures were encountered at a median (range) follow up of 6 (3– 36) months.

Conclusions. Laparoscopic HJ is feasible and safe. Expansion of experience is required to refine the operative technique and establish long-term results.

279 SYSTEMATIC EVALUATION OF LITH MOUSE CANDIDATE GENES IN HUMAN GALLSTONE DISEASE

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Background and Aims. Cholelithiasis is a frequent and economically highly relevant health problem in industrialized countries. Genetic predisposition has been demonstrated by familial clustering (familial relative risks between 3 and 7). The familial relative risk is further increased in patients with a young age of onset to ~30–40 for patients with an age of onset under 40 years. In twin studies, MZ concordances around 40–56% versus 0-8% in DZ twins have been reported. Over 20 mouse “Lith” loci have been identified by genome-wide QTL mapping in inbred mouse strains. This study was undertaken to investigate the human ophthalmic of five attractive positional and functional candidate genes that are located in three major murine gallstone susceptibility loci as candidate genes for gallstone disease in humans.

Methods. Over 2500 patients who had undergone cholecystectomy for symptomatic gallstone disease below the age of 66 years were recruited using Omnibus. Patients were divided in 4 categories: typical biliary lithiasis, atypical biliary lithiasis, nonlithogenic stone disease, and common bile duct stones. The familial relative risk is further increased in patients with a young age of onset to ~30–40 for patients with an age of onset under 40 years. In twin studies, MZ concordances around 40–56% versus 0-8% in DZ twins have been reported. Over 20 mouse “Lith” loci have been identified by genome-wide QTL mapping in inbred mouse strains. This study was undertaken to investigate the human ophthalmic of five attractive positional and functional candidate genes that are located in three major murine gallstone susceptibility loci as candidate genes for gallstone disease in humans.

Results. The investigated patient sample provides a power of greater than 80% for the detection of odds ratios down to 1.55. No evidence of association of the five genes in the single point tagging markers, coding SNPs and in the sliding window haplotype analysis was detected (all nominal single point p-values 0.06).

Conclusions. This investigation is the first association approach to the molecular genetic investigation of the general “gallstone” trait in humans. The study demonstrated that fine mapping of the investigated murine “Lith” regions are required to identify the causative genetic variants for gallstone disease in mice and humans.

280 GALLBLADDER METASTASIS FROM BREAST CANCER: CASE REPORT

Histopathological examination revealed galbladder metastasis from breast carcinoma. Five years ago for breast carcinoma. With a preoperative diagnosis of acute biliary pancreatitis she underwent ERCP and seven days after laparotomic mastectomy(2001) and adjuvant chemotherapy.

We report a 78 years old woman that was admitted in our unit for acute melanoma, gastric, pancreatic, colonic, renal and cervical carcinomas. In our review the malignancies most likely to metastasize to the galbladder are few cases have been reported in the literature. 

Bile duct injury (BDI) is associated with high rates of litigation. Sixty three percent of all medical liability claims, involving procedures performed by general surgeons, is filed after the occurrence of BDI. In almost 9% of these cases, a patient died due to the occurrence of BDI.

The main cause of proximal bile duct strictures is hilar cholangiocarcinoma (HCCA). Recently, IgG4-related lymphoplasmacytic sclerosing pancreatitis (LPSP) has been described mimicking distal cholangiocarcinoma. The aim of this study was to assess the role of IgG4-related sclerosing disease in patients with benign diseases after resection for suspicious proximal bile duct strictures. Furthermore, the long term follow-up of these patients was assessed.

A total of 185 consecutive patients underwent resection on the suspicion of HCCA between January 1984 and June 2005. In 32 patients (17.3%), a benign stricture was found on histopathological examination of the specimen. These lesions were analysed by histological and immunohistochemical analysis.

Of 32 patients, the most common presenting symptoms were obstructive jaundice in 25 patients (78%) and malaise in 19 patients (59%). Surgical procedures included common bile duct resection in 29 patients (91%), which was combined with liver resection in 7 patients. Histologically, the bile duct walls in 15 patients (47%) showed diffuse, moderate/severe lymphoplasmacytic infiltration with marked fibrosis. Of these, 14 pts (93%) showed abundant IgG4-bearing plasma cell infiltration compared to moderate/severe CBD-B lymphocyte in 9 pts (75%). In the T lymphocyte population, 11 pts (73%) showed moderate/severe CD4 cells whereas 7 pts (47%) had moderate/severe CD8 cells. IgG-plasma cell staining showed moderate infiltration in 7 of 15 patients (47%) and was negative in one patient. Abundant IgG4-bearing plasma cell infiltration around the bile duct lesions was seen in 2 of the 15 patients (13%) with moderate/high suspicion of an autoimmune disease. In 5 patients IgG4-plasma cell staining was negative and the remaining 8 patients showed slight infiltration of IgG4-plasma cells. In 6 patients, the IgG4-bearing plasma cells were completely composed of IgG4-bearing plasma cells. Long-term complications occurred in 11 patients. Patients with high suspicion of an autoimmune disease showed more recurrent biliary complications compared to patients without features of an autoimmune disease (50% vs. 27%, respectively; P=0.250).

The main characteristics of these 11 patients were: 1) obstructive jaundice in 7 patients (63.6%) and recurrent biliary complications in 8 patients (72.7%). 2) Cryptogenic cholestasis in 4 patients (36.3%) and IgG4-related sclerosing disease in 3 patients (27.2%).

Conclusions. Features of autoimmune disease were seen in 47% of patients with benign hilar strictures resected for presumed HCCA. IgG4-related sclerosing disease was found in 6.3% of patients with benign hilar strictures.

284 TOTALLY LAPAROSCOPIC MANAGEMENT OF CHOLEDOCHAL CYSTS USING A FOUR-HOLE METHOD

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Background. Choleodochal cyst is a rare benign disease of the bile tract. However, once diagnosed, it must be excised with the gallbladder because of...
the risk for cancer developing in the biliary tree, including the gallbladder. This report introduces a new surgical technique for totally laparoscopic excision of choledochal cyst and hepaticojejunostomy using a four-hole method.

