When biliary enteric anastomosis is indicated for choledocholithiasis, the surgeon has the choice between choledocoduodenostomy (CD), which carries a risk of cholangitis by reflux of duodenal contents, and hepaticojejunostomy (HJ), which is more time-consuming and precludes further endoscopic exploration. As of yet, one technique has not been shown to be superior to the other in controlled trials. Between January 1978 and November 1990, 130 patients (31 males and 99 females), 61 ± 15 (m ± sd) years old were enrolled in this randomized study. CD was performed in 64 patients, while HJ was performed in 66 (side-to-side in 25 cases and end-to-end in 41). The major end point was the occurrence of cholangitis within the 3 years following the operation as defined as biological cholestasis associated or not with fever or pain. Other criteria were postoperative mortality, morbidity, and reoperations on the main bile duct. Postoperative mortality was 3.8% (5 patients), without any statistical difference between the 2 groups (4 in the CD group vs 1 in the HJ group). Postoperative morbidity was not different: 1 biliary fistula in the CD group (1.6%) vs 5 in the HJ group (7.5%). Late results in 120 patients (mean follow-up: 55 ± 11 months) showed that: a) 107 patients (89.2%) had no symptoms related to biliary-enteric anastomosis; b) cholangitis episodes occurred in 13 patients (10.8%) (6 in the CD group and 7 in the HJ group, NS); c) cholangitis occurred during the 1st year in 8 patients (61%) and during the 2nd year in 5 patients (39%); d) no marginal ulcer was found in the HJ group. This randomized controlled trial confirms the good results of CD and HJ in choledocholithiasis, with similar mortality and morbidity rates in both groups, and 90% asymptomatic patients in the long term follow-up. Nonetheless, these results favor the use of CD in choledocholithiasis, because CD is less time-consuming than HJ, and does not preclude further endoscopic exploration.

In 1984 we initiated a prospective controlled trial comparing endoscopic sclerotherapy (ES) with the distal spleno-renal shunt (DSRS) in the elective treatment of variceal hemorrhage in cirrhotic patients. The study comprised 80 patients (Child A–B) assigned to one of the 2 groups according to random number table: 40 to DSRS and 40 to ES. During the postoperative period, no DSRS patient died, while 1 ES patient died of uncontrolled hemorrhage: 2 DSRS patients (1 from varices, 1 from duodenal ulcer) and 8 ES patients (4 from varices, 4 from esophageal ulceration). Long-term follow-up was complete in 100% of patients. However, in the ES group, 1 patient was successfully submitted to liver transplantation and another to shunt surgery. 5 year survival rate, was 83% for DSRS and 36% for ES groups (p<0.05). The global percentage of rebleeding was 5% in DSRS patients (2 from duodenal ulcer) 38% for ES patients (3 from varices, 3 from hypotensive gastroopathy and 1 from an unknown source p=0.0028). 3 DSRS and 2 ES patients suffered mild chronic encephalopathy (p= NS). This trial seems to indicate that DSRS, in patients with good liver function, is more effective that ES in preventing gastroesophageal rebleeding, without serious sequel and with a tendency to improve survival.

In this study the effects of classical cholecystectomy (CC) and LPC on lung function and stress response were compared. Secondly the effect of general anesthesia with or without thoracic epidural anesthesia (TA) were compared. Thirty patients were randomly allocated into three groups; 1- CC, 2-LPC, 3-LPC+TA. Peak expiratory flow (PEF) forced expiratory flow (FVC) and forced inspiratory flow in one second (FeV1) were measured pre-, 2, 4, 8, and 24 hours postoperatively. Arterial blood samples were taken pre and postoperatively to assess plasma levels of cortisol and glucose. Data are expressed as mean ± SD. Results were analyzed with repeated measures ANOVA and Wilcoxin-signed rank test. P values < 0.05 were considered significant.

Results: The groups were similar with respect to height, weight, duration of the operation and age of the patients. Two hours postoperatively FVC decreased significantly in all groups compared to preoperative values. Group-1: 3.8±0,94L to 1.07±0.27L (P<0,01). Group-2: 3.63±1.46L to 2.13±0.4L (P<0.05). Group-3: 3.76±0.92L to 2.84±0.91L (P<0.05). In group-1 the reduction was larger than in Group-2 and 3 (P<0,05). Differences between Group-2 and 3 were not significant. These changes remained unaltered for 24 hours. Similar changes were observed with FeV1 and peakflow measurements. FVC to FeV1 remained unchanged. After surgery levels of glucose and cortisol increased in all groups, but levels remained unchanged in group 3 after 120 min. Glucose levels after induction of anesthesia and the epidural catheter were higher in group 3 (P<0,05).

Conclusion: During LPC the endocrine metabolic response is not abolished. Thoracic epidural anesthesia alters this response but does not significantly influence pulmonary function. The reduction in pulmonary function was less with LPC as compared with CC. LPC should be the treatment of choice in pulmonary compromised patients since the reduction in pulmonary function is less in LPC, compared to CC.

In 42 patients laparotomized for ductal (n=33) or other periampullary (n=9) carcinomas the following parameters were determined in fresh tumor tissue: Status of ploidy, percentage of proliferating cells by monoclonal antibody Ki-67, EGF-receptor and erbB-2 oncogene expression, and content of the protease cathepsin-D. Results were correlated with the kind of tumor, TNM-status, grading, and survival.

The actual median survival was only 98±33 days in the hypodiploid group, compared to 215 ± 84 and 229 ± 51 of the diploid and triploid tumors, respectively. Percentage of Ki-67 positive cells was 19.2 ± 3.4% in ductal adenocarcinoma as compared to 8.2 ± 1.8% in periampullary cancer. Five of 10 patients with distant metastases showed a strong EGF-receptor expression but only 2/30 in case of local disease. Cathepsin-D content was 99.6 ± 15.7 in Tx Nx M1 but only 58.2 ± 6.6 in Tx Nx M0 cases.

The parameters evaluated proved to be discriminative for survival and biological behavior of the tumor. Thus, they might be useful to define subgroups of patients benefitting of adjuvant or additive palliative treatment modalities.
Whipple’s operation in many institutions still is the golden standard for resective surgery in periampullary tumors. Recently pylorus-preserving pancreaticoduodenectomy (PPPD) became increasingly popular.

Goal of the present study was to provide rationales for choosing PPPD rather than the Whipple procedure in resection of malignancies of the periampullary region.

From 4/86 to 11/91 a total of 55 patients with malignant periampullary lesions underwent pancreatic head resection, either Whipple (n=37) or PPPD (n=18). The ratio of ductal adenocarcinoma to other periampullary tumors was 3:1 and 9:8, respectively.

We conclude PPPD to be the surgical technique of choice in the vast majority of resectable malignancies of the pancreatic head region. Up to now zero mortality and lack of histopathological evidence, that removal of the distal stomach improves local tumor clearance probably will restrict the classic Whipple procedure to few cases, where the tumor is otherwise technically not resectable.

GASTRIC EMPTYING (GE) AND MYOELECTRIC ACTIVITY IN THE EARLY POSTOPERATIVE PERIOD AFTER PYLORUS PRESERVING PANCREATODUODENECTOMY (PPPD)

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Introduction. Delayed gastric emptying DGE) has been reported as a frequent complication of PPPD. Gastric dysrhythmias have been postulated as a mechanism for this phenomenon. Also pancreatic cancer patients may have DGE prior to surgery. Pre- and early postoperative GE, in combination with gastric myoelectric activity have never been adequately studied and are therefore the subject of this presentation.

Patients and methods. GE of a liquid meal (300ml, 375 kcal) was studied in 8 pancreatic and periampullary cancer (PP) patients (4 M, 4 F; mean age 53 ± 21 yrs) using Applied Potential Tomography (APT). Myoelectric activity was measured by surface electrogastrography (EGC) during 1 hr fasting and 1.5 hrs postprandially, and analyzed by computerized power spectrum analysis. 5 of these patients were also studied within the first 2 weeks following PPPD. The same measurements were done in 20 controls (12 M, 8 F; mean age 63 ± 8 yrs).

Results. Gastric emptying was delayed in both pre- and postoperative PP patients compared to controls, the t1/2 being resp. 154.3 ± 137.139 ± 122 and 83.1 ± 32 min (p = N.S.). Gastric dysrhythmias were not observed in the preoperative and postoperative period. The postprandial/fasting power ratio of the postoperative PP patients was significantly decreased compared to normal (1.50±0.92 resp. 6.28 ± 4.82; p = 0.05), indicating a decrease in gastric motor activity in these patients. Postprandial peak power and power ratio in the postoperative period decreased compared to the preoperative period (p = 0.06). A significant correlation between pre- and postprandial mean gastric frequency and t1/2 could be demonstrated.

Conclusion. Although many uncontrollable factors may govern GE, myoelectrical abnormalities of the stomach may play a role in the early postoperative gastric dysfunction following PPPD. Slowing of GE prior to surgery cannot be explained by disturbances in gastric myoelectric activity, but may involve tumor-related effects. Gastric dysrhythmias, when present, probably play a role in the development of DGE.
PYLORUS PRESERVING PANCREATODUODENECTOMY: TEN YEARS EXPERIENCE WITH 129 CASES

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In 1978 Traverso and Longmire revived the idea of preserving the pylorus during pancreaticoduodenectomy. Since that time a lot of cases have been reported. Our experience with 129 procedures is here reported. Pylorus preserving pancreaticoduodenectomy (PPPD) does not adversely affect morbidity or survival as compared to Whipple resection even dealing with pancreatic cancer moreover improving the patient post operative quality of life. 129 PPPD (81n=48), including 9 total pancreatectomies were performed between Jan. 1982 and Jan. 1991. 18 had chronic pancreatitis, 26 pancreatic cancer, 26 papillary cancer, 11 common bile duct cancer, 5 duodenal cancer and 1 retropertioneal lymphoma. The mean age was 63.6+/-11.08 in the neoplastic group and 46.72+/-10.56 in the chronic pancreatitis group. Operative mortality rate was 8.89% (4 in the last 3 yrs.), half of the deaths occurring not for abdominal causes. The mortality rate was 3.79% and 6 pts. required reoperation. Postoperative nasogastric suction was maintained for an average of 12.3 days (5-27), in the 22% of pts. a delayed gastric emptying (more than two weeks) was observed (no additional surgery required). Food reintroduction was satisfactory accomplished by the majority of pts. The weight gain average, six months after surgery (excluding pts. with early post-operative neoplastic recurrence), was 3.7 kg (some pts. gained 7-10 kg). Specific late complications were observed in 5 pts.: 2 perforations from peptic ulcer requiring surgical repair (1 during chemotherapy for lymphoma and the other 45 months after surgery), 1 pt. bled from duodenum (42 months after surgery), 2 pts. bled from anastomosis, all of them were successfully treated with medical therapy. 22 pts. operated on for pancreatic cancer are still alive: 1 in free of recurrence after 9 yrs., 1 is alive more than 7 yrs. after resection; 2 more than 4 yrs., 2 more than 3 yrs. and 4 more than 1 yrs. (1 with liver metastasis). The remaining 12 survivors are between 6 and 12 months from surgery, 43 pts. died by cancer recurrence: the operative mortality rate was 67.64%. All pts. operated on for pancreatic cancer are alive except one, who died for laryngeal cancer; late complications in this group were: 1 stenosis of the hepaticojunostomy, successfully treated with percutaneous dilatation and 1 small bowel subocclusion due to adhesions spontaneously relieved. Pain relief was satisfactory obtained in every pt. Survival analysis, retrospectively comparing 2 homogeneous groups of pts. who underwent resection for pancreatic cancer, failed to demonstrate any significant difference between those in whom a Whipple procedure was performed as compared to the ones resected according to Longmire's technique.

BACTERIAL TRANSLOCATION IN EXPERIMENTAL BILIARY OBSTRUCTION

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Obstructive jaundice is frequently associated with septic complications and enteric bacteria have been isolated from both the infectious focus and bile in jaundiced patients. The mechanisms by which enteric bacteria translocut from the gut are not clarified, though an impaired reticuloendothelial function in obstructive jaundice has been reported. Sprague-Dawley rats were subjected to sham operation (n=10) or common bile duct ligation and transaction (CBDL; n=35). After 2 weeks, jaundiced animals received either oral administration of physiological saline (n=15), macromel tripeptide-phosphatidyl ethanolamine (MTP-PE) liposones (n=10) or placebo (empty) liposones, while sham operated rats received physiological saline, 48 h prior to evaluation of enteric bacterial translocation. Both portal and systemic blood, bile and cecal content were collected and cultured aerobically and anaerobically, as well as tissue samples from the liver, spleen and mesenteric lymph nodes (MLN).

Positive MLN cultures in jaundice + saline (7/115; 47%) and jaundice + placebo animals (4/10; 40%) significantly differed (p<0.05) from sham operated animals (1/10; 10%). No positive MLN cultures were seen in jaundiced animals treated with MTP-PE (p<0.05 as compared to other jaundiced animals). One positive liver culture was noted both among sham operated, jaundice + saline and jaundice + placebo animals. Cecal counts (CFU/gm) of E coli, Lactobacillus acidophilus and aerobic and microaerobic bacteria did not statistically differ, though the number of E coli tended to be higher in jaundiced animals. Histological examination of the terminal ileum demonstrated subepithelial oedema in all jaundiced animals.

In conclusion, bacterial translocation was demonstrated in rats with 2 weeks of biliary obstruction, which together with the previously reported impaired RES function might explain the increased incidence of septic complications. Oral administration of liposomal MTP-PE prevented bacterial translocation.

PERI-OPERATIVE RENAL TUBULAR DYSFUNCTION IN PATIENTS WITH OBSTRUCTIVE JAUNDICE: THE VALUE OF URINARY ENZYMOLGICAL STUDIES

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Urinary enzyme excretion studies can highlight the inadequacy of conventional parameters of renal function, in determining the incidence of peri-operative renal tubular dysfunction in patients with obstructive jaundice. Using established automated assay techniques the urinary activities of the proximal renal tubular brush border enzymes, gamma-glutamyl transpeptidase (CST) and alanine aminopeptidase (AAP), along with that of the intracellular lysosomal hydrolase N-acetyl-B-D-glucosaminidase (NAG) were measured in the urine of 14 jaundiced patients (group 1) immediately prior to, and 24 hours after biliary surgery. Additional urinary enzyme excretion patterns were studied in 45 non-jaundice patients undergoing minor surgery (group 2), and surgery (group 3).