Methods. Between October 2003 and 2006, the authors performed totally laparoscopic choledochal cyst excision for 18 patients. All the patients except one were women, and the mean age was 57.3 years (range, 17–62 years). According to the Todani classification, there were eight type Ia cases, four type Ib cases, and six type IV cases. Choledochal cyst excision and Roux-en-Y hepaticojejunostomy were performed laparoscopically using the four-port technique.

Results. The mean operation time was 220 min (range, 150–330 min). No operative or postoperative transfusion was required. An oral diet was started on postoperative day 3. The average length of hospital stay was 5.8 days. There was no major complication associated with Anastomosis leakage or hemorrhage. None of the patients had an adverse response, as determined by clinical or laboratory evaluation during a 2- to 19-month follow-up period.

Conclusions. Considering that choledochal cyst is common among young women, who are especially interested in cosmetic results in addition to complete resolution of medical problems, the laparoscopic management of choledochal cyst may be an attractive treatment option.

285 ROUX-EN-Y DUODENOJEJUNOSTOMY AFTER BLEEDING CONTROL OF AMPLA OF VATER

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Introduction. Bleeding is a serious complication after ERCP (endoscopic retrograde cholangiopancreatography) following EST (endoscopic sphincterotomy). Most of cases are improved without further active treatment. But in a few cases, other treatment modalities such as angiographic embolization or surgical exploration are needed. Case report: We report a case of anmpulla of Vater bleeding after ERCP following EST, which is treated successfully by duodenotomy with bleeding control and Roux-en-Y duodenojejunostomy. A 57-year-old woman is referred with impression of biliary stone disease. ERCP is performed to evaluate of jaundice by expert medical doctor. Unexpected bleeding after ERCP is developed and 2 times of endoscopic bleeding controls are tried but failed because of bad endoscopic field. Gastroduodenal artery embolization is carried out by angiographic intervention, but bleeding is not controlled. After Kocherization, longitudinal duodenotomy by 5 cm in length is performed and active bleeding artery is suture ligated. Considering, if of poor blood supply of duodenum due to previous embolization, primary closure can be dangerous. Roux-en-Y duodenojejunostomy is done by retrocolic fashioned. The patient recovered without any other complication and discharged. We think that Roux-en-Y duodenojejunostomy is a safe method to repair the compromised duodenum. Retrocolic loop duodenojejunostomy also can be an alternative.

286 TRAUMATIC NEUROMA OF THE COMMON BILE DUCT

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Trumatic neuroma is the nonneoplastic proliferative mass of Schwann cells and neurites that may develop at the end of a severed or injured nerve. The usual location of traumatic neuroma is in amputated extremities. However, traumatic neuroma of the bile duct can occur following cholecystectomy due to a reactive proliferation of pericholangial nerve tissue induced by injury. We present the case of 78-year-old man presenting, 17 years after cholecystectomy, with a common bile duct mass. He was treated by surgical resection of the common bile duct at the mass site, and Roux-en-Y hepaticojejunostomy. Postoperative course was uneventful. Histologic examination revealed a traumatic neuroma. Although traumatic neuromas in the bile duct were very rare, it should be included in the differential diagnosis of bile duct mass in patients with a history of cholecystectomy.

287 A CASE OF PREDUODENAL PORTAL VEIN AND COMMON BILE DUCT ASSOCIATED WITH CHOLEDODHAL CYST

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A preduodenal position of the portal vein (PDPV) and common bile duct (PDCBD) is a very rare congenital anomaly. We experienced this particularly rare case which is associated with choledochal cyst. Our patient, a 35-years-old female, was diagnosed to have choledochal cyst and cholecyst-choledocholithiasis. The PDPV and PDCBD was discovered during the resection of the extramural biliary tract including choledochal cyst, and Roux-en-Y hepaticojejunostomia. This anomaly was not diagnosed preoperatively, but it could have been. Although embryological anomalies of the portal venous system and biliary duct system, such as prepancreatic portal vein (PPPV), and PDPV, PDCBD, are rarely encountered in adult population, it must be aware of their possibility and be able to recognize them to avoid major intraoperative injury. The case is being reported because of the rarity of this condition and also to stress the importance of accurately recognizing this anomaly when treating the concomitant diseases, particularly when surgical implications are involved. We also discuss the anatomy and embryology of these structures and briefly review the patterns of previously reported cases that we found.

288 MANAGEMENT OF BENIGN BILIARY STRICATURE: REVISITED

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Introduction. Benign biliary stricture remains difficult management problem and a major challenge to hepatobiliary surgeons. New minimally invasive techniques have met great enthusiasm as they avoid difficult operations. Since there is currently no consensus on which patients should have what type of procedure, a review of the effectiveness of all available treatments is necessary to set a standard treatment.

Methods. The authors reviewed the treatment and outcome of all patients with benign biliary stricture who were managed at our institution between 2002 and 2006. Demographic data and result of diagnostic and therapeutic procedures before and after referral were obtained and analyzed. Diagnosis of a stricture was confirmed by either endoscopic retrograde pancreatocholecystography (ERCP) or percutaneous transhepatic cholangiography (PTC). In patients with bile duct injuries recognized during the operation intraoperative cholangiography was immediately performed and surgical repair undertaken. The common bile duct (CBD) stricture was identified based on the preoperative cholangiography and/or delayed runoff of contrast. The iatrogenic strictures were classified according to the Bismuth classification. Patients were treated surgically and/or endoscopically according to the aetiology and the degree and the level (Bismuth’s classification) of the stricture. However the management choice was made on individual basis, evaluating carefully the personal medical history, and evolving data with respect to outcome after each diagnostic procedure performed.