In group 2, the pre- and post-operative urinary activities of NAG, GGT and AAP did not differ significantly, at 24+16 vs 30+38 U/mmol creatinine; 3.8+1.3 vs 4.1+3.8 U/mmol creatinine and 1.1+0.7 vs 1.3+1.2 U/mmol creatinine respectively. However those with obstructive jaundice (group 1) demonstrated, not only a significantly (p<0.01) elevated pre-operative urinary excretion of NAG (236+153 U/mmol creatinine), GGT (6.6+2.5 U/mmol creatinine) and AAP (8.8+1.1 U/mmol), but also further significant elevation of NAG (328+182) p<0.01, GGT (11.5+5.0) p<0.05 and AAP (10.1+6.1) p<0.01, activity following surgical intervention. There was no correlation between the duration of the obstructive jaundice nor the degree of hyperbilirubinaemia and the levels of enyzymes detected. Urinary NAG levels were also significantly elevated following aortic reconstructive surgery, 45.3+38 vs 128+88 U/mmol creatinine p<0.05, though this was less marked than in the jaundiced group. The surgical and anasthetic insult in these two groups was comparable. The serum creatinine concentration remained static in both the jaundiced (92+32 vs 89+20 umol/l) and the aortic reconstructive (32.4+49 vs 90+47 umol/l) groups, in the peri-operative period.

Urinary enzymology, applied to patients with obstructive jaundice, reveals a significant proximal renal tubular dysfunction compounded by surgical intervention. Serum creatinine concentration, the conventional measurement of renal function, lacks this sensitivity, especially in the early post-operative period, and its diagnostic value is limited.

THE IMPORTANCE OF ANTIENDOTOXIN ANTIBODIES IN PATIENTS WITH OBSTRUCTIVE JAUNDICE

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Introduction Patients with biliary obstruction have a high mortality and morbidity following surgical intervention. Endotoxin and tumour necrosis factor (TNF) have been implicated in the pathogenesis of these complications but have only been found sporadically in obstructive jaundice. Antibodies are produced in response to endotoxin and persist long after release of an endotoxin pulse. Antiendotoxin antibodies may be a better measurement of chronic endotoxin exposure. Methodology Preoperative plasma samples were obtained from 19 jaundiced and 11 control patients. TNF was quantified using an ELISA. Endotoxin was measured by a quantitative limulus lysate assay. IgG and IgM anti-core glycolipid (CGL) antibodies were measured using an ELISA.

Results Mean±standard error: Jaundice n=19 Control n=11

|          | TNF (pg/ml) | Endotoxin (pg/ml) | IgM antiCGL (median units) | IgG antiCGL (median units) |
|----------|-------------|-------------------|---------------------------|----------------------------|
| Jaundice | 1.4±1.1     | 16.2±8.1          | 87.9±14.2                 | 274.6±55.7*                |
| Control  | 0.8±0.6     | 7.3±1.7           | 24.8±12.7                 | 113.6±15.2                 |

* Significant difference vs controls p<0.05 Mann Whitney

Conclusions The inability to detect significantly increased concentrations of endotoxin and TNF implies that single daily measurements are of little clinical benefit. In contrast the significant rise in IgG antiCGL antibodies indicates chronic exposure to endotoxin. These results emphasise the need for specific antiendotoxin therapies in jaundiced patients.
MONOCYTE AND PLASMA LEVELS OF TRANSFORMING GROWTH FACTOR BETA (TGFβ) IN OBSTRUCTIVE JAUNDICE PATIENTS

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Transforming growth factor beta (TGFβ) down-regulates some aspects of immunity (T cell, NK cells & humoral immunity). We have investigated TGFβ levels in plasma and monocytes from jaundiced patients.

Plasma and monocyte were separated from jaundiced (n=44, mean bilirubin 179.2 mM/L) and control (n=30, mean bilirubin 9.9 mM/L) patients blood. Monocyte were then stimulated by LPS. The TGFβ levels were measured by the standard CCL64 cell bioassay. Total bile acids in the plasma was measured using an Enzabile kit. Results are shown as mean ±SEM and statistics are by Student T test. (RU=international Reference Unit).

| Plasma TGFβ (RU/ml) | Monocyte TGFβ (RU/ml) |
|---------------------|-----------------------|
| Control: 27.1±6.3, 27.9±6.1 | 33.9±2.9, 32.7±7.3 |
| Jaundice: 90.6±23.5, * | 193.9±23.1, # |
| *p<0.05 vs control. | # vs benign |

Plasma TGFβ levels are increased in jaundiced patients and are highest in malignancy. The highest levels (>200 RU/ml) were seen in patients with poorest prognosis. There is no statistical correlation between bilirubin and TGFβ(r=0.17) or between bile salts and TGFβ(r=-0.02).

Conclusion: Patients with obstructive jaundice have significantly increased plasma TGFβ level which is probably not related to monocyte production. This increase shows a relationship to the patients prognosis.

SMALL BOWEL MORPHOLOGY IN CONVENTIONAL AND GERM FREE RATS IN OBSTRUCTIVE JAUNDICE

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Increased morbidity in patients undergoing surgery for obstructive jaundice is attributed to systemic endotoxaemia which may be due to increased absorption secondary to changes in the intestinal epithelium. Small bowel mucosal morphology has been studied in conventional and germ free rats with obstructive jaundice. Methods used included light microscopy, enzyme histochemistry and electron microscopy. The morphological changes were observed with PAS and alcian blue stains which revealed an increased intensity of staining of the goblet cells. Enzyme histochemistry showed that the brush border activity of alkaline phosphatase was decreased with some regions showing virtually no activity. The activity of the cell membrane marker enzyme 5 nucleotidase was also decreased. Electron microscopy revealed damage to the microvilli, thickening of the rootlets, hypertrophy of the Golgi apparatus, scattered mitochondrial damage and changes in the nuclei and cell membrane of the epithelial cells. Mitochondrial changes were not paralleled by activities of succinic dehydrogenase and cytochrome oxidase which were normal. No morphological differences were found between conventional and germ free animals. The data presented indicates that changes in jejunal morphology are not secondary to endotoxins but are most likely due to the absence of bile.

POSTOPERATIVE BILE LEAKAGE: THE ENDOSCOPIC MANAGEMENT

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Postoperative bile leakage is a serious complication, in which surgical treatment has its limitations. This study evaluates the endoscopic management.

Patients: Between 1982 and 1990, 55 patients (28 female, 27 male; mean age 55) were referred with postoperative bile leakage. Initial surgery included cholecystectomy in most cases. T-tubes were employed in 17 patients. The patients presented with a biliary-cutaneous fistula (n=27), peritonitis (n=10), recurrent intraabdominal abscess formation (n=5), progressive jaundice (n=7), cholangitis (n=5) or pancreatitis (n=1). The mean interval between initial surgery and presentation was 37 days, (range 5-292). Therapy consisted of standard sphincterotomy, if needed subsequent stone extraction, with or without endoprosthesist placement. The aim of all treatment modalities was to facilitate bile flow into the duodenum.

Results: The biliary tract and the site of the leakage were visualized during ERCP in 98%. The site of leakage was the cystic duct stump (n=37), the CBD (n=6), the CBD (n=6), a hepatic radical (n=4) and a surgical anastomosis (n=1). Distal obstruction due to retained gallstones was present in 15 patients and due to concomitant strictures in 18. Overall, 48 of 55 patients were treated endoscopically: sphincterotomy (n=11), sphincterotomy and stone extraction (n=10), stone extraction and stent placement (n=5), stent placement (n=19) and stent placement followed by nasobiliary drainage. An excellent outcome (clinical and radiological improvement and closure of the bile fistula) was achieved in 43 patients (90%). Despite adequate therapy, 5 patients (10%) had ongoing sepsis resulting in a fatal outcome.

Conclusion: Postoperative bile leakage can be diagnosed effectively by ERCP, and treated safely by subsequent endoscopic management.

HIDA-SCINTIGRAPHY AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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Obstruction of the bile ducts or bile leakage are serious complications after laparoscopic cholecystectomy. HIDA-scintigraphy is a sensitive method to evaluate the bile flow.

The aim of the study is to assess the value of HIDA-scintigraphy to detect biliary complications after laparoscopic cholecystectomy. In 51 patients a scintigraphy of the bile ducts was performed with Tc99m-dimethyl-phenyl-carbamoxyl-methyl-IDA (n=8) or Tc99m-trimethyl-bromo-IDA (n=43) in a dose of 3.5 mCi intravenously, 24 hours after the operation. Anterior abdominal images were made at intervals during 1 hour or longer when necessary. The scintigraphic findings were compared to the clinical course.

No biliary obstructions were noticed. In 5 patients bile leakage was seen on the scintigraphic images. Three patients had no clinical symptoms of bile leakage. In 1 patient bile leakage from the cystic stump was found at laparotomy. In another patient a bile collection was found at re-laparoscopy. Better images were made using Tc99m-trimethylbromo-IDA than Tc99m-dimethylphenylcarbamoxyl-methyl-IDA. All patients recovered uneventfully.

In conclusion: HIDA-scintigraphy with Tc99m-trimethylbromo-IDA is a highly sensitive method for early diagnosis of bile leakage after laparoscopic cholecystectomy, although routine postoperative scintigraphy is not warranted.
TREATMENT OF BENIGN BILIARY STRICTURES: SURGERY OR ENDOSCOPY?  

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Benign biliary strictures (BBS) remain a therapeutic challenge. This study compares the treatment results of surgery and endoscopy in one institution. 

Patients: Between 1981 and 1990, 35 patients were treated surgically (ST) and 66 by endoscopic biliary stenting (ET). In almost all patients the initial trauma occurred during biliary tract surgery. Patient characteristics, previous repairs and level of obstruction were comparable in both groups. 

ST consisted of constructing a biliary-enteric anastomosis in healthy tissue. ET consisted of placement of endoprostheses, with elective exchange trimonthly for a one year period. 

Initial Results: In 35 ST patients a proximal hepaticojejunostomy (HJ) was performed. Postoperative complications included: sepsicaemia (n=5), bile leakage (n=2) and major bleeding necessitating relaparotomy (n=2). ET related early complications comprised: minor pupillary bleeding (n=1), cholangitis (n=2) and pancreatitis (n=2). During treatment all complications were stent related: cholangitis (n=14), recurrent cholestasis (n=2) and stent migration (n=2). In 46 patients the endoprostheses were eventually removed. 

Late Results: After a mean period of follow-up of 50 months (range 10-85), 5 of 35 ST patients (14%) restricted. Recurrent stricturing occurred in 8 of 46 ET patients (17%) after a mean period of follow-up of 42 months (range 4-99). Subsequently, 6 patients underwent a HJ and 2 were restented. 

Conclusion: Surgical or endoscopic treatment of BBS yields comparable results. Indications for ST are complete transsections, previous repairs and failures of ET. Candidates for ET are those unfit for surgery or presenting with concomitant biliary fistula. In all other patients we advocate ET as the initial treatment.

F019  

OPERATIVE RISK OF REHEPATECTOMIES FOR LIVER TUMORS  

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Rehepatectomies for recurrent primary or secondary liver carcinomas have become more frequent. The purpose of this work was to assess the operative risk of re-hepatectomies. Between 1984 and 1991, 295 liver resections have been performed. Twenty-seven resections (9.2%) were re-hepatectomies: second resection in 23 patients and third resection in 4 patients. Mean age (16 males and 7 females) was 55 years (range: 18 to 73 years). Ten patients had recurrent metastases from colorectal primary, 7 patients (6 with cirrhosis) had recurrent hepaticcellular carcinoma and 6 patients had another kind of tumor. The first liver resection in these patients had been major resection in 9 cases, segmentectomy (1 or 2 segments) in 10 cases and atypical resection in 4. Re-hepatectomy was major in 7 patients, segmental in 7, and atypical in 13. Operative mortality was 4.4% (1 patient). Mean operative blood transfusion was 4.5 ± 5.2 units of packed red cells, twice the mean blood transfusion in first-hand hepatectomies in our series. Four patients (14.8%) had operative complications: thrombosis of portal vein requiring a portocaval shunt, injury to hepatic duct resulting in T-tube drainage, and coagulation disorders with diffuse bleeding in 2 patients. The latter complication occurred in 2 of the 4 patients with a third liver resection. Bleeding stopped after packing in one patient with a normal liver. Bleeding resulted in death from exsanguination in the second patient who had liver cirrhosis. Severe operative complications were more frequent in patients with a third hepatectomy (50%) than in patients with a second hepatectomy (8.7%). 

These results suggest that the operative risk of re-hepatectomy is far more important than that of a first liver resection. Indication of a third hepatectomy should be cautious, particularly in patients with cirrhosis.

F018  

WHY AND WHEN BILE DUCT INJURY OCCURS  

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Bile duct injury (BDI) is the most dangerous complication after cholecystectomy. The incidence of BDI usually low (0.2-1%), but it is associated with high morbidity and mortality. Factors that has been considered to be related with BDI are the surgeon skill, variations of the bile duct anatomy, inflammatory local conditions, and intraoperative cholangiography. 

Aim: To investigate the clinical features and the predisposing factor for BDI in a consecutive series of 3,051 cholecystectomies. 

Patients and Methods: The clinical records of 3,051 patients who underwent cholecystectomy between June 1977 and January 1990 in a surgical unit of a 600 bed teaching hospital were reviewed. BDI was classified as Group I: BDI diagnosed intraoperatively, Group II: BDI diagnosed in the immediate postoperative time, and Group III: BDI with late presentation. Age, sex, intraoperative diagnosis, surgeon skill (staff or resident), technical difficulty, intraoperative cholangiography, anatomy of the bile duct and the results after surgical repair were evaluated. 

Results: During the period of study we observed 26 BDI. 19 BDI occurred after biliary surgery (19/3051, 0.6%), and 2 after gastric surgery (2/470, 0.4%). 18 BDI were diagnosed intraoperatively (Group I), 4 in the immediate postoperative time (Group II), and 4 cases presented months or years (3m-18y) after cholecystectomy (Group III). In 62% of cases, the intraoperative cholangiography demonstrated the BDI. BDI were significantly more frequent in cases operated by staff surgeons than by residents (p<0.001), and in cases with a more difficult surgical field (p<0.005), 2 patients died after surgical repair of a BDI (2/26, 7.7%). The morbidity rate was 54%. 28% patients developed late complications (cholangitis, stenosis or cholecdocholithiasis). 

Conclusions: 1. BDI occurred more frequently in cases technically difficult and operated by skilled surgeons. 2. Intraoperative cholangiography has been useful for preoperative detection of BDI. 3. The incidence of BDI is low, but it is associated with high morbidity and mortality. These results must be considered when comparing open cholecystectomy with new alternative treatments of cholelithiasis as laparoscopic cholecystectomy.

F020  

EFFECT OF PORTAL AND PERIPHERAL SERUM ON CULTURED HEPATOCYTES AND COLONCARCINOMA CELLS AFTER PARTIAL HEPATECTOMY IN RATS  

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For patients with liver metastases of a colorectal carcinoma (CC) a partial hepatectomy (PH) is the only hope for cure. The majority of patients die however because of recurrences. After PH an overwhelming multiplication of cells occurs in the remnant liver in order to restore liver mass and function (regeneration). There is circumstantial evidence that tumor cells are stimulated also during the peak of liver regeneration. The aim of the study is to detect whether portal or peripheral serum contains factors responsible for this phenomenon. In Wag-Rij rats a 70% PH, sham (SH) or no operation (CO) is performed. After various time intervals (24 hours and 14 days) portal and peripheral (right atrium) serum is withdrawn for addition to cell cultures of hepatocytes (H) and CC cells. Portal serum is added to mixed cultures of CC and H. DNA replication is measured by 3H-thymidine incorporation, using a scintillation counter producing dpm. 

Cell cultures of CC cells show a 10 fold increase in dpm if cultured with PH serum taken from rats 24 hours after operation compared to SH or CO serum (p=0.005). PH, SH or CO portal serum taken 14 days after the procedure reveals no significant differences. Peripheral serum shows a higher number of dpm comparing portal serum taken 14 days after PH, SH or CO. Using mixed cultures of H and CC cells (ratio 1:1 and 1:10) a significant increase in dpm is found compared to cells cultured separately (p<0.01). This potentiating effect is not found if a ratio of 10:1 (CH:CH) is used. 

Conclusions: Portal serum taken 24 hours after PH contains factors stimulating the growth of CC cells. A potentiating effect can be found if H and CC cells are cultured in conjunction. A minimal amount of H seems to be essential for the interactive stimulation.
F021

SURGICAL APPROACH TO SEGMENT I FOR MALIGNANT TUMORS
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Seven complete and thirteen partial resections of segment I (caudate lobe) were performed for malignant tumors. In all cases except one, removal of segment I was associated with other types of hepatic resection either for technical or carcinological reasons. Six were iterative hepatic resections for recurrent liver metastases. In two cases the future remaining left lobe was pre-operatively hypertrophied by right portal venous embolization. Hepatectomies were performed with intermittent portal triad clamping (mean total duration: 63 minutes, range 20-120) and after preparation for total vascular exclusion. Associated partial resection of the inferior vena cava was necessary in three cases. Mean duration of operation was 285 minutes (range 60-540) and mean blood loss was 1749 milliliters (range 200-5200). There was no postoperative mortality and morbidity was low (30%). Surprisingly we retrospectively discovered that free margins were small, less than 5 millimeters in 83% of the cases. In spite of limited free margins and six iterative hepatectomies, eight patients are free of disease with a mean follow-up of 19.2 months. Technical problems were different for each case and case by case adaptation was necessary. Left, right, and central approaches were used accordingly. If resection of segment I associated with a right or left hepatectomy can be currently considered as a standard major hepatic resection, isolated complete resection of segment I remains a real technical challenge.

F022

HEPATIC ISCHEMIC TOLERANCE: COMPARATIVE ANALYSIS OF WARM AND COLD ISCHEMIA
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Hepatic ischemic damage was studied in experimental and clinical settings comparing warm ischemia (pringle manoeuvre) and after hypothermic in situ protection.

MATERIAL AND METHODS: A. Experimental study: in 10 pigs (20-25 kg BW) vascular exclusion of the liver and establishment of a porto-caval-jugular bypass. E-group 1 (n=5): 2 h warm ischemia; E-group 2 (n=5) hypothermic in situ protection (HTK solution 5°C) and subsequent 2 h ischemia. B. Clinical study: 16 patients (C-group 1) underwent conventional hepatic resections (Pringle maneuvre): ischemic time: 25 min (0-47). 8 patients (C-group 2) liver resection was performed after vascular exclusion and hypothermic in situ protection (HTK sol.). Ischemic time: 137 min [29-180]. Conventional laboratory parameters were compared in the postoperative course on day 1, 3 and 7. [results given as median; *p<0.05 (U-test)]

RESULTS:

| RESULTS: | GOT UL | GLDH UL | Billi umol/l | PT% |
|----------|--------|---------|-------------|-----|
| E-group1 | 449* 36 | 24 15* 3* 2* | 13 5 3 | 45 100 100* |
| E-group2 | 127 12 25 | 5 1 1 | 8 5 3 | 82 100 90 |
| C-group1 | 163 37 22 | 101 28 14 | 58 46 28 | 56 67 78 |
| C-group2 | 399 36 18 | 181 151 21* | 65 31 15* | 63 63 87 |

CONCLUSIONS: The experimental study showed the significant protective effect of hypothermic in situ protection of the liver compared to warm ischemia. From the clinical results it can be concluded that inspire a 5 fold prolonged ischemic time, ischemic damage (transaminases) was moderately more pronounced, functional parameters (bilirubin, PTT) were less depressed.

F023

WATER-SOLUBLE ETHYLHYDROXYETHYL CELLULOSE PREVENTS BACTERIAL TRANSLOCATION INDUCED BY MAJOR LIVER RESECTION IN THE RAT
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Enteric bacteria might act as pathogens, translocating across the intestinal barrier to extraintestinal sites after major liver resection. Methods to decrease the incidence of translocation are thus sought for.

Water-soluble ethylhydroxyethyl cellulose (EHEC) was administered orally or intravenously prior to 70% or 90% hepatectomy in the rat. The influence of enteric bacterial translocation to mesenteric lymph nodes (MLN) and blood, enteric bacterial population and bacterial adherence on the intestinal surface was determined. Phagocytic capacity by visceral and circulating macrophages were determined by the uptake of 125I-labeled, heat-killed E. coli.

Oral or intravenous administration of EHEC reduced the incidence of bacterial translocation to MLN and blood following major liver resection. Oral EHEC appeared more effective than i.v. administration in protecting against bacterial translocation to MLN in animals with 90% hepatectomy. EHEC (oral and i.v.) significantly diminished intestinal macrophage uptake capacity of 125I-labeled, heat-killed E. coli as compared to animals without EHEC administration. Overgrowth or colonization of enteric bacteria following major liver resection could be prevented by both oral and i.v. EHEC. Adherence of 14C-labeled, alive E. coli on the intestinal mucosa decreased following EHEC treatment in animals subjected to major liver resection.

In conclusion, EHEC seems to be a potent agent preventing translocation of enteric bacteria from the gut following major liver resection, probably by balancing enteric microflora, inhibiting bacterial attachment onto the intestinal surface and blocking phagocytosis by intestinal macrophages.

F024

PANCREATIC INSULINOMAS: OUR PERSONAL EXPERIENCE
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Pancreatic insulinomas represent the main cause of primitive hyperinsulinism. Since 1959 we have operated 36 patients for suspected insulin-secretting neo-plasms of the pancreas; 29 cases turned out to be insulinomas (2 multiple, 3 malignant) 5 diffuse islet hyperplasia; 2 hypoglycemic syndromes with no specific anatomophatological features. The preoperative localization was obtained in 18 patients (50%); intraoperative diagnosis was established in 18 cases in the 29 cases of true insulinoma. In 28 cases of true insulinomas, 18 corpora-caudal resections and 10 enucleations were carried out; the 3 malignant insulinomas were treated with extensive distal pancreatectomy; in 2 cases, hepatic metastasis were already present (pulmonary enucleation in one and resection in the other). For the neoplasia not localized, the intervention consisted on a programmed, monitored distal resection: we observed 1 case of occult insulinoma and 5 isular hyperplasia, while in 2 patients no insulinoma was found. The operative mortality was zero: postoperative complications, specific and aspecific, occurred in 10 pts. Long-term results (mean follow-up 9 yrs), in the 26 cases of benign insulinomas, included 22 complete resolutions and 4 improved clinical conditions. In the 3 cases of malignant lesions we observed residual hypoglycemia only in 2 patients that presented hepatic metastasis. The 7 cases of diffused hyperplasia had a decisive and definitive improvement, temporarily present in those two patients with a negative histological exam. In those neoplasia, the relative diagnostic facility contrasts with the difficulty encountered in localizing the neoplasms. In the cases that concerned simple adenomas, the therapeutic possibilities depend on tumor site, reserving the resections for multiple localizations or uneasy enucleations. Resections is a must in the malignant form. Unlocalized lesions, on the other hand, require a resection with simultaneous monitoring of the glycemic blood levels combined to a histologic control.
VITAMIN A ABSORPTION, A NEW TEST FOR QUANTITATIVE EVALUATION OF EXOCRINE FUNCTION IN CHRONIC PANCREATITIS (CP)

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There is a need for non invasive repeatable techniques to measure exocrine function in chronic pancreatitis. Vitamin A esters are hydrolysed in the gut by a pancreatic lipase before absorption into mucosal cells. This phenomenon forms the basis of a new and simple test of pancreatic exocrine function.

A physiological but safe oral dose of 10,000 IU Vitamin A is given after a 12 hour fast. Pre-dose and 1 hour blood samples are taken for retinyl esters (RE), retinol binding protein (RBP), retinol and pre-albumin (PA). In 30 CP patients (diagnosed clinically and by ERCP), the mean RE level at 3 hours was 63 nmol/1 compared with 296 nmol/1 in a control population.

We think that this significant difference in absorption is due to inadequate enzyme secretion from the pancreas to hydrolyze the administered Vitamin A ester. We know that most of the patients had normal RBP levels (38 mg/lit) and normal liver function tests as well, consistent with normal protein synthesis.

The degree of Vitamin A absorption failure correlates with the severity of other features of CP. There are in addition, differences in the pattern of absorption between CP patients with alcoholic and non-alcoholic aetiology.

OPERATION FOR CHRONIC PANCREATITIS

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71 patients with chronic pancreatitis were operated 1982-1989 because of severe chronic pain: 54 men, aged 15-72 years, median 43, and 17 women, 30-76 years, median 37. The pain had lasted for 1/2-10 years, median 2 years, no difference between the three types of operations.

42 patients were operated with a Partington-Rochelle drainage procedure, 18 a.m. Whipple, and 11 patients with resection of body and tail. Type of operation was decided by ERCP: drainage was performed in diffuse disease with dilatation of the whole pancreatic duct to at least 6 mm; in severe changes without dilated duct resection was performed. Supplementary biliary surgery was done in 6 drainage operations and 2 resections.

No perioperative mortality. Median hospitalization time 14 days for all three types of operations. Two patients had to be re-operated because of complications. 17 patients died before follow-up, in four cases death was related to pancreatitis.

77 patients (80%) answered a questionnaire after an observation time of 1½-8½ years, median 4½ years: Visick I: 47%, Visick II: 11%, Visick III: 21%, Visick IV: 21%. 5 patients had diabetes preoperatively and another 20 at the time of follow-up. 35 patients had diarrhoea preoperatively, 8 of these had normal stools after drainage. 40% were unemployed and a further 30% after operation, worst in the Whipple group. In carefully selected patients with painful chronic pancreatitis operation will yield satisfactory results in 70-80%.

INTRAOPERATIVE RAPID RADIOIMMUNOASSAY FOR INSULIN (IRRI) IN LOCALIZING INSULINOMA

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Abstract: In patients with organic hyper-insulinism, intraoperative rapid radioimmunoassay for insulin (IRRI) in veins draining the pancreas might help localize the tumor. Blood samples for IRRI are taken at various sites in the splenic and portal veins developed by us in a simple way. Of 13 patients, the highest insulin concentrations correlated with the site of the tumor in 12. The high insulin level is detected at the hepatic hilus in remaining one with diffuse insulinopenia. Also, Small insulinomas less than 1 cm in diameter could be found. In one patient with a tumor of 0.4 cm in diameter and another one with two microinsulinomas are properly resected by distal pancreatectomy, which could not be detected by any imaging procedure and palpation at operation. Therefore, it could be avoid blind distal resection of the pancreas, and possibly invasive preoperative diagnostic procedures.

PANCREATIC MUCINOUS CYSTADENOMA AND CYSTADENOCARCINOMA. A MULTICENTER STUDY OF 51 CASES

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Pancreatic mucinous cystadenoma (MCA) is a potentially malignant tumor which can change into pancreatic cystadenocarcinoma (CAC). This retrospective multicenter study conducted by the French Association for Surgical Research from 1.1978 to 12.1987 was designed to compare the prognoses of these two pathologies.

MCA: all patients were females (mean age 44 yrs, ranging from 23 to 72). The tumor was localized in the head: 3, in the body: 5, and in the tail: 21 cases. Mean diameter of the tumor was 8 cm. Surgical procedures were as follows: 1 biopsy, 1 cystojejunostomy, 27 total resection of the tumor: 1 Whipple procedure, 34 distal pancreatectomies, 2 tumorectomies. No postoperative death occurred. All patients are alive, free of any recurrence at last follow-up.