Results. Forty-nine patients with benign biliary stricture were treated. Causes of the stricture were chronic pancreatitis (17, 35.6%), injuries (12, 24.5%), cholangitis (8, 16.3% primary sclerosing cholangitis; 4, 8.1% other), enterohepatic anastomosis (3, 6.1%), choledochal cyst (3, 6.1%), crohn’s disease of duodenum (1, 2%), aberrant anatomy (1, 2%). 28 (57.1%) patients had only endoscopic interventions (ercp and/or ptc stenting and balloon dilatation). 16 (32.6%) patients were treated with both surgical and interventional procedures. 5 (10.2%) patients underwent only surgical treatment. Repeated interventional treatments gave less complications (4/28) than surgery alone (4/5) or surgery and interventional procedure together (1/5) as well as were correleated to a less initial hospital stay (<40 days) and total hospital stay (P<0.01). Recurrence rate was less in patients treated by surgery 18.4% (9) than in patients treated by endoscopy 22.4% (11) but not statistically significant. Recurrent stricture after interventional treatments was successfully treated by surgery in 7 patients (14.3%) and by repeated minimally invasive treatments in 4 patients (0.08%). Recurrent stricture after surgery was successfully managed by repeated interventional treatments. There was no difference in the outcome according to the level of the stricture and the etiology.

Discussion. Successful management of benign biliary stricture requires a multidisciplinary approach. Endoscopic stenting is often chosen as the initial treatment and repeated interventional procedures are a real option. Surgery achieves good long-term results and is indicated when interventional procedures failed. Combination of surgical and interventional techniques provides the best results.

289 OUTCOME OF SURGICAL MANAGEMENT OF MALIGNANT BILE DUCT STRICTURES: INSTITUTIONAL EXPERIENCE

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Introduction. Relevant clinical experience in managing cholangiocarcinoma has been limited to few referral centers. Fewer than 30% of patients are suitable for formally curative resection (R0 resection). Standard treatment of patients with unresectable cholangiocarcinoma is biliary drainage. The
authors analyze and assess the management and outcome in patients with cholangiocarcinoma in a single tertiary referral center.

**Methods.** Between 2002 and 2005, database of all patients with bile duct cancer treated at our institution was reviewed. Demographics, results of imaging studies, pathology, and survival were analyzed. Pre-operative biliary drainage was achieved by endoscopic stenting and/or percutaneous transhepatic drainage in 95% of patients in this series. Therefore combined gastric and biliary bypass procedures for unresectable malignant disease between August 2000 and January 2006 were identified and outcomes reviewed.

**Results.** Two hundred and two patients underwent open surgical biliary drainage procedures for palliation of malignant disease. Underlying malignant disease included pancreatic carcinoma (n=88), duodenal adenocarcinoma (n=5) and distal cholangiocarcinoma (n=3). 53 of the patients underwent a planned palliative bypass procedure; the remainder being performed after unresectable disease was identified at laparotomy. Findings that precluded resection were liver metastases (21%), peritoneal deposits (19%), metastatic lymph nodes (19%) and unresectable vascular involvement (10%). The overall post-operative morbidity rate was 26.4%. The post-operative mortality rate was 3.5%, secondary to gastric perforation (2), cardiac complications (2), pulmonary embolism (1) and sepsis (1). Median hospital stay was 20 days (range 4–68). Median survival was 9 months. During follow-up, 3 patients developed recurrent jaundice required transthepatic stenting and 2 patients developed late gastric outlet obstruction requiring refashioning of gastrojejunostomy.

**Conclusion.** Surgery prevented recurrent jaundice or gastric outlet obstruction in 95% of patients in this series. Therefore combined gastric and biliary bypass is a safe and effective treatment for these symptoms in patients with unresectable malignant disease.

**291 OPEN BILIARY BYPASS PROCEDURES AS PALLIATION FOR UNRESECTABLE MALIGNANT DISEASE DISEASE**

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**Introduction.** Although endoscopic palliation of jaundice is increasingly employed in the palliation of unresectable malignant disease, surgical bypass still has a role to play in setting. This study aimed to reappraise the short and long-term results of combined biliary/gastric bypass (hepatojejunostomy and gastrojejunostomy) as palliation for unresectable malignant disease.

**Patients and Methods.** All patients undergoing simultaneous biliary and gastric bypass procedures for unresectable malignant disease between August 2000 and January 2006 were identified and outcomes reviewed.

**Results.** Two hundred and two patients underwent open surgical biliary drainage procedures for palliation of malignant disease. Underlying malignant disease included pancreatic carcinoma (n=88), duodenal adenocarcinoma (n=5) and distal cholangiocarcinoma (n=3). 53 of the patients underwent a planned palliative bypass procedure; the remainder being performed after unresectable disease was identified at laparotomy. Findings that precluded resection were liver metastases (21%), peritoneal deposits (19%), metastatic lymph nodes (19%) and unresectable vascular involvement (10%). The overall post-operative morbidity rate was 26.4%. The post-operative mortality rate was 3.5%, secondary to gastric perforation (2), cardiac complications (2), pulmonary embolism (1) and sepsis (1). Median hospital stay was 20 days (range 4–68). Median survival was 9 months. During follow-up, 3 patients developed recurrent jaundice required transthepatic stenting and 2 patients developed late gastric outlet obstruction requiring refashioning of gastrojejunostomy.

**Conclusion.** Surgery prevented recurrent jaundice or gastric outlet obstruction in 95% of patients in this series. Therefore combined gastric and biliary bypass is a safe and effective treatment for these symptoms in patients with unresectable malignant disease.

**292 LONGTERM RESULTS OF BENIGN BILIARY STRictures RECONSTRUCTION**

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**Introduction and Aim.** Operative bile duct injuries and benign bile duct strictures (BBDS) continue to be a surgical challenge. We present our 30-year experiences.

**Methods and Materials.** Over 30-year period, 242 pts were operated for BBDS. There were 147 female (60.74 %) and 95 male (39.26%) pts. The average age was 48 (14–76) years. Two pts (0.83%) had congenital stricture, 2 (0.83%) posttraumatic, and 238 (98.34%) postoperative BBDS (224 after choledocholithotomy, 9 after distal gastrectomy, 4 after hydatid cyst operations and one after hepatic debridement for blunt hepatic trauma). We had 99 (40.9%) primary repairs and 143 (59.1%) repairs after one to six previous attempts of reconstruction. According to Bismuth’s classification, there were 28 (11.57%) strictures of type I, 47 (19.42%) of type II, 102 (42.15%) of type III, and 65 (26.86%) of type IV. We registered more then 215 complications prior to our reconstruction: intrahepatic lithiasis (82), liver fibrosis or cirrhosis (21), atrophy/hypertrophy complex (4), liver abscess (8), incisional hernia (17), biliodigestive fistula (1), colonic fistula (1), gastrojejunal fistula (1), supp. pericarditis (1), retroperitoneal bilia (1), portal vein thrombosis (1), subhepatic abscess (4), biliary peritonitis (12), CBD varices (1) and so on. In 80 pts, 1 to 6 attempts of reconstruction had been performed. In 53 previously reconstructed pts Roux-en-Y jejunal limb was not adequate. In two pts reconstruction was technically impossible. In 234 pts hepaticojejunostomy with 75 cm long Roux-en-Y limb, in 4 choledochoduodenostomy and in 2 choledochoplasty were carried out.