CAC: There were 11 males and 11 females (mean age 63 yrs ranging from 49 to 82). The tumor was localized in the whole pancreas: 3, in the head: 12, in the body: 6, and in the tail: 1 case. Surgical procedures were as follows: 8 curative resections, 4 palliative resections, 10 internal biliary and digestive bypasses. Two patients died postoperatively. Twelve patients died during follow-up with a mean survival of 10 months. Eight patients are alive, but 4 with recurrence.

These results suggest that MCA of the pancreas should be systematically resected. This is justified by: 1) the potential risk of MCA to change into CAC; 2) the good results of surgical treatment of the MCA; 3) the poor prognosis of CAC even if radical surgery is performed.
ADJUVANT INTRAOPERATIVE RADIATION THERAPY VERSUS RESECTION ALONE IN THE TREATMENT OF PANCREATIC CANCER

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We report our experience on the association of surgical resection with intraoperative radiation therapy (IORT) in the treatment of pancreatic cancer.

Between 1985 and 1991, 61 resections for pancreatic cancer, out of 192 observed cases, were performed at our institution. In 25 patients IORT was added to resection (group 1), whereas other 36 patients underwent resection alone (group 2) because of unavailability of linear accelerator or patient's refusal. Radiation doses from 15 to 20 Gy, with electron beam energies between 6 and 12 Mev, were delivered. Extension of the disease was analyzed: the mean diameter of the tumor was 3.1 cm in group 1, 3.5 cm in group 2; the percentage of nodal involvement resulted 62% in group 1, 43% in group 2. Operative mortality and overall post-operative complications were respectively 4% and 32% in group 1, 2.7% and 25% in group 2; no directly IORT-related complications were observed. One-year, two-year and three-year survival rate according to life-table method were respectively 62%, 27% and 22% in group 1; 40%, 18% and 11% in group 2. Median disease-free survival resulted 9 months in group 1, 7 months in group 2. Among patients with evidence of recurrent disease, a local recurrence was detected in 3 out 10 patients in group 1 (30%), and in 10 out 15 patients in group 2 (66%).

Our results suggest that a better local control and an improved survival could be obtained in patients with pancreatic cancer by adjuvant IORT.

VALIDITY OF COMBINED RESECTION OF THE PANCREAS AND PORTAL VEIN FOR CARCINOMA OF THE PANCREAS

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It seems to be prevalent opinion that patients with pancreatic cancer have a poor prognosis as a result of low resectability rate and extremely low long term survival rate. We have improved the result by performing combined resection of the pancreas and portal vein.

Between March 1976 and September 1991, 236 patients with pancreatic cancer were admitted to our clinic and 138 underwent resection. Seventy-seven 56% of the 138 patients received such procedure. As a result of this policy, resectability increased to 58%. Pancreatoduodenectomy and total pancreatectomy were carried out in 45 and 32 patients, respectively. According to pTNM classification, 11 patients were in stage I, 12 in stage II, 40 in stage III, and 14 in stage IV. Curative resection was performed in 39 (51%) of the 77 patients.

Thirteen patients (17%) died postoperatively and the remaining 64 were discharged from the hospital. The mean survival periods were 24 months in the curative resection group and 7 months in the non-curative resection group, a statistically significant difference. Four patients undergoing curative resection lived more than five years and the longest survivor is alive eight years and three months.

Combined resection of the pancreas and portal vein is a worthwhile procedure to improve the treatment for pancreatic cancer.

EXCHANGE EFFECT OF PARTIAL GASTRECTOMY ON Pancreatic CARCINOMA

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The controversial issue of enhanced pancreatic cancer risk following partial gastrectomy has been explored in male Wistar rats (n=40) weighing 250-300g. Animals were randomised to receive either 60% distal gastrectomy with Roux-en-Y reconstruction or gastrostomy and resection (control). Immediately after operation each group was further divided into subgroups, receiving i.p. injections of saline or azaserine (30mg/kg/wk for 3 wks). At 15 mo blood was obtained at 0,5,15 and 30 minutes after a fatty meal for cholecystokinin (CCK) assay; rats were then killed. Pancreatic weight was measured, and histological sections were examined for atypical acinar cell foci (AACF), the putative precursor lesion of carcinoma. There were no significant differences in body weight or pancreatic weight between controls and rats with gastrectomy. Only azaserine-treated rats had acidophilic AACF: Partial gastrectomy substantially increased the number of acidophilic AACF per pancreas (median 26.05 vs 2.09,P<0.005), with a 9-fold increase their volume (p<0.005). Basal and postprandial plasma CCK concentrations were higher after gastrectomy than in controls (P<0.05). Partial gastrectomy has an enhancing effect on azaserine-induced pancreatic carcinogenesis, probably by means of increased CCK release.
A prospective study involving preoperative chemoradiation (CRT) for locally advanced pancreatic and periampullary carcinoma was evaluated. Thirty patients (14 females, 16 males; ages 37-79) with biopsy-proven F0-33 biliary sepsis prior to completion of CRT. On restaging, 4 had metastases, (body/tail) and duodenum (3) received radiation (50.4 Gy, 180 cGy/fx, 5 days/week) concurrent with 5-FU, 1 gm/m²/day continuous infusion (days 2-5, 28-32) and mitomycin C 10 mg/m² bolus (day 2). One patient died of biliary sepsis prior to completion of CRT. On restaging, 4 had metastases, 2 had portal vein occlusion, 1 had poor performance status and 1 refused operation. The remainder underwent laparotomy 3-6 weeks after CRT. Fourteen pancreatectomies (10 total, 2 Whipple, 2 distal) were performed. Two in-hospital deaths. Resectability rate 44% (12/27) for pancreatic and 67% (2/3) for duodenal carcinoma. All specimens revealed clear margins and extensive necrosis with hyalinization. Lymph node metastasis were found in 14%. The two duodenal carcinomas had no residual tumor. The actuarial 5 year survival was 43% and 0% for the resected and non-resected groups respectively (p<.04). Considering pancreatic carcinoma alone, the actuarial three year survival was 35% for the resected group and 0% for non-resected group (p=.07). Pattern of metastasis were found in 14%. The two duodenal carcinomas had no metastasis. The related antigen of four antibodies are highly glycosylated molecules of gastrointestinal cancer-associated antigens. The detection of cancer-associated antigens in sera is based on the inhibition of binding of antibodies to target antigens. The positive rate was determined by the ELISA when index of inhibition greater than the mean ±2SD of normal individuals. In pancreatic cancer patients, 58.8%, 62.5%, 75.8% and 87.5% were positive with PS-1, PS-2, PS-7 and PS-10. While in normal individuals, 4%, 4%, 3%, and 6% were positive. These four monoclonal antibodies were used in combination (cock-tail), the positive rate was increased to 96.2% in pancreatic cancer and only 7% in normal individuals and 15.2% in non-malignant diseases. These study show the potential usefulness of monoclonal antibody in the diagnosis of human pancreatic cancer.

A panel of monoclonal antibodies were derived from BALB/c mouse immunized with mucin of pancreatic cancer cell line SW1990, four of them designed as PS-1, PS-2, PS-7 and PS-10, all scerated IgM. When tested in paraffin sections of malignant and normal human tissues by SABC immunohistochemical methods, 90% of pancreatic cancer tissues reacted with PS-1, PS-2, and PS-10, while 70% reacted with PS-7. Most of gastric cancer, colorectal cancer and Vater's ampulla cancer reacted with these four antibodies, but less in other cancers. Normal pancreatic tissue reacted with PS-1, PS-2 and PS-10 differently, but not with PS-7. The related antigens of four antibodies are highly glycosylated molecules (20KD) with mucin-like biochemical characteristics. They are all gastrointestinal cancer-associated antigens.

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We have examined the histopathological factors affecting the degree of local spread, regional lymph node (RLN) metastases, and overall survival (O.S.) in a group of 50 cases of resected carcinoma of the exocrine pancreas. Although the mean O.S. for the group was 14.3 months, resected patients without RLN involvement had a mean survival of 24 months. In contrast the mean O.S. rate was 8 months for patients with RLN involved. Size, tumor location, and histological grade were compared to RLN involvement and O.S. The mean size of primary tumor did not differ significantly between patients with or without RLNs (5.1 vs 4.6 cm). However, 7 of 8 T1 tumors were <4 cm and 35% of tumors >4 cm were T1 lesions. In contrast, only 1 of 17 (6%) of tumors >4 cm was T1. Histological grade was correlated with nodal status and O.S. There was a significant difference between histological grade and the presence of metastatic lymph nodes (G1, 37% positive, G2-4 55% positive). Patients with well differentiated tumors had a mean survival of 21 months compared to a mean survival of 10 months for less differentiated tumors (p<0.05). This difference was even more significant when stratified for nodal status. The patients with well differentiated tumors and no RLN involvement had a mean survival of 36.1 months compared to 8.6 months for well differentiated tumors with RLN involvement. In summary, we have shown that size, histological grade, and local spread predict for nodal status. However, specific patient subgroups (G1, node negative) exhibit an excellent survival when curative pancreatectomy resection is successful.

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Imaging of biliary strictures may suggest malignancy but bile (BIC) and brush (BRC) cytology can provide tissue diagnosis. We studied 92 consecutive patients (median age 66 years, range 39-91) with biliary strictures on ERCP (71) or PTC (21). Brushings (38) were taken using a modified Genaan cytology brush (6 Fr, Wilson Cook) passed alongside a guide wire which remained through the stricture. Bile (92) was aspirated after internal/external catheter or endoprosthesis insertion. Specimens were examined by one experienced cytologist (AD) and reported as positive or negative for malignant cells. Malignant (66) or benign disease (14) was confirmed by histology or laparotomy in 52 patients and by follow up in 28. 12 patients with uncertain diagnosis were excluded. The overall sensitivity of BRC was significantly greater that BIC (59% vs 30%; p<0.01) as was diagnostic accuracy (69% vs 43%; p<0.01). Specificity was 100%. Sensitivity for each tumor was:

| Tumor Type       | BIC Sensitivity | BRC Sensitivity |
|------------------|----------------|-----------------|
| Pancreatic       | 30%            | 55%             |
| Cholangiocarcinoma| 30%            | 57%             |
| Ampullary         | 29%            | 100%            |
| Other Tumors     | 18%            |                 |

There was no procedure related complication and the average sampling time was less than 5 min.

We conclude that BRC is more sensitive than BIC in detecting malignancy and with the technique described is safe and rapid.

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PERCUTANEOUS USE OF SELF EXPANDABLE METALLIC STENTS IN ADVANCED MALIGNANT HILAR LESIONS

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Purpose: The value of self expandable stents (wallstent; Medinvent, Lausanne) in the palliative treatment of patients with malignant hilar obstruction was studied.

Methods: Fifty-one patients were treated by a total of 72 stents. Six patients had a type I lesion, 9 a type II lesion and 36 a type III or IV lesion. Stent diameter was 1 cm; length 3.5-10.5 cm.

Results: In all but 7 patients (type III or IV) bilirubin levels turned to normal values. The median survival of 32 patients who died was 4.3 months (0.7-18m). Nineteen patients are alive after a median period after stent placement of 10 months (1-28M). Recurrence or worsening of the jaundice was seen in 17 patients, after a median period of 8 months. Tumor overgrowth at the proximal end of the stent(s) was the cause in 7, at the distal end in 4, tumour ingrowth, haemobilia and angling of the stent each in one patient. The cause was not established in two patients. Re-intervention was performed in 15 patients (29%). Thirteen patients benefited from the re-interventions (median follow up 3 months).

Conclusion: The use of the Wallstent in malignant hilar biliary obstruction compares favourable to plastic stents, as re-obstruction is mostly not stent related, but caused by tumor progression.

LONG-TERM SURVIVAL OF PATIENTS WITH CARCINOMA OF THE MAIN HEPATIC DUCT JUNCTION

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Long-term survival of patients with carcinoma of the main hepatic duct junction is now the issue. We herein report on 10 patients who lived more than five years after surgery. Surgery was carried out by surgeons in six institutions, who were trained at Keio University Hospital, under the same policy that extensive resection of the bile duct combined with liver resection be the procedure of choice. In a total of 140 patients, 79 underwent resection, a resectability rate of 56.4%; 7 patients died postoperatively, an operative mortality rate of 8.8%. Ten of the 79 patients lived more than five years after surgery. Procedures of liver resection in the 10 patients were right trisegmentectomy in four, right lobectomy in three and left lobectomy in three. Combined resection of the portal vein was carried out in three. The resected margins of the bile ducts were clear in all patients. Histologic diagnosis was well differentiated adenocarcinoma in five and moderately differentiated adenocarcinoma in four. Lymphatic metastases were observed in two. It should be stressed that extensive resection of the bile ducts combined with liver resection is feasible and valid.
F041

RESULTS OF A RANDOMIZED STUDY OF BOLUS VS. CONTINUOUS I.V. APPLICATION OF APROTININ FOR REDUCTION OF BLOOD PRODUCT REQUIREMENTS IN ORTHOTOPIC LIVER TRANSPLANTATION (OLT)

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A reduction of blood product requirements in OLT with systemic application of aprotinin has been reported. However, randomized studies are still lacking. Effects of different aprotinin regimens on hemostatic changes and blood product requirements in OLT were investigated in an open, prospective, randomized study. OLT was carried out according to standard techniques. Adult patients were randomized to receive either bolus treatment of aprotinin (3 x 0.5 mio. KIU (kallikrein inhibitor units) (n=13) or continuous aprotinin infusion of 0.1-0.4 mio. KIU/h (n=10) group 2). Signs of hyperfibrinolysis before and after graft reperfusion were significantly lower in group 2 as measured by whole blood clot lysis time in thrombelastography (TEG). Tissue plasminogen activator (t-PA) activity increased significantly less in group 2 than in group 1 during the anhepatic phase. Intraoperative blood product requirements were higher in group 1 (median RBC u. 8 [4-13]) than in group 2 (median RBC u. 7 [4-13]). Transfusion requirements during the first 3 postoperative days were significantly lower in group 2 than in group 1 (median RBC u. 1.5 vs. 3.5 [p<0.05]). Analysis of the early perfusate of the liver graft detected signs of decreased t-PA release of the graft in group 1, pointing to a protective effect of high aprotinin concentrations to hepatic endothelial cells. The results demonstrate the advantage of continuous aprotinin infusion over bolus application in OLT.

F042

BILARY TRACT COMPLICATIONS IN LIVER TRANSPLANTATION

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INTRODUCTION: Biliary tract reconstruction is considered the "Achilles' heel" of liver transplantation. Many forms of reconstruction had been proposed to decrease morbidity (between 8 to 96% in literature reports).

MATERIAL AND METHODS: Between April 1986 to September 1991, 233 orthotopic liver transplants (OLT) have been performed at "12 de Octubre" Hospital (three intraoperative deaths), 188 in adults and 12 in children. Single layer suture of 5/0 poliglactic acid (Vycril) was the technical preference, 8 to 12 F size of T-tube was the more common. Biliary complications were diagnosed by biochemistry, radiology and scintigraphy.

RESULTS:

| Biliary Anastomosis | CD-CD T | CD-CD | H-J | TOTAL |
|---------------------|---------|-------|-----|-------|
| Number of OLT       | 125     | 52    | 50  | 227   |
| Total complications | 13 (10.4%) | 6 (11.5%) | 6 (12%) | 25 (18.8%) |

COMPlications:
- CD-T: Choledocho-choledochostomy with T-tube
- CD-CD: Choledocho-choledochostomy without T-tube or stent
- H-J: Hepatico-jejunostomy

Complications include: biliary leakage (7); leakage after removal T-tube (2); Fistula (3); Obstruction (1); Stenosis (4); Stenosis + stones (2); Anastomotic dehiscence (2); Biloma and collection (4).

CD-CD is our first choice method of reconstruction T-tube has the advantage of direct radiological access. Not using it simplifies the technique, but may delay the diagnosis of complications.

F043

PROTEINASE INHIBITOR (APROTININ) FOR THE TREATMENT OF REPRESSION INJURY AFTER LIVER TRANSPLANTATION

AN EXPERIMENTAL STUDY IN PIGS

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Recent work had shown that cold preservation produced a sinusoidal lining cell injury in liver allografts and that the attachment mechanisms of sinusoidal lining cells to the extracellular matrix might be involved in this pathogenesis. The purpose of this study was to determine whether aprotinin given during the reperfusion may reduce this injury in a pig liver transplantation model.

METHODS: Pigs weighting 18-26 kg were used for orthotopic liver transplantation (OLT). Aprotinin was administered IV in 7 recipients: 20,000 KIU/kg body weight as a bolus and 7,500 KIU/kg body weight per hour as continuous infusion for 6 hours after reperfusion. The cold ischemic time was 5.9±0.5 h in the untreated (n=8) and 5.7±0.75 h in the aprotinin-treated group (n=7). Blood samples were drawn in the donor, in the recipient after starting the operation, and 6 hours after reperfusion and on postoperative days 1,3 and 5. Liver injury was assessed from release of transaminases.

RESULTS: In the untreated group 5 out of 8 pigs and in the aprotinin-treated group all pigs survived. In both groups GOT levels increased postoperatively and reached maximal values on the first postoperative day. However, in the aprotinin-treated group the increase of GOT was significantly lower (430±172 U/l) than in untreated group (887±275 U/l)

CONCLUSION: The results indicate that inhibition of proteases by aprotinin after revascularization is able to reduce the reperfusion injury. Since the hepatic extracellular matrix is mainly composed of proteoglycans and glycoproteins which can be altered by proteinases, protection of sinusoidal cell detachment may represent one important pathway through which aprotinin exerts its protective action.

F044

BILIARY COMPLICATIONS AFTER LIVER TRANSPLANTATION

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Biliary complications following liver transplantation have always contributed significantly to postoperative morbidity. Despite better management by interventional radiology and reduced mortality prevention of these complications by a safe surgical techniques seems to be one of the most important prerequisites.

Therefore, we analyzed retrospectively the incidence of biliary complications in relation to the type of biliary reconstruction. Out of 635 operations performed within 18 years only 538 primary transplants were evaluated, including 445 adults and 93 children. Major types of biliary anastomosis were choledochocholedochostomy in a side-to-side CD-Cdcds (n=500) or end-to-end = CdCdcd (n=50) fashion, and choledochojejunostomy = Cdj (n=165). 13 patients had no biliary reconstruction.

The overall biliary complication rate necessitating surgical reinterventions was 16.6% (67/525). The relationship between type of anastomosis and kind of complications is shown in the following table:

| Complications | total no. | (%) | anastomosis | T-tube | others |
|---------------|-----------|-----|-------------|--------|--------|
| CD-Cdcds      | 26/300    | (8.7) | 15 (15.0)   | 9 (3.0) | 2 (0.7) |
| CD-Cdcddee    | 18/600    | (3.0) | 8 (13.3)    | 9 (15.0) | 1 (1.7) |
| Cdj           | 43/165    | (26.1) | 23 (13.9)   | 8 (4.8) | 12 (7.3) |

Apart from T-tube problems or especially bleeding from the Roux-en-Y loop in patients with Cdj more than half of all complications were related to the anastomosis. CdCdcds had, by far, the lowest rate of only 5%, in pediatric recipients there was no complication at all. These data from a larger series confirm our previous experience that CdCdcds is the safest type of biliary reconstruction after liver transplantation, and should be considered as the anastomosis of first choice.
RESULTS OF LIVER TRANSPLANTATION IN FULMINANT HEPATIC FAILURE AND LATE ONSET HEPATIC FAILURE IN CHILDREN

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The mortality rate of fulminant hepatic failure (FHF) and late onset hepatic failure (LOHF) in childhood has remained between 70–95% despite recent improvements in medical therapy. Liver transplantation has become an important therapeutic option in adults with this entity, but has been performed very infrequently in children.

Between March 1988 and October 1991, 13 children aged from 1 month to 14 years with FHF or LOHF received a total of 14 liver transplants. This is the largest series reported in the literature. The aetiology was viral hepatitis in 5, undetermined in 4, drug hepatotoxicity (carbamazepine) in 2, autoimmune hepatitis and congenital haemochromatosis in 1. Reduced-sized livers were used in 11 of the 14 transplants. The postoperative morbidity included infective complications and abdominal bleeding. Two patients died from Graft Versus Host Disease, one from brain aspergillosis and another from graft infarction after portal vein thrombosis. Nine patients (70%) survive with a median follow-up of 18 months.

Liver transplantation should be the therapeutic option in children with FHF and LOHF where the chance of recovery with intensive medical therapy is poor.

Surgery for Biliary Atresia – The Place of Liver Transplantation

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Although the benefits of porta-enterostomy in the primary treatment of biliary atresia are widely accepted, many patients obtain limited benefit and develop life threatening complications of chronic liver failure. The Cambridge-King’s College Hospital liver transplant programme has carried out paediatric transplants since January 1984. We have reviewed the results of this procedure in patients with biliary atresia. The 73 such patients transplanted up to September 1991 have been analysed in 2 periods - 1984-88 (34 patients) and 1989-91 (39 patients).

The indications for transplantation were the development of life-threatening complications, particularly gastro-intestinal bleeding, ascites, recurrent sepsis, encephalopathy and cessation of growth.

In the earlier group 34 patients received 44 grafts (retransplant rate 29%). Graft survival at 1 and 2 years was 46% and 39%. Patient survival was 56% and 50%. In the later period 39 patients received 48 grafts (retransplant rate 22%). Graft survival at both 1 and 2 years was 66% and patients survival 84%. No graft or patient was lost after 2 years in either group.

The mean age of patients was 3.4 years (1984-8) and 4.6 years (1989-91). However, 10 (29%) of the early group were aged less than 2 years compared to 17 (44%) of the later group. More patients in the later series were transplanted with “reduced size” grafts (33% vs 7%) these being used in emergency cases, as a consequence of which very few patients now die whilst awaiting transplantation.

The results of paediatric liver transplantation have improved rapidly in recent years. We feel that this procedure should now be considered at an early stage in those cases where conventional surgery has proved unsuccessful.

Orthotopic vs Heterotopic Liver Transplantation in the Pig: Effects of Long-term Graft Preservation and Prostaglandin E1 on Intraoperative Hemodynamic Changes

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We compared the intraoperative hemodynamic changes during orthotopic liver transplantation (OLT) with those during heterotopic liver transplantation (HLT), after different duration of cold storage of the graft. The effect of prostaglandin E1 (PGE1) on these parameters was also studied. Sixty-nine female Yorkshire pigs underwent wither OLT (N=32) or HLT (N=37) with a graft stored for 2 hr (N=31), 24 hr (N=16), 48 hr (N=7), or 72 hr (N=15) in the University of Wisconsin solution. PGE1 was added to the preservation solution and both donor and recipient animals in 16 transplantations of the various groups. Amongst others, cardiac output (CO), mean arterial pressure (MAP), and systemic and pulmonary vascular resistance (SVR, PVR) were measured at different time points during the operative procedure. For the three main variables - i.e., the type of transplantation, the use of PGE1, and the preservation time, multiple regression analysis was performed. During HLT, portal vein clamping lowered MAP and CO, while during the anhepatic phase in OLT, SVR increased and CO dropped. After reperfusion of the graft an increase in PVR and a decrease in SVR was found in both OLT and APLT. At different stages of the surgical procedure, longer graft storage time diminished CO and MAP (P<0.001), especially in OLT. PGE1 appeared to reduce the cardiovascular reserves needed to compensate the changes after recirculation of the graft. We demonstrated that extension of the graft preservation period resulted in poor cardiac performance, more so in OLT than HLT. The native liver in HLT might be able to metabolize the myocardial depressant factors, released into the circulation upon reperfusion. Prostaglandin E1 did not protect against the reperfusion syndrome.

Optimal Treatment of Budd-Chiari Syndrome (BCS) - Conventional Surgery or Liver Transplantation?

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BCS delineates a heterogenous group of various etiologic and morphologic disorders leading to hepatic venous outflow obstruction. Accordingly, the optimal treatment of this disease remains a controversial issue.

In order to elucidate the role of different operations we analyzed our own experience with the past ten years. This consecutive series includes 41 patients (30 females, 11 males) with ages ranging from 12–49 years. The etiology of BCS was known in approximately 50%; one patient had a veno-occlusive disease following bone marrow transplantation. 10 patients underwent conventional surgery as primary therapy: portocaval shunt (2), caval thrombectomy and Maass stent (1), portocaval side-side shunt (2), mesocaval shunt (2), cavomesoportal shunt (1), and dorcocranial liver resection and hepatoportal anastomosis (2). Total hepatectomy and liver transplantation (LTx) was performed in 31 cases as first option; 4 additional patients were transplanted after failed previous surgery. So far, 1541 patients have died. Only one of the primary non-transplanted patients has survived; 3/4 patients out of this group could be rescued by secondary LTx. 22/31 primary liver recipients are alive with a maximum follow-up of nine years (5-year actuarial survival 68%).

These results demonstrate clearly that LTx is one of the therapeutic options to be considered for patients with BCS. Certainly, our own experience is biased by the unfavourable outcome after conventional surgery thus supporting the more aggressive attitude of LTx. Even more, proper patient selection remains the crucial question which can only be answered by better understanding and definition of the pathogenetic, morphologic and clinical spectrum of this particular disease.
F049

AN IN VITRO METHOD FOR COMPARING THE EFFICACY OF TWO PRESERVATION SOLUTIONS IN ONE CANINE LIVER USING THE 5'-NUCLEOTIDASE ASSAY

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The value of 5'-nucleotidase (5'-NT) as a marker of liver graft viability was studied in relation with liver preservation experiments. In 6 mongrel dogs, the main right and left branch of the portal vein were cannulated and flushed separately in situ with cold UW-solution (UW) and EuroCollins (EC), respectively. After hepatectomy, the right and left liver lobes were split and stored at 4°C in either solution. 5'-NT in liver tissue was determined histochimically (lead salt method) in cryostat sections. After 48h storage in EC, the 5'-NT score had decreased to 31%±16% (n=6), whereas in UW, 5'-NT score was 76%±10% (n=6). Significantly (p<0.05) higher 5'-NT scores were found also after 24h and 72h preservation time in UW. This result is in keeping with the higher preservation tolerance of liver grafts preserved in UW. The 5'-NT assay was applied in relation with graft function in orthotopic liver transplantation experiments in dogs. All dogs with liver grafts preserved in UW-solution during 24h (n=4) and 48h (n=3) survived (>5 days). Pre-transplant 5'-NT scores ranged from 61% to 100%. The 72h preserved livers (n=5) did not show life supporting function. Pre-transplant 5'-NT scores (35%±12%, n=5) were significantly (p<0.05) decreased. In conclusion, the 5'-NT assay in conjunction with the double flush method through the portal vein, provides a simple and rapid in vitro method to test solutions for liver preservation.

F050

LIVER GRAFT ASSESSMENT IN ORGAN DONORS BY THE LIDOCAINE/MEXG TEST IS UNRELIABLE.