**Results.** Of 242 patients (34 men, 35 women) with a mean age of 67.1. According to the Bismuth classification 2 (4.3%) patients belonged to type I, 6 (13.2%) type II, 17 (36.9%) type IIIa, 10 (21.7%) type IIIb, 11 type IV (23.9%). Thirty-three (47.82%) patients had confirmed histological diagnosis, remainder being diagnosed on strong radiological evidence. Sixty-two (89.8%) patients required biliary drainage. 59 endoscopic drainage procedures were performed (8 failed). 40 patients required further monolateral PTCD and 14 bilateral PTCD. Fifty-eight (84%) patients had unresectable disease; 19 patients underwent surgical exploration with curative intent. Two patients were offered palliative surgical bypass. Eleven (16%) underwent resection (1 after neoadjuvant chemotherapy); 7 had a concomitant partial hepatic resection. Seven had major complication and 1 died post-operatively (9% mortality rate). The 1-year survival rate was 59% for patients who receive chemotherapy and 22% for those who did not have any chemo.

**Conclusion.** Only complete tumor resection, including hepatic resection, increases survival in patients with hilar cholangiocarcinoma, although it carries the risk of significant morbidity and mortality. Percutaneous drainage is almost always necessary as endoscopic stenting is often unable to relieve the jaundice. Adjuvant chemotherapy after both surgical treatment and palliative resection has a significant benefit in terms of survival rate compared with both surgery and stenting alone.
Results. Three pts died within first six months (two in whom the reconstruction was impossible and one of unrelated cause), while three pts died due to liver cirrhosis and eight of unrelated causes. Eight pts were lost from follow up. The rest 220 (96.69%) pts were followed up from 4 months to 30 years (median 9.3 years). Good results were achieved in 171 (77.73%), satisfactorily in 45 (20.45%) and unsatisfactorily in 4 (1.82%), three of whom were fully reoperated.

Conclusion. Good or satisfactory results could be achieved in an overwhelming majority of patients if the proper reconstruction is not performed too late.

293 SECTORAL AND SEGMENTAL BILE DUCTS INJECTIONS. HOW DO WE MANAGE THEM?

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Introduction. Sectoral and segmental operative bile duct injuries, usually related to the right lobe liver bile ducts, continue to be a challenge. Their treatment is still controversial.

Material and Method. Over a 32 years period we treated 18 patients with segmental bile duct injuries. In 4 patients the injury was recognized during original surgery, 4 were sent for biliary peritonitis, 6 for external biliary fistula, 3 for cholangitis, and 1 for liver abscess and cholecystitis. Primary repair was performed in 4 patients, 3 over a T-tube, and 1 with Roux-en-Y anastomosis. Patients with biliary peritonitis were submitted to open surgery during which lavage and drainage were carried out and all detached bile ducts were ligated. All 6 patients sent for external biliary fistula were followed for 4-6 weeks to see whether the fistula would close spontaneously. So, a total of 10 patients had external biliary fistula. Three patients with ligated duct were submitted to Roux-en-Y repair and abscess drainage. The patient with a ligated duct who developed liver abscess, wound dehiscence and peritonitis was submitted to abscess and abdominal drainage.

Results. All 4 patients with primary repair did well with good long term outcome. Only one patient developed incisional hernia requiring an open surgical repair. Five out of 10 external biliary fistulas closed spontaneously and required no further surgery. The rest 5 patients had to be submitted to Roux-en-Y reconstruction. Two patients submitted to Roux-en-Y reconstruction after a ligation did well with good long term outcome. Third patient developed a stricture of the anastomosis which required reoperation with good long term outcome. The last patient with ligated sectoral duct developed a series of complications for which he had to be submitted to repeated surgery and subsequently died.

Conclusion. Primary repair seems to be the best solution if the injury is recognized at original surgery. Ligation of the injured duct can lead to serious complications even with a fatal outcome, so that should be cautiously indicated. External biliary fistulas should be followed for several weeks as there is at least 50% chance to close spontaneously with good long term outcome.

294 GALLBLADDER CANCER INVADING THE PERIMUSCULAR CONNECTIVE TISSUE: RESULTS OF RE-SECTION AFTER PRIOR SIMPLE CHOLECYSTECTOMY

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Aims. Most T2 gallbladder cancers are diagnosed at final pathology after cholecystectomy. Reoperations including liver resection and regional lymph node dissection are needed to achieve better long-term results. The aim of this study is to evaluate long-term results of re-resections after prior non-curative surgery for T2 carcinomas.

Patients and Methods. Single-unit, retrospective study from January 1985 to December 2006. Twenty-five out of 30 T2 cancers were diagnosed postoperatively after simple cholecystectomy. Twenty-one who have undergone re-resection (liver resection + lymph node dissection) are the basis of this study.

Results. Four patients (Group A), who underwent simple cholecystectomy in other hospitals, were referred to us when a local recurrence developed during the follow-up. In the remaining patients (Group B), no visible recurrence were shown by the preoperative staging. The mean time between simple cholecystectomy and re-resection was 133.3 days (95% CI: 39.344–227.323): the cholecystectomy-re-resection mean time was significantly higher in the group A (p = 0.005). The in-hospital mortality rate was 0%. Median follow-up from the re-operation was 41.026 months. Overall 5-year survival rate was 59.259% with a median survival of 63 months. Median and 5-year survival rate of the Group B patients were 70.4 months and 81.818%; thirteen patients are actually alive without recurrence. Median survival of Group A patients was 25 months (p = 0.015); all these patients have died of recurrence within 4 years from the reoperation. At final pathology, lymph node metastases and/or residual disease in the gallbladder bed were found in 5 patients of the Group B. No significant difference in long-term survival was found out between patients with or without residual disease at final pathology.