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Lidoamine/monooethylglycinexilide (MEXG) test was performed in 38 liver donors prior to organ harvesting. The serum MEXG 15 min after an IV bolus of 1mg/kg of lidoamine in the donor (MEXG t15) was retrospectively correlated with outcome of the transplant and early liver graft function. Three donors were excluded from the study because of a pre-test contamination with lidoamine. Among the remaining 35 liver transplants (OLT), 4 patients were retransplanted within 10 days post-OLT (primary nonfunction (PNF): n=4; early severe graft dysfunction: n=2), and three recipients died, with median (range) donor MEXG t15 (ng/ml) at 100 (86-119) and 169 (146-182), respectively, when compared to 87 (18-245) in the remaining 28 OLT patients alive with functioning grafts. Considering the literature (1), a MEXG t15 value <80ng/ml was considered arbitrarily as the cut-off point which may predict poor or good liver graft quality, respectively. Donor and preservation data were not statistically different in the 2 corresponding groups in terms of mean donor age (21.9 vs 21.0), days in intensive care unit (2.8 vs 2.6), ischERIC time in hours (13.6 vs 12.7) and T-cell crossmatch. One month graft survival rate was significantly higher in the <80ng/ml group (12/12: 100%) when compared to the >80ng/ml group (7/23: 30.4%; p=0.036). Moreover, early (days 1-5) post-OLT cytolytic and functional parameters were similar in both < or >80ng/ml MEXG t15 groups: peak SGOT (U/L) (216±24 vs 2173±336), peak SGPT (U/L) (1684±1476 vs 1952±1939, NS), mean SGPT (1051±1791 vs 1354±1533, NS), minimum PT (%) (43±17 vs 43±13, NS), and peak total bilirubin (mg/dl) (0.8±4.9 vs 10.6±5.0, NS). In conclusion, (1) the MEXG test failed to predict graft outcome, as the 2 PNF cases had "excellent" MEXG t15; (2) low donor MEXG t15 correlated neither with poor graft outcome nor with early liver dysfunction. Low MEXG t15 value should thus not preclude the use of a liver donor, particularly in the current context of organ shortage.

(1) Adam R, et al. Transplant Proc 23: 2470, 1991.

F051

MODIFICATION OF RETICULOENDOTHELIAL FUNCTION BY MURAMYLDIPEPTIDE ENCAPSULATED LIPOSOMES IN JAUNDICED RATS TREATED WITH BILIARY DECOMPRESSION

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Septic complications and renal dysfunction are major causes of morbidity and mortality following biliary surgery in the jaundiced patient. In previous studies we demonstrated that reticuloendothelial system (RES) function was severely depressed in rats with biliary obstruction and RES function tended to normalize very slowly following biliary decompression. Ways to increase the recovery of RES function following biliary obstruction are thus sought for. The present study investigates the influence of liposome encapsulated muramyl dipeptide (MDP) administered in jaundiced and biliary decompressed animals. Rats with 2 weeks biliary obstruction, with or without 1 week of concomitant biliary decompression relieving the jaundice, were treated with either normal saline, free MDP, placebo liposomes or liposome encapsulated MDP. RES function was evaluated by the blood clearance (described as the corrected phagocytic index) and organ localization (liver, spleen, lungs, kidneys) of i.v. injected 125I-labeled, heat killed E. coli. The corrected phagocytic index following 1 week of biliary decompression returned to normal levels in animals treated with MDP-liposomes, while RES function was impaired in all other jaundiced and biliary decompressed groups. In the biliary decompressed, MDP-liposome treated group, renal localization of radioabeled E.coli was significantly lower as compared to all other jaundiced biliary decompressed groups. We conclude that treatment with MDP-liposomes improves the otherwise impaired RES function in rats with biliary obstruction and especially in the early phase following biliary decompression of jaundice.

F052

CAN WE DO AWAY WITH PTCD?

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Percutaneous transhepatic cholangiography and drainage (PTCD) is performed in surgical jaundice to decompress the biliary tree and improve hepatic functions. However, the risk of sepsis is high in these patients due to immunosuppression (1) and surgical outcome remains poor. This raises a question - can we do away with PTCD? To answer this query a study was carried out in 2 phases. During the 1st phase mortality was compared between 2 groups of patients: (A) those undergoing surgery without PTCD (n=11) and (B) those undergoing surgery following PTCD (n=13). The mortality was 57.14% in Gp A as compared to 61.54% in Gp B. Serum estimations of bilirubin levels carried out during the course of drainage (3 wks) revealed a gradual and significant decrease, from 12.52±8.3 mg% to 6.9±3.4 mg%. Antipyrine half-life did not change significantly (19.14±3.7 hrs) as compared to basal values (21.96±3.8 hrs). The phagocytic and intracellular capacities of PMN remained suppressed (Basil: 22.13±3.68% phago. and 19.1±4.49% ICK; post drainage: 20±8.48% phago. and 11.15±3.05% ICK). Thus PTCD did not improve metabolic capacity of the liver and mortality was higher due to sepsis. Considering this high incidence of sepsis and based on our earlier studies which have demonstrated immunotherapeutic potential of Tinospor cordifolia (TC) (2,3), 2 additional groups were studied: (C) patients receiving TC during PTCD (n=16) and (D) patients receiving TC without PTCD (n=14). A significant improvement in PMN functions occurred by 3 weeks in both groups (31.25±2.65% phago. and 24.8±5.6% ICK). The mortality in Gp C & D was 25% and 14.2% respectively during preoperative period. There was no mortality after surgery. It appears from this study that host defences as reflected by PMN functions play a important role in influencing prognosis. Further decompression of the biliary tree by PTCD seems unwarranted.

(1) Rege et al, Ind J Med Res 1989: 90,478
(2) Dahanukar et al, HPB Surg 1990: 2 (Suppl), 38
(3) Bapat et al, HPB Surg 1990: 2 (Suppl), 210.
ENDOPROSTHESIS RELATED BILE DUCT PATHOLOGY AN EXPERIMENTAL STUDY IN THE DOG

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The histopathological changes of extrahaepatic bile ducts after a period of Endoprosthetic Biliary Drainage (ED) and its consequences for subsequent Biliary Tract Surgery were assessed in 21 mongrel dogs. 5 dogs (group A) underwent ED during 4 weeks and were sacrificed 2 months after removal (RS) of the stent. In 6 dogs (group B) the 4 weeks of ED was followed by hepaticojejunostomy (HJ) and observed for 2 months. In 5 dogs (group C) the common bile duct (CBD) was ligated (4 days) and treated subsequently with ED (4 wks) and HJ (2mths). In group D (n=5) the effect of CBD ligation (4 days) and direct HJ (2 mths) was studied. Stenting was accomplished by duodenotomy and CBD biopsies were obtained during HJ and upon sacrifice. Bile samples were cultured (BC) during each step of the procedure.

| CBD inflammation (-,+-,+-+,+++ | 10% | 30% | ++ | ++ | ++ |
|-------------------------------|-----|-----|----|----|----|
| pos.bile culture after ED      | 100%| 30% | +  | ++ | ++ |
| After 2 mths                   |     |     | 1x | 1x | 1x |
| pos.bile culture after sacrifice| no | no  | 1x | 1x | 100% |

Conclusion: Endoprosthetic biliary drainage of both a normal and obstructed CBD resulted in a distended fibrocellular bile duct, showing severe chronic inflammation with epithelial hyperplasia of the mucosa. At 2 months after removal of the stent the inflammation is still moderately present. A higher incidence of postoperative (infectious) complications was noted after biliary tract surgery with previous endoscopic stenting.

F055

CHANGE OF HEPATIC MITOCHONDRIAL REDOX STATE BY ENDOBLADY DRAINAGE IN OBSTRUCTIVE JAUNDICE

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Aim: The redox tolerance test (RTT) quantifies the changes of hepatic mitochondrial redox state by measuring the arterial ketone body ratio (KBR) in response to oral glucose load. The aim of this study is to clarify the liver function as measured by the RTT in obstructive jaundice (OJ) and to examine the changes in RTT during percutaneous transhepatic biliary drainage (PTBD).

Patients and Methods: 22 patients with OJ underwent RTT before and two weeks after PTBD. Patients with overt diabetes mellitus were excluded. RTT was performed as described by Mori et al (Ann Surg 1990; 211:438-446). A redox tolerance index (RTI=100xAKBR/Aglucose), which means the response of arterial KBR to glucose loading, was used as an indicator for RTT. Results: The patients were classified into three groups according to RTI: Group A: RTT before<0.5; Group B: RTT(before)<0.5 and RTT(after)<0.5; Group C: RTT(before)<0.5 and RTT(after) 0.5. RTI were maintained above 0.5 in all patients in Group A (n=13) and no change was found after PTBD (before: 0.97±0.35 (mean±SD); after: 1.07±0.38). RTI in Group B (n=5) were improved variously after PTBD. There were no hospital deaths both in Group A and B. In Group C (n=4), RTI of 2 patients were fallen after PTBD and 3 patients died in the hospital by cholangitis. Conclusion: (1) RTT can be a useful method for the evaluation of outcome in OJ. (2) From the standpoint of hepatic mitochondrial redox state, PTBD has a limited role in improving liver function.
THE IMPACT OF A NEW CLASSIFICATION ON THE MANAGEMENT OF SELECTED PATIENTS WITH CHRONIC PANCREATITIS

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Our working classification consists of three types of cysts based on ductal obstruction. By this classification, 94 patients were divided into three groups: post-necrotic type I in acute pancreatitis (50 patients), post-necrotic type II in chronic pancreatitis (32 cases), and type III in chronic pancreatitis (12 patients). E.R.C.P. performed in all patients with chronic pancreatitis in 11 patients with acute pancreatitis.

Average follow-up: 10.2 months (range 1-82).

Type I: Percutaneous drainage (PD) was successful and did not carry complications. Internal drainage PD should be the treatment of choice.

Type II: PD was associated with prolonged drainage and risk of complications. Internal drainage should be used when ductal communication is present.

Type III: PD not used. It should be addressed by drainage or resection.

Reference:
A. D'Egidio, M. Schein Br J Surg 1991; 78:585-9

EVIDENCE FOR AUTOIMMUNITY IN CHRONIC PANCREATITIS

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The precise aetiology of chronic pancreatitis is unclear. High numbers of T-lymphocytes in the pancreas and pancreatic specimens suggest possible involvement of cell-mediated immune mechanisms. Aberrant expression of major histocompatibility complexes (MHC) is a prerequisite for organ-specific autoimmune, and normal pancreatic epithelial cells do not express such complexes. Expression of MHC Class I (β2-microglobulin) and Class II (HLA-DR) determinants were investigated in 93 patients (64 males, 29 females, mean age 41 years) operated on for chronic pancreatitis. Expression of both MHC antigens was alcohol (63 patients), recurrent acute pancreatitis (12), congenital lesions (2) and unknown (16). Immunohistochemical staining of tissue sections involved standard immunoperoxidase techniques using specific antisera. No MHC expression was seen in 10 histologically normal pancreas (controls). β2-microglobulin expression in pancreatic cellular epithelium was observed in 76 specimens (82%) while HLA-DR was present in 61(66%). Staining of both MHC determinants was confined to ductular and ductal epithelial cells was observed in 76 specimens (82%) while HLA-DR was present in 61 (66%).

Immunohistochemical staining of tissue sections involved standard immunoperoxidase techniques using specific antisera. No MHC expression was seen in 10 histologically normal pancreas (controls). β2-microglobulin expression in pancreatic epithelial was observed in 76 specimens (82%) while HLA-DR was present in 61 (66%). Staining of both MHC determinants was confined to ductular and ductal epithelium with no staining of acinar cells: β2-microglobulin (ductules 63%, ducts 51%; NS) and HLA-DR (ductules 59%, ducts 53%; NS). Positive staining was not related to aetiological agent or age. This aberrant MHC expression, together with a T-cell infiltration, suggests a cell-mediated component to chronic pancreatitis.

PROGNOSTIC VALUE OF CT SCAN IN SEVERE ACUTE PANCREATITIS: A PROSPECTIVE, MULTICENTRIC STUDY

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From October 1986 to January 1991, 234 patients with severe acute pancreatitis (SAP) have been entered in a prospective, multicentric study to evaluate the prognostic value of early CT scan. The criteria for inclusion was a first attack of pancreatitis requiring an admission in an ICU. An initial CT scan was performed within 48 hours of admission in 228 patients. Each CT scan was performed throughout the entire abdomen before and after intravenous injection of contrast medium. A form was filled for each CT scan to collect the following data: size of the pancreas, enhancement after contrast medium injection, visualization of the portal and splenic veins on angiographies, number and location of peripancreatic collections. Survival curves and curves of occurrence of a pancreatic abscess were constructed by the method of Kaplan-Meier and compare with the Log Rank test. The non visualization of the portal and splenic veins on angiographies was related to increased mortality and abscess formation (p<0.0001). Collections located in the lower part of the right and left mesocolons, in the right posterior pararenal space were predictive of abscess formation and increased mortality rate (p<0.01). The non visualization of a part of the pancreatic parenchyma on angiographies did not influence the prognosis. Concerning the Ranson CT scan classification, grade E was significantly related to increased mortality and abscess formation when compared with the other grades (p<0.02).
MANAGING THE COMMON DUCT STONE IN THE LAPAROSCOPIC CHOLECYSTECTOMY ERA

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At open cholecystectomy, operative cholangiography was performed to confirm suspected or identify unsuspected C.B.D. stones allowing concomitant treatment. Since laparoscopic cholecystectomy (L.C.), instead of operative cholangiography, reliance has been placed on E.R.C.P. to diagnose and treat by sphincterotomy (E.S) C.B.D. stones. This has led to an increased incidence of ERCP and sphincterotomy with possible complications. To determine if these stones could be managed surgically in the laparoscopic era, L.C. with routine op. cholangiography was attempted in 200 surgically unselected patients. In those with suspected C.B.D. stones (L.F.T., U/S, pancreatitis, jaundice), in 75%, the stones had passed by the time of surgery. In 7 of 10 patients with C.B.D. stones, the duct was cleared with a combination of cholangioscopic or image intensifier monitored trans cystic duct sphincter dilation and flushing or basket extraction. There were no complications in this small number. Three patients required post op. ERCP sphincterotomy (DRP).

We conclude laparoscopic exploration of C.B.D. at L.C. is possible provided routine op. cholangiography is used. ERCP use will be reduced if not used preoperatively to screen for and treat C.B.D. stones but reserved for post op. retained stones the incidence of which may be increased.