Conclusions. T2 cancers discovered incidentally after simple cholecystectomy should be reoperated on as soon as possible: the appearance, before operation, of a recurrence is significantly related to a dismal prognosis. Otherwise, the finding of residual disease on the specimen does not seem to be correlated with a worse prognosis.

295 EXTRACAPSULAR LYMPH NODE INVOLVEMENT IN NODE POSITIVE PATIENTS WITH ADENOCARCINOMA OF THE AMPULLA OF VATER

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The presence and extent of lymphatic dissemination is an important predictor of survival in patients with adenocarcinoma of the ampulla of Vater. Extracapsular lymph node involvement (LNI) and its impact on survival have been studied for several malignancies. No available literature to independent prognostic factor of extracapsular LNI in adenocarcinoma of the ampulla of Vater and the clinical consequences.

The aim of the present study was to assess the incidence and extent of extracapsular LNI in a consecutive series of patients with adenocarcinoma of the ampulla of Vater, and its impact on survival. Lymph nodes were found in 75% of the patients (69% in patients operated, 45% in patients who died later due to liver cirrhosis and eight of unrelated causes. Eight pts were re-examined by a pathologist, experienced in the field of gastrointestinal malignancies. Follow-up data was collected at the outpatient clinic or by contacting general practitioners.

The incidence of 230 positive nodes, extracapsular LNI was identified in 100 (43% of the positive nodes), occurring in 44 of 75 lymph node positive patients (59%). The median potential follow-up period for was 88 months (11–179). The median overall survival in patients with only intracapsular LNI was 30 months (95% CI 20–40) in comparison to 18 months (95% CI: 13–23) for those who had extracapsular LNI (p < 0.016). Five-year overall survival rates were for intracapsular LNI and extracapsular LNI, respectively 20% and 9%. Multivariate analysis demonstrated that for patients with positive lymph nodes, extracapsular LNI and tumor differentiation were independent prognostic factors of extracapsular LNI.

The presence of extracapsular LNI identifies, in patients with an adenocarcinoma of the ampulla of Vater, a subgroup with a significantly worse long-term survival. Adjutant therapy after resection, i.e. chemo- and/or radiation therapy, might be considered for this particular subgroup.

296 INTRADUCTAL PAPILLARY MUCINOUS NEOPLASM(IPMN) OF THE BILE DUCTS: THE CLINICAL FEATURES AND OUTCOME OF 25 CASES

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Introduction. Intraductal papillary mucinous neoplasm(IPMN) of the bile ducts may be considered as an uncommon intraductal growing tumor characterized by intraluminal papillary masses in association with bile duct dilatation and obstruction. Some of these tumors secrete a mucin. Histologically, they resemble intraductal papillary mucinous tumor of the pancreas. But their clinical features and outcomes after surgical resection are not well known.

Objectives. The purpose of this study was to evaluate the clinical, radiological, histopathological characteristics and the prognosis of the IPMN of the bile ducts.

Methods. From October 1995 until August 2006, a retrospective analysis of 25 patients who underwent operation for IPMN of the bile ducts was made. Clinical features and radiological, pathological and operative findings were reviewed. Survival rate was analyzed in 25 patients with IPMN of the bile ducts.

Results. The main symptoms was abdominal pain (36.0%). In 5 patients (20.0%), the lesions were incidentally found in radiologic study. Radiologically, 23 (92.0%) dilatation of the bile ducts. 10 diffuse dilatation of entire bile tree, 8 with or without dilatation of the extrahepatic bile duct, 10 disproportionate dilatation, 3 intrahepatic huge cystic dilatation of the bile ducts. As to location of the lesion in liver was left dominant (64.0%). 7 patients were diagnosed IPMN of the bile ducts before operation. In preoperative diagnostic: 10 cholangiocarcinoma, 4 recurrent pyogenic cholangitis, 2 intrahepatic duct(IHD) stone, 1 abscess, and 1 cystic neoplasm. 23 of 25 patients were performed hepatic resection with or without extrahepatic
bile ducts resection. There was no in hospital mortality. Pathologic features of the lesion: 1 hyperplasia, 2 adenoma, 3 moderate dysplasia (2 adenoma background), 1 carcinoma, 1 in-situ, 18 cysts (6 coexist with hyperplasia, adenoma, in-situ). The median survival time is 59.8 month and 1–2–4– year survival rate 90.5%, 84.0%, 84.0%, respectively. All 6 patients with benign IPMN of the bile ducts were still alive without recurrence. Preoperative diagnosis of benign disease were made in 7 patients for chronic cholecystitis, HBD house. These lesion were confirmed 3 carcinoma, 1 in-situ, 2 adenoma and 1 hyperplasia, pathologically. Conclusion. IPMN of the bile ducts is a benign to malignant disease. During the biliary ducts resection is performed by patients with bilia
dilatation in radiologic study. The prognosis of IPMN of the bile ducts especially benign category is excellent. Aggressive surgical resection is a treatment of choice for IPMN of the bile ducts.

297 CHOLANGIOCARCINOMA (SINGLE HEPATIC CLINIC EXPERIENCE)

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Peripheral cholangiocarcinoma (ChC) is the second on frequency occurred liver cancer. In Russia this cancer is extremely rare occurred. The purpose of the study is to estimate the clinical situation by this kind of liver cancer and to define the prospects in its treatment. For the period from Dec. 2002 till Dec. 2005 in our hospital 12 patients with the confirmed diagnosis cholangiocarcinoma were observed. In spite of the fact that bilobar involvement was applied to 7 patients, surgery is executed to all patients. The volume of liver resection was individual, but an obligatory condition was full (5 patients) or minimal (7 patients) removal of a tumoral tissue (citoreductive surgery). All patients in the postoperative period received immuno- and chemotherapy and the hyperthermal intraoperative intraperitoneal chemotherapy. Perioperative mortality was 0%. In the group without bilobar process, the minimal long term observation has made 1 year, the maximal – up to 3 years. 3 patients had an advanced process. In the group with bilobar involvement, the maximal long term observation has made 4 months, the maximal – up to 2 years. 2 in 7 patients have died (the period of supervision of 5 months and 1,1 year). The received preliminary results allow to approve, that new intraoperative techniques and oncologic methods allow to prolong substantially the life in this group of patients.

298 ACUTE CHOLECYSTITIS WITH LIVER CIRRHOSIS

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Background. Acute cholecystitis is one of the most frequent surgical pathologies. There is no sufficient information about the course of such acute process during the liver cirrhosis. The combination of these two pathologic conditions leads to significant stress for surgeons. Aim. The purpose of this study is to estimate the clinical experience of the treatment in this group of patients.

Methods. Within the period of existence of multi-specialized hepatological department (1998–2005) we observed 27 patients who had such combined pathology is exposed. The ratio of men/women was approximately identical (15:12), the age structure was also identical (43:45). The cirrhosis was confirmed only for 1 patient. In the postoperative histological investigation, the hypertrophy of gall bladder walls without attributes of their destruction was marked. Obtained results have allowed us to consider, that most often it take place the mimicy of acute process on a background of strengthening of activity of the basic process in a liver. Therefore another 11 patients with such diagnosis got not surgical treatment only of the basic process of a liver, even on a background expressed WBC and suspicions on the destruction of gall bladder walls at visualizing techniques. The condition of all patients was normalized. Besides in 1 month of dynamic follow up was observed at 7 patients from 9 (with US biliary calculi), it has not been received the confirmation of biliary calculi.

Conclusions. Obained data allow to refuse substantially performance of surgery at patients with cirrhosis of a liver.

299 OPERATIVE OUTCOME FOR CHOLANGIOCELLULAR CARCINOMAS: SINGLE CENTER EXPERIENCE

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Introduction and Aim. Surgical resection of cholangiocellular carcinomas (CCC) is the only therapy with a curative intention. This study was conducted to clarify the efficacy of surgical resection for the treatment of such patients during the last six year.

Patients and Methods. From April 2000 to April 2006, a total of 480 patients underwent hepatic resection at our department, among them 19 patients (2.5%) had CCC. Fourteen had periductal infiltrating or intraductal growth type tumor. Six cases underwent extended right lobectomy with R1 (P0) resection of the left liver (10 of 14 cases). Three patients underwent extended left lobectomy with CBD-R, 2 cases underwent left lobectomy and posterior segmentectomy, respectively, and one undergo left trisegmentectomy with CBD-R following PE, and partial resection and extended lateral segmentectomy.

Result. Eight of 19 patients were still alive at the end of the study. The actuarial patient survival at 1 and 3 years was 55.7% and 41.8%, respectively. Fourteen of 19 patients had recurrence, most of them (10 of 14 patients) had recurrent liver tumor (10 of 14 cases). Patients had GEM treatment after recurrence; however, GEM did not have a significant effect on patient survival after recurrence (GEM: 11.4+/-4.1 mo vs none-GEM: 15.3+/-13.7 mo, P=0.56). Thirteen of 19 (64.2%) patients received R0 resection by histological findings. Patient survival at 1 and 3 years for R0 cases were 76.9% and 57.7%, respectively. R0 resection had significant benefit on patients survival rate compared to R1 (P=0.0007).

Conclusion. Major hepatectomy with CBD resection was the only treatment for patients with CCC with biliary invasion of IHCCC. R0 resection was an important prognostic factor for IHCCC patients after surgery. Our data suggested that the effectiveness of recurrent treatment of GEM is still unclear.

300 UNUSUAL COMPLICATIONS OF GALL STONES AND LAPAROSCOPIC CHOLECYSTECTOMY

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Introduction. Complications from gallstones and laparoscopic cholecystectomy can be serious, and even fatal, if there is a delay in recognition and treatment. We aim to present two unusual, life threatening complications as a result of gall stones and laparoscopic cholecystectomy. Their management is highlighted.

Case 1. Cystic arterial erosion and haematemesis. An 81 year old female with calculus cholecystitis had a failed ERCP for a biliary stricture. She presented 10 weeks later with left basal pneumonia. During her stay in the hospital she developed epigastric pain, followed by haematemesis 2 days. She became unstable due to further haematemesis. Patient was resuscitated and transferred to the high dependency unit. OGD showed ful of blood malodorous stool to located to the stomach. Laparotomy showed adhesions and gall bladder containing a single large stone. With no other obvious source of bleed, gall bladder was mobilised revealing an acute cystic arterial bleed which was spurting from second part of Duodenum. Patient had subtotal cholecystectomy, duodenal defect closure, and feeding jejunostomy. She recovered well to be discharged home 7/52 later.

Case 2. Pseudo aneurysm of right hepatic artery and haemobilia. A 57 year male presented with right sided abdominal pain 4/52 weeks after laparoscopic cholecystectomy. Pain was associated with haematemesis. Investigations revealed raising LFTs. U/S scan showed 5 cm aneurysm in the gall bladder bed following which he was transferred to a tertiary centre for intervention. CT demonstrated an aneurysmal sac of 6.9 cms, slow to fill with contrast and the feeding vessel could not be clearly visualised. A possibility of a cystic artery stump or right hepatic artery aneurysm arising from the right hepatic artery was highlighted. Patient developed near fatal haematemesis, malena and was haemodynamically unstable. Post resuscitation he was transferred for angiography. Angiography showed a subtle pseudo aneurysm arising from the hepatic artery adjacent to two surgical clips. Embolisation of the distal and proximal ends revealed that there was more than one bleeding point, requiring embolisation of the whole right hepatic artery. The Patient was discharged home and is clinically well.

Conclusion. Gall stones eroding cystic artery and pseudo aneurysm causing arteriobiliary fistula are rare complications of gall stones and laparoscopic cholecystectomy. A high index of suspicion and timely intervention is important in patients who present with haematemesis and haemobilia. Needless to say trauma to arteries should be avoided during laparoscopic cholecystectomy.
ACUTE CHOLECYSTITIS – SURGICAL TACTICS AND LETHALITY

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The early cholecystectomy tactic leads to a decrease of 1% to 10% lethality. We have set an objective to investigate the surgical tactic and lethality in acute cholecystitis (AC).