CHOLEDOCHODUODENAL FISTULA ASSOCIATED WITH CHOLELITHIASIS

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Choledochoduodenal fistula (CF) situated on or around the longitudinal fold is most probably caused by the spontaneous passage of gallstones. It was very difficult to diagnose until the introduction of duodenal fiberoscopy. At our Endoscopy Unit, of the 796 patients with choledocholithiasis who were subjected to endoscopic cholangiography, spontaneous CF was diagnosed in 58 (7.3%). The group consisted of 39 female and 19 male patients with an age range from 47 to 84 years. CF was classified in two types: type I was present on the longitudinal fold (75%) type II was present at the duodenal mucosa adjacent the longitudinal fold (25%). Common bile duct calculi were present in 49 patients (84%). The incidence of jaundice at the time of endoscopic examination in patients with fistula was 6.9% compared with 73.6% in patients without fistula. The spontaneous disappearance of jaundice in choledocholithiasis is probably due to formation of CF. Sphincterotomy was successful in all patients with fistula and common bile duct calculi (84%).

ROLE OF EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY IN THE MANAGEMENT OF COMMON BILE DUCT STONES

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We evaluated the role of extracorporeal shock wave lithotripsy (ESWL) in the management of common bile duct (CBD) stones. A total of 40 patients were taken up for the study. All the patients had endoscopic papillotomy done and biliary drainage was established in all by nasobiliary catheter. Number of shocks given ranged from 700 to 11000. No more than 4000 shocks were administered in each treatment session with a minimum time interval of 48hrs. between consecutive sessions. Most stones were crushed around 17.2 K.V. Stone fragmentation was achieved in 80% of cases, and stone clearance was obtained in 70%. Adjunctive non-surgical procedures were necessary for stone removal in 30% patients and 15% patients required surgery to clear the ducts. Mean hospital stay was 8 days. There was no mortality and complication rate was relatively low. Nine patients had skin bruising and ecchymosis, five patients had exacerbation of cholangitis. Three patients had biliary pain. It was therefore concluded that ESWL is a helpful and safe adjunct in treating difficult-to-reach or difficult-to-remove bile duct stones in the elderly or high risk patients.
MANAGEMENT OF BILE DUCT STONES IN THE ERA OF LAPAROSCOPIC CHOLECYSTECTOMY

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The development of laparoscopic cholecystectomy (LC) has led to new dilemmas in the management of common bile duct (CBD) stones. This study examined the approach to CBD stones in 207 consecutive patients submitted to LC.

CBD stones were suspected pre-operatively in 50 patients on criteria of abnormal liver function tests, dilated CBD on ultrasound or a prior history of biliary pancreatitis. 14/50 had pre-operative ERCP with CBD stones found in 9 and extracted by endoscopic sphincterotomy (ES) in 8/9. In 4/9, at subsequent LC and operative cholangiogram (OC), residual stones were present. 2 required open operation and exploration of the CBD (ECBD), 1 had a follow-up ERCP and stone extraction and 1 was followed clinically as the stone was felt small enough to pass through the previous ES. 36/50 went to primary LC. In 35/36 OC was successful and in 2/35 the duct was clear. In 10 of the remaining 11, duct clearance was attempted laparoscopically by relaxing the sphincter pharmacologically and flushing the CBD via the OC catheter. This approach was successful in 8/10. Of the remaining 7, 3 went to open ECBD and 4 had follow-up ERCP within 42 days of LC. In 2/4 the CBD stone had passed by the time of ERCP and the remaining 2 required ES and stone extraction. CBD stones were detected on OC in 6/159 patients without pre-operative suspicion of CBD stones. In 3/6 the stones were cleared primarily at LC. 2/6 required subsequent ERCP. In 1 of these the duct was clear and the other required ES and stone extraction. 1 patient has been left to clinical follow-up.

In conclusion, it is possible to deal with CBD stones by laparoscopic techniques in over 1/3 of patients at the time of initial LC. In the remainder, CBD stones can usually be cleared by subsequent ERCP and ES, but about 1/2 will actually have passed their CBD stone by the time of follow-up ERCP. In this setting pre-operative ERCP should probably be reserved for patients with clinical jaundice or cholangitis at presentation.

1102 HEPATIC RESECTIONS FOR PRIMARY LIVER CANCER

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From 1960 to 1989, 5160 patients with liver diseases were admitted in our institute. Among them, 3760 cases were malignant tumors, most of them were primary liver cancer (97%). Among 2210 (60.6%) exploratory cases, 1102 were resectable with a 50% resection rate. There were 992 males and 110 females. Patients ages between 40-60 accounted for 90%.

Resection margin was expressed as RMO and RM when resection margin is less than cmand equal to or greater than cmm, respectively. In patients with tumorsize less than 4cm, there was statistical difference in the recurrence rate between RMO(n=12) and RM(n=5). But in patients with tumor size less than 4cm, there was significant difference between RMO(n=13) and RM(n=10).

In conclusion, when tumor size is less than 4cm in diameter, recurrence rate can be reduced with more than 1cm of resection margin, but when tumor size is 4cm or greater, the recurrence rate can not be reduced by more than 1 cm of resection margin. So when tumor size is 4 cm or greater, another therapeutic modality may be necessary.

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THE EFFECTS OF MONOCYTE DERIVED CYTOKINES ON THE PROLIFERATION OF HEPATOMA CELLS

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Monocyte derived cytokines are important in immune regulation and cell proliferation. We studied the proliferation of a hepatoma cell line, PLC/PRF/5, under the effect of seven monocyte cytokines: IL-1, 6, 8, GM-CSF, TNFα, TGF-β1, and hepatocyte growth factor (HGF). Cells were co-cultured with recombinant cytokines for 72 hrs, and then quantified by a [3H]thymidine(3H-2-y) assay, 5-bromo-2-deoxyuridine bromide assay.

Result: mean±SEM percentage proliferation compared with control (medium only). *p<0.05 by Student T test.

| Cytokine | Mean ± SEM Percentage Proliferation |
|----------|-----------------------------------|
| IL-1(100U/ml)| 1.2 ± 0.4%* |
| TNFα(2.0ng/ml)| 1.8 ± 0.6%* |
| HGF(40ng/ml)| 2.8 ± 0.3%* |
| IL-6(20ng/ml)| 3.6 ± 0.2%* |
| IL-8(10ng/ml)| 4.6 ± 0.5%* |
| GM-CSF(10ng/ml)| 5.8 ± 0.3%* |
| TGFβ1(100ng/ml)| 6.9 ± 0.7%* |
| 5-bromo-2-deoxyuridine bromide assay | 7.2 ± 0.8%* |

These data show that among the monocyte derived cytokines, IL-1 and IL-6 have stimulatory effects on hepatoma cell growth while others, especially IL-8, HGF, TNFα, and TGFβ1 are inhibitory. Viability of cells was tested by a trypan blue exclusion test and by morphological changes, that some cytokines are inhibitory to cell proliferation and are not cytotoxic. We conclude therefore that monocytes and their derived cytokines probably have a significant role in the host response to hepatoma.

F071

COMPLICATIONS AFTER LAPAROSCOPIC AND CONVENTIONAL CHOLECYSTECTOMY: A COMPARATIVE STUDY

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Since growing popularity of laparoscopic cholecystectomy (LC) makes a prospective, randomised, comparative study nearly impossible, we compared retrospectively 500 LC with 748 conventional, elective cholecystectomies (CC) for their intra- and postoperative complications.

Results: Lethality 0% for LC, 0.4% (n=3) for CC. Intraoperative complications requiring an extension of the operation: LC 0.8% (n=4): lesion of the aorta (1), the duodenum (1), the common bile duct (2). CC 5% (n=4): lesion of the duodenum (1), the common bile duct (2), the liver (1). Postoperative complications: LC 2.8% (n=14): of which 5 (19%) demanded a surgical intervention. The different complications and their therapeutic consequences will be named. Overall complication rates: LC 4.2% (n=32); CC 3.6% (n=18). This number decreasing rapidly with growing experience (OP.Nr.1-30: 13.3%; 31-70: 7.5%; 71-500: 2.7%).

Conclusion: Lethality, postoperative and overall complication rates were lower after LC. Particularly the non-specific complications and wound problems were negligible due to early mobilisation and the small incisions. Intraoperative complications and surgical interventions occurred slightly more often, but their number dropped with growing experience. The actual results will be presented.

F072

A STUDY OF POSTOPERATIVE PULMONARY FUNCTION AFTER LAPAROSCOPIC CHOLECYSTECTOMY

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A prospective evaluation study on pulmonary complications in laparoscopic cholecystectomy was performed, comparing the results obtained with those of a similar study previously performed in open cholecystectomy, following the same method.

Patients were evaluated on respiratory symptoms, preoperative Thorax X rays, forced spirometry, lung perfusion scans of the liver and lung. Preoperative and postoperative PCO2 and PO2 were also measured.

The sample consisted of 30 patients (80% of which were women). Average age was 49.57 years ± 11.88 years. Average weight: 66.8 Kg ± 14.5 Kg. Average Height: 1.60 meters ± 0.09 mts.

Ten percent of the patients had a history of asthma. None of them suffered from chronic obstructive pulmonary disease. 30% were smokers and 50% had a history of obesity.

Functional preoperative tests were normal in the 73% of the cases. 4 cases presented a restrictive pattern and 4 an obstructive pattern.

The average preoperative vital capacity was of 94.13 ± 18.23. Average preoperative FEV1: 90.43 ± 19.27. Average FEV1/VC relation was of 80.60 ± 26.99. Average FEF 25-75% was of 91.90 ± 32.86.

In 80% of the cases presenting the missing 20% slight hypoxemia. Average postoperative PCO2 was of 83.01 ± 10.17 mmHg.

In all cases postoperative PCO2 was normal being the average 70.02 ± 6.02 mmHg. Thorax X rays showed in 9 of the cases laminar atelectasis (30%) 21 of the cases (70%) presented diaphragmatic bilateral elevation. 13 cases (65%) showed increase in the bronchial mark (tram lines).

Average postoperative FVC was 72.67 ± 20.07. Average FEV1: 70.40 ± 20.37. FEV1/FVC relation was of 82.40 ± 7.27. The FEF 25-75% was of 69.49 ± 28.82.

Of all the patients evaluated 16 (that is 53%) showed a restrictive pattern.

The average postoperative PAO2 was of 79.72 ± 10.35 and average PCO2 of 37.06 ± 4.16 mmHg.

Average length of hospitalization was of 1.40 days ± 0.71 days and only 3 patients presented clinical complications (10%) such as acute bronchitis in all three cases.

The FVC variation was of -21.67 ± 20.84. FEV1 variation was -20.03 ± 21.08 and that of FEF 25-75% of 92.01 ± 33.64.

PCO2 variation was -3.01 ± 12.54 and PCOS variation of -0.04 ± 6.78 mmHg.

Conclusion: Comparing these findings with those observed in the study performed with conventional cholecystectomy we observe that with laparoscopic cholecystectomy deterioration of pulmonary function, X rays alterations, length of hospitalization period and
LAPAROSCOPIC CHOLECYSTECTOMY IN THE OBESE AND MORBIDLY OBESE PATIENT.

The expanding indications for laparoscopic biliary tract surgery prompted us to assess the appropriateness of employing this treatment modality in obese (O) 20% over ideal weight and morbidly obese patients (MO) (100 lbs over ideal body weight). Our initial concern was that obesity may constitute a contraindication to laparoscopic cholecystectomy (LC). In our McGill series of 907 LC, we have encountered 220 O and 26 MO patients. The median operative time for the O and MO was 75 & 102 min compared with 88 min for all patients. The successfully treated patients in the O and MO groups were discharged within 24 hours and returned to their usual activity in one week. Intraoperative complications which required conversion to open cholecystectomy occurred in 9% for O and 7.7% for MO patients compared to 5% overall. Reasons for conversion included bile leak (1), hypoxemia (1), CBD injury (2), arterial injury due to trocar insertion (3). Related complications included 3 wound infections, 3 significant hemorrhatons, 1 biloma, and 1 bile leak. Technical recommendations include (1) the 30° scope (2) open insertion of the trocar (3) initial port selection just above the umbilicus. Our experience supports the fact that O and MO are not contraindications to LC.

LAPAROSCOPIC CHOLECYSTECTOMY UNDER EPIDURAL ANESTHESIA – AN IDEAL COMBINATION OF MINIMAL INVASIVE SURGERY AND MINIMAL INVASIVE ANESTHESIA

Epidural anesthesia (EPA) has been reported to exert beneficial effects in surgical procedures. In this retrospective study we evaluated the outcome of EPA in pat. undergoing laparoscopic cholecystectomy (lap. CHE). Unselected 61 patients (39 female, 22 male), mean age 46.9 years (20/86), mean weight 71.7 kg (46/125) with symptomatic gallstone disease were admitted to our lap. CHE-program maintaining analgesia with EPA. Preoperative patient selection and indication for lap. CHE were unchanged.

Venlatory measurements and arterial blood gas analyses were performed preoperatively (1) in the horizontal supine position with TS-T10-level of analgesia, (2) after intraabdominal insufflation of CO₂ for pneumoperitoneum and (3) at the end of the procedure. During the procedure the patients were maintained with oxygen insufflation of 3 l/min through an anesthetic face mask. Intraoperative sedation was given if necessary.

No significant changes of minute ventilation or arterial blood gas measurements were observed. Furthermore, no intra- or postoperative either anesthetic or surgical complications occurred.

In review, our experience shows that EPA in lap. CHE is associated with almost no risk and is an acceptable anesthesiological technique even for unselected patients.