For a period of 6 years (2000–2005) in the Emergency Surgery Department of MHATEM “N. I. Pirogov” 1864 patients have been operated for acute cholecystitis, of which 704 males and 1160 females (1:1.6). Most frequently affected age group is 61 yrs./C1/ over 60 yrs. constitute 970, 2.8%. Of 1816 emergency operated patients (up to 3rd day of admission), lethality among patients with ChDA is 10.3%, while external drainage inserted and on 2 hepaticojejunoanastomosis. Formally viewed, the (ChDA) has been performed on 135 patients, 128 patients have Kehr-drainage inserted and on 2 hepaticojejunoanastomosis. In fistulas with a large defect of the choledochal duct, Mirizzi syndrome type 3 and right hepatectomy in 1.

An alternative method is bilio-enteral anastomosis. However, in the cases of severe inflammation, worn out tissues (inflammatory infiltration of the hepato-duodenal ligament, pericholedochal lymphadenopathy, anastomosis is an extremely risky procedure-risk of anastomosis leakage, stenosis etc. An alternative procedure is plastic of the choledochal duct with teres ligament (even in choledochitis).

The treatment of these pathologies presents a challenge for the surgeon.

ANALYSIS OF 71 SURGICAL BYPASS PROCEDURES FOR MALIGNANT BILIARY OBSTRUCTION: A COMPARISON OF PREDICTED AND ACTUAL SURVIVAL

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Objective. Surgical exploration of patients with potentially resectable malignant biliary obstruction may result in either resection or a palliative bypass. The aim of this study was to compare actual and expected mortality figures in patients undergoing biliary bypass and to assess whether an aggressive surgical approach for exploration can be justified.

Methods. A retrospective study of patients undergoing biliary and gastric bypass (hepaticojejunostomy-en-Y and gastroenterostomy) in whom exploration/resection had been planned pre-operatively between September 2000 and February 2006. Case notes were reviewed and demographic details, operative information and outcome data extracted.

Results. 71 patients were identified. Diagnoses included pancreatic cancer (n = 61, 86%), duodenal carcinoma (n = 4, 6%) and cholangiocarcinoma (n = 2, 3%). Median patient age was 66 years (range 36 to 86 years) and the median hospital and 30-day mortality was 14% (range 6.7 to 66.2%). In hospital and 30-day mortality was 1.4% (n = 1) with 66.2% of patients alive at 6 months (n = 47) and 46.4% of patients alive at 1 year (n = 32).

Conclusions. Actual mortality (1.4%) was less than predicted mortality (18.2%). This study. Significant numbers of patients were alive at 1 year. These data support an aggressive policy for surgical exploration of malignant biliary obstruction whenever there may be a possibility of curative resection.

LIVER TRANSPLANTATION AFTER LAPAROSCOPIC LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA

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Liver resection (LR) for solitary HCC <5 cm in Child A patient is controversial because of associated mortality and morbidity, and increased risk in case of subsequent liver transplantation (LT). We have shown that in selected patients with peripheral tumors, laparoscopic LR was a safe and efficient procedure. We report here the first patients who underwent LT after laparoscopic LR.

Patients. Among 48 patients who underwent laparoscopic LR for HCC, 10 (21%) underwent subsequent LT. Indication for transplantation was recurrent HCC in 7 patients (salvage LT), second stage after neoadjuvant resection in 2 (bridge LT) and compensated cirrhosis in 1. All patients had Child’s A or B cirrhosis due to hepatitis B or C in 7 patients and alcohol in 3. Previous resection included 1 segment or less in 6 patients, left lateral sectionectomy in 3 and right hepatectomy in 1.

Results. LT were performed after a mean of 22 months (range 7–49). LT was performed with cadaveric donor in 9 patients and living donor in 1. All transplantations were performed with IVC preservation with temporary porto-caval anastomosis. LT was straightforward in all cases. In 7 patients there were no or minor adhesions and there was no re-operation. In one patient with major portal hypertension, there were hypervascular adhesions between the omentum and the liver. LT procedures were uneventful with a mean operative time of 7 hours (range 4–9). There were no postoperative deaths. One patient died at 8 months from biliary sepsis. After a mean follow-up of 13 months (range 1–45), all other patients are alive and without tumor recurrence.

Conclusion. Our study shows that previous laparoscopic LR for HCC does not impair operative and postoperative LT results. The main advantage is the drastic reduction of adhesions permitting straightforward laparotomy and LT. Furthermore, laparoscopic LR could have an impact on the therapeutic strategy of HCC complicating chronic liver disease as a bridge to liver transplantation, especially in patients with peripheral initial tumor.

LIVING DONOR LIVER TRANSPLANTATION IN DIEGO BLOOD DISPARITY

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During 1949, Mirizzi describes the so-called functional hepatic syndrome in jaundiced females, which is observed in 0.7% to 2.7% of cholecystectomies. There are different views in literature with regards to the surgical treatment of the Mirizzi syndrome. We classify the Mirizzi syndrome into two types, as do other authors. In type I, there is no additional communication between the gallbladder and biliary tree. Type II is characterized by a communication between the cystic duct and the hepatic duct, which is parallel to the hepatic duct, is then more 3 cm longer, and contains an incarcerated stone, which compresses it. In type B, there is a complete obstruction of the cystic duct. Type II presents a biliobiliary fistula between the gallbladder and common hepatic duct, incarcerated in the istula.

No external biliary fistulas are observed. We found internal biliary fistulas as a complication of acute cholecystitis in 29 cases, of which 9 were cholecysto-duodenal, 4 colo-biliary, 6 bilo-biliary and 10 Mirizzi syndrome. In fistulas with a large defect of the choledochal duct, Mirizzi syndrome type II, and in the case of intrahepatic lesions the method of choice is removal of the fistula above Kehr-drainage (either through the fistula or choledochotomy) if possible with a gallbladder lambo, but only with an absolute assurance of the absence of the gallbladder carcinoma. A similar case of gallbladder carcinoma, histologically proved, reported by Bayer. We always perform an intraoperative cholangiography through the Kehr-drainage.
Dia antigen in the Diego blood type system (DBS) is an anthropologic marker of Mongoloids. We report the first case of liver transplantation (LT) involving DBS disparity. The recipient was a 58-year-old woman with fulminant hepatic failure and 32-year-old daughter was a donor. DBS were Dr (a–b+) in the recipient and Dr (a+b+) in the donor. Living-related liver transplantation was performed, and immediate graft function was obtained. No signs of biliary rejection were observed on postoperative days 1–4. Biopsy performed on postoperative day 10, 63, and 87 because of elevation of the serum bilirubin level, showed no signs of humoral rejection. Eighty days after the transplant operation, the patient developed severe aspergillus pneumonia and died on post-transplantation day 120. In conclusion, liver transplantation can be performed successfully in cases of Diego blood type disparity.