LAPAROSCOPIC CHOLECYSTECTOMY; THE BAA-R-EXPERIENCE I

New year 1991 the Universities of Buenos Aires (B) (Hospital clinicas), Rosario (R) (Clinico Britanico, Argentina and Aarhus(A)), (Aarhus Kommunehospital, Denmark introduced; laparoscopic cholecystectomy as standard treatment of cholecystolithiasis and a collaboration was established in order to evaluate its mortality and morbidity. During the first 10 months of 1991 18 surgeons (10 consultants [6.9%] and 8 chief residents [3.1%]) performed 425 (B:m=143,Aarhus=141 and R: m=150) laparoscopic cholecystectomies for symptomatic cholecystolithiasis (95 [22.3%] with chronic cholecystitis and 50 [7.1%] with moderate to severe acute cholecystitis. CBD stones were found preoperatively in 23 (5.5%) of the patients. They were removed endoscopically. Preoperative choanalgiography was performed routinely in Rosario and selectively in Buenos Aires (n=3). Aarhus (n=1). However, the number of patients with residual stones was the same in Rosario (n=3) Buenos Aires (n=1) and Aarhus (n=2). The residual stones were removed endoscopically (n=4), laparoscopically (n=1) or surgically (n=1). The mean duration of the laparoscopic operations was 72 minutes (range 30-360 min). They were performed with one death (0.2%) and a morbidity rate of 7.6% (major biliary leakage (n=4), stenosis of the CBD (n=1)): 1.0% minor (wound infections (n=1)), abdominal wall hematoma (n=7), residual common duct stones (n=6), mild subcapsular emphysema (n=4), respiratory problems (n=2), cardiovascular problems (n=2), intraabdominal abscesses (n=1). 6.6%. There was one injury to CBD (0.23%) which required reconstructive biliary surgery. Seventeen patients (4%) required conversion to open cholecystectomy because of technical difficulties. Ninety-one percent of the patients was on a regular diet the morning after surgery. The mean hospital stay was 1.6 days (range 0-14 days) and the mean time of return to full activity was 6-35 days (range 3-21 days). The study shows that laparoscopic cholecystectomy can be performed safely by the average surgeon in university hospitals and it indicates that routine cholangiography has no advantages or disadvantages compared with selective choanalgiography.

OUT-PATIENT LAPAROSCOPIC CHOLECYSTECTOMY

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Laparoscopic cholecystectomy has rapidly become the treatment of choice for patients with symptomatic gallstones. This has, in part, been due to the significant decrease in post-operative pain, hospital stay, and a rapid return to normal activities. Of our first 200 patients scheduled for laparoscopic cholecystectomy, there was a 6% rate of conversion to ‘open’, with an average post-operative stay for all patients 1.8 days. If only successful laparoscopic cholecystectomy patients are included, the post-op stay is 1.5 days. During our last 100 cases we have been treating selected patients as out-patients. To be considered for out-patient therapy patients must be highly motivated, live in or near the city and have a significant other at home to care for them. Eighteen of 21 patients selected for out-patient therapy were successfully discharged from hospital within 6 hours of surgery. None of these patients required re-admission to hospital, nor did they have any complaints regarding their early discharge. The 3 patients scheduled for out-patient laparoscopic cholecystectomy but who required admission following surgery had nausea and vomiting which precluded their early discharge. All 3 of these patients were discharged the following day. We conclude that out-patient laparoscopic cholecystectomy is a viable alternative to admission in as many as 1/5th of patients. The option is safe and acceptable in the motivated patient.
ESWL AND LAPAROSCOPIC CHOLECYSTECTOMY – AN APPROPRIATE PROCEDURE IN LARGE BARREL SHAPED GallBLADDER STONES

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Laparoscopic extraction of large barrel shaped gallbladder stones through a small paraumbilical incision can be difficult and sometimes impossible. In our surgical dept we performed ESWL (LITHOSTAR PLUS, Siemens Comp.) in 52 patients 37 female and 15 male prior to laparoscopic cholecystectomy. The single stone diameter was between 3 and 4.5 cm. 41 patients suffered from pure cholesterol, the other 11 from calcified stones. On average 3200 + 1250 shock waves with an energy level of 750 bar were applied. The ESWL treatment time ranged from 15 to 45 minutes (21 + 16 min.).

In all cases stones could be disintegrated successfully to a final fragment size of 1–12 mm. Laparoscopic cholecystectomy was carried out 1 day post ESWL routinely without problems. The gallbladder could be easily removed using a 1.5–2 cm small incision of the abdominal wall.

No complications were seen in the postoperative course and all patients were discharged on the 4th postoperative day.

HYALURONIC ACID ENHANCED 3H-5-FLUOROURACIL UPTAKE IN THE MALPERFUSED RAT LIVER

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Biological and chemical properties of hyaluronic acid (HA) qualify this macromolecule as a prospective carrier of drugs particularly for targeting to different tissues. To assess this we studied the effect of HA on tritiated 5-Fluorouracil (3H-5-Fu) uptake by acute and chronic malperfused rat liver tissue using two models:

1. Ischemia/reperfusion: Four groups of rats (A, B, C, D) were subjected to 30 minutes liver ischemia followed by a period of reperfusion. Two sham (E,F) groups served as controls. All groups received intravenous (I.V.) 3H-5-Fu at the end of reperfusion period with (A, C, E) or without (B, D, F) I.V. HA (15mg/kg). Groups C and D also underwent a "once-through" liver perfusion before liver tissue harvesting to eliminate blood factor.

| Group | A(9) | B(9) | C(6) | D(6) | E(8) | F(9) |
|-------|------|------|------|------|------|------|
| meanCPM | 42487 | 45392* | 37372 | 40790* | 45591 | 46261 |
| SEM | ±659 | ±839 | ±665 | ±328 | ±536 |

2. Liver-implanted tumor: Two groups of rats with liver-implanted rat mammary carcinoma received I.V. 3H-5-Fu alone or combined with I.V. HA. Liver (LVR) and tumor (TMR) tissues were processed for radioactivity counting.

| Tissue | TMR(9) | TMR(HA) | LVR(9) | LVR(HA)(9) |
|--------|-------|---------|-------|-----------|
| meanCPM | 314 | 461* | 1979 | 2237* |
| SEM | ±25 | ±61 | ±133 | ±122 |

In the results, *means P<0.05 by ANOVA-1, vs. untreated groups

Conclusions: The exogenous HA may preferentially target depleted tissue and therefore enhance drug delivery to such tissue.

THE EFFECT ON LIVER METASTASES OF CIRCADIAN PATTERNING OF CONTINUOUS HEPATIC ARTERY INFUSION (CHAI) OF FUDR

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Previous studies have shown that using a circadian patterned CHAI of FUDR has lowered the toxicity of the infusion and allowed for higher doses of FUDR to be given. The question of whether this decrease in toxicity is accompanied by an increase in antitumor efficacy has not been demonstrated. A hepatic artery catheter was placed in 18 Fisher Rats 10 days after an adenocarcinoma had been implanted subcapsularly in the liver. Nine animals received a constant CHAI of FUDR at a dose of 10mg/kg/d for 14 days. Another 9 animals received a circadian timed CHAI of 15mg/kg/d of FUDR. In this pattern 67% of drug was delivered between 3pm and 9pm each day. Four of the rats on the constant schedule died of toxicity from the infusion. All of the animals with the constant infusions had a decrease in the tumor volume from 87 to 100%. In the animals given circadian cycled continuous FUDR too died of toxicity. One had an increase in tumor size while the rest had a decrease in size from 94 to 99%. There was no significant difference in the response rates in the two groups. This study shows that with circadian timing more drug can be delivered with lower toxicity and have an equal anti-tumor efficacy to constant CHAI.

REPEATED TRANSIENT DEARTERIALIZATION OF A LIVER TUMOUR IN THE RAT

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This experiment was designed to elucidate the optimum period of repeated dearterialization of liver tumours without giving rise to collaterals. Repeated dearterializations were achieved with a minioocluder implanted around the hepatic artery. Forty rats assigned to receive intermittent dearterialization for 0 (sham operation), 30, 60, 120 and 180 minutes respectively (A-E n=8 each) and compared to permanent dearterialization (F n=6). The tumour size was measured before and after 5 days of daily dearterializations. Another 18 rats were allocated to repeated transient dearterializations for 2 hours/day prolonged to 18 days (G), control (H) and permanent dearterialization (I) (n=6 each).

Results: The tumour growth was almost totally retarded in groups D, E and F after 5 days of dearterialization and highly significantly less compared to group A, B and C (p<0.01). The growth rate was modestly retarded in group C compared to groups A and B (p<0.05). After 18 days of dearterialization the tumours resumed to grow though the growth rate in group G was still much less compared to groups H and I (p<0.05). No collaterals could be demonstrated in D and minor collaterals in F in contrast to fully developed collaterals in F and I.

Conclusion: The optimum period of arterial blockade retarding this liver tumour without giving rise to collaterals is between 2 and 3 hours.
F081

WATER-JET-COOLED Nd: YAG LASER COAGULATION OF RAT LIVER METASTASES: SELECTIVE TUMOR DESTRUCTION

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We investigated the use of laser in treating hepatic metastases from colon cancer. A syngeneic colon carcinoma CC531 was implanted in the liver of 68 Wag/Rij rats; 20 days after inoculation, when the tumor diameter was about 5 mm, laser therapy was performed with a water-jet-cooled Nd: YAG laser at energies of either 600 J, 850 J, 1,200 J, 1,700 J or 2,400 J and a power setting of either 10 or 20 W. Liver damage was determined on the basis of histological sections taken on day 1 after treatment using a computer integrated image analyzer and serum AST/ALT levels measured on day 1 and 2. To assess liver function an antipyrine clearance test was performed on day 2 after treatment. Sections of day 36 were used to evaluate tumor remission. Light microscopy on day 1 showed coagulative necrosis up to 10 mm in diameter. Multiple regression analysis of the parameters used indicated a significant relationship between laser energy and liver damage ($R^2=0.05, P=0.01$). At 20 W liver damage was 22% larger than at 10 W. Tumor destruction also increased with energy applied, resulting in complete tumor destruction at 2,400 J, whereas massive tumor outgrowth occurred in control animals. No deterioration in liver function was found as measured by antipyrine clearance. The results of this study show the ability of the water-jet-cooled Nd: YAG laser to produce selective tumor necrosis with minimal liver damage. Treatment of several superficial tumors at different liver lobes would be possible, thus reducing surgical trauma and diminishing complications like bleeding and liver failure.

F082

COLORECTAL LIVER METASTASIS (LM): EXTRAHEPATIC DISEASE, FOUR OR MORE LM, AND CLEAR MARGIN SMALLER THAN 1 CM ARE NOT AUTOMATIC CONTRAINDICATIONS TO LIVER RESECTION (LR)

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AIM: TO retrospectively study the prognostic value of the 3 criteria commonly recommended as contraindication to LR during the last ten years: extrahepatic disease, 4 or more LM, and clear margin smaller than 1 cm.

Patients (pts): 85 pts with 2 years minimal follow-up had LR for LM; 20 had intrabdominal or pulmonary extrahepatic disease (also resected), 16 had 4 or more independent LM 17 had clear margin equal zero, 24 between 0 and 5 mm and 15 between 5 and 10 mm. One post-operative death occurred (1.2%).

Results: crude and disease free survivals were similar for these pts and for the pts with classical good prognostic criteria. Actuarial 2, 3, 4, and 5 year crude survival was 77%, 63%, 45% and 28% respectively; disease free survival was 76%, 51%, 31% and 17% respectively for each group of pts.

Conclusion: these 3 classical contraindications to LR have no real value. Prognostic determinants of LR for LM from colorectal cancers always appear very vague in the literature and should be studied in an extensive multicentric prospective study without exclusion criteria.

F083

ISOLATED LIVER PERFUSION WITH MITOMYCIN-C IN PATIENTS WITH HEPATIC METASTASES.

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Nine patients with irresectable colorectal hepatic metastases (percent hepatic replacement 25-75%) were subjected to new method of Isolated Liver Perfusion (ILP).

Procedure: Surgical isolation and subsequently perfusion of the liver coupled to an extracorporeal circuit during h.20 rain. with MMC (dose 30 mg/m²).

Results: All patients survived the procedure. One patient died after 40 days following the operation due to Veno-occlusive Disease (VOD). Two other patients developed this syndrome, and needed a peritoneal-venous shunt. The liver function tests LDH, SGOT, SGPT and bilirubin increased significantly after ILP but all returned to normal within one week.

Responses: One patient had an objective complete response on CT scan (alive NED > 9 mo.), and seven of eight evaluable patients had an objective partial response (4 alive > 10-16 mo.)

Conclusion: ILP was well tolerated by the patients. ILP with MMC induced significant toxicity and resulted in objective tumor regression in 7 of 8 evaluable patients, including one complete response.

F084

CONTINUOUS SIMULTANEOUS INTRAARTERIAL (IA) AND INTRAVENOUS (IV) THERAPY OF LIVER METASTASES OF COLORECTAL CARCINOMA. RESULTS OF A PROSPECTIVE RANDOMIZED TRIAL.

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From 1982 to 1990 276 patients (pts.) with hepatic metastases of colorectal carcinoma were admitted in our clinic. 159 pts. did not get a treatment. Further 91 pts. were treated regionally and the remaining 26 pts. underwent a surgical resection of the metastases. Since pts. died under IA chemotherapy of extrahepatic spread of the metastases, we started a randomized controlled trial to compare the efficacy of IA to continuous simultaneous IA and IV chemotherapy of liver metastases. The first 20 pts. were treated only IA (pilot group PG). The other 71 pts. were stratified by primary tumor stage and the percentage of liver involvement and were then randomly assigned before surgery to receive either IA (IA group n=34 pts.) or IA and IV therapy (IA/IV group n=57 pts.).

Intervention: 14 days continuous infusion of FUdR each month (0.2 mg/kg/day in all IA treated pts. and 0.3 mg/kg/day in the IA and IV group; infusion pump no. 400, dual).

Results: The complete and partial response rate was 59%, 57% and 50% in the IA, IA/IV and PG respectively. 79% of the IA group, 75% of the PG and 51% of the IA/IV group developed extrahepatic disease in a median follow-up time of 24 m (p<0.01). Hepatic and systemic toxicity in the IA and IA/IV group were acceptable. No significant difference in survival was found between the IA and IA/IV groups (p=0.09). The difference in extrahepatic disease free survival was between the two randomized groups significant p<0.01.
IDENTIFYING PATIENTS WITH CHOLELITHIASIS UNLIKELY TO BENEFIT FROM SURGERY

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There is a 34% incidence of post cholecystectomy pain. This study was undertaken to identify those patients with cholelithiasis unlikely to benefit from surgery. Patients with gallstones who were referred to a general surgical clinic were studied. A single investigator using a detailed questionnaire and an objective biliary