306 POST LIVER TRANSPLANT BILIARY CAST SYNDROME

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Background. Biliary casts occur as a complication of Orthotopic liver transplantation (OLTx). Incidence varies between 3%–18%. Biliary cast syndrome (BCS) is a clinical entity associated with casts leading to morbidity, graft failure, need for Re-transplantation and mortality. Management of BCS is difficult. We aim to review our experience and present a novel percutaneous approach for duct clearance.

Methods. Retrospective review of management of 3 cases of BCS.

1) A 34 year old female after 9 months following OLTx for paracetamol overdose developed BCS with hepatic artery occlusion (HAO). Initial ERCP clearance helped. 6 months later, she presented with multiple liver abscesses.

2) A 65 year old female developed BCS without HAO 3 months following OLTx for PBC. Failed ERCP led to PTG and drainage followed by Segment IV b resection with open cast removal and biliary reconstruction. A month later, casts reformed leading to jaundice and sepsis. She was re listed but died of sepsis with MODS.

3) A 9 year male had OLTx for hyperoxaluria complicated by hepatic arterial thrombosis necessitating a second transplant. 13 years after 2nd transplant, a 3rd transplant was performed for late conduit thrombosis and chronic graft failure. For this 3rd transplant, a new supra-renal hepatic arterial conduit was fashioned and biliary drainage obtained using a Roux-en Y hepaticojunostomy was needed 18 months later. She remains well.

Conclusion. With our limited experience apart from the traditional approaches using ERCP and surgery to remove the casts, a percutaneous endoscopic approach is safe, and could be considered as an option before surgery.

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307 CONCOMITANT PRESENCE OF CHOLANGIOCARCINOMA OF THE DUCT CONFLUENCE COLORECTAL CARCINOMA, BREAST CANCER AND THYROID TUMOR IN THE SAME PATIENT: A NEW MULTITUMORAL SYNDROME?

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A female patient had non malignant thyroid tumor at age 22, breast ductal cancer at age 40, cholangiocarcinoma of the hepatic duct confluence at age 62, and colon cancer (Dukes, cancer in the sigmoid colon) not associated with FAP at age 66. In particular, the patient underwent right hepatectomy plus caudate lobe resection and bileduct-jejunosotomy and had disease free survival greater than 7 years, dying at age 69 because of recurrence from the colorectal malignancy.

The entire kindred, including 11 subjects spanning 4 generations, was recruited for clinical and genetic screening. In particular, germ-line mutations of the APC gene (Adenomatous Polyposis Coli), mismatch repair genes (HNPPCC), PTEN, responsible for Cowden disease, BRCA1 and BRCA2 (breast plus pancreatobiliary carcinoma), and STK11/LKB1, responsible for Peutz-Jeghers syndrome were searched, in all available subjects. No germ-line mutation in these genes has been found up to now.

Peutz-Jeghers syndrome (PJS) is a dominantly inherited disease characterized by hamartomatous gastrointestinal polyps and microcystic cutaneous pigmentation of the lips and buccal mucosa, associated with germ-line mutations in the STK11/LKB1 gene (1p13.3), that encodes a multifunctional serine-threonine kinase. An increased risk of gastrointestinal, gynecologic, breast, thyroid and pancreatic carcinomas (>136 folds) has been reported. Several reports have shown LOH on 19p in breast, colorectal and pancreatic cancer. However, since the STK11/LKB1 gene has been cloned, evidence for biallelic somatic inactivation of STK11 in colorectal and breast cancer is lacking. Recent reports have shown evidence for genetic heterogeneity in PJS. Interestingly, about 30% of patients with a clinical pathologic diagnosis of PJS failed to show a germ-line mutation of the STK11/LKB1 gene. A second candidate gene, possibly located at 19p14 has been hypothesized. In particular, a very high incidence of cholangiocarcinoma (40%), possibly located at 19p14 has been observed in PJS patients not showing germ-line mutations of STK11/LKB1 gene.

Search for this new candidate gene is in progress.

308 IS CA19.9 OF VALUE IN SCREENING FOR COLORECTAL ME-TASTASES?

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Background. Carcinembryonic antigen (CEA) is regularly used in the postoperative monitoring of patients with colorectal carcinoma in the hope of identifying treatable liver metastases. Whilst Ca 19.9 is frequently used as a marker of pancreaticobiliary neoplasia, there is some evidence to suggest it may have a prognostic role in the assessment of colorectal liver metastases. The aim of this study was to explore this role.

Methods. All patients undergoing resection of colorectal carcinomas during the 3 year period 2003–2005 were identified from a prospectively maintained database. Individuals in whom parallel CEA and Ca 19.9 measurements were performed sequentially during follow-up were identified and the relationship between tumour markers, clinical course and findings of computed tomography were investigated.

Results. Ninety three patients were identified with complete follow-up. The results are summarised in a temporal fashion in relation to the location of metastases.

Liver Local Lung
CEA and Ca 19.9 11 3 0
CEA pre Ca 19.9 3 2 1
CEA only 1 0 1
Ca 19.9 pre CEA 1 0 0
Ca 19.9 only 3 0 1
No CEA or Ca 19.9 0 3 3

Conclusions. The combination of CEA and Ca 19.9 identified all patients with liver metastases demonstrated on CT whereas CEA alone would have missed 21% of cases suggesting that Ca 19.9 may have a role in screening of patients. However, the fact that neither marker was reliable for local recurrence or lung metastases means that CT will remain the modality of choice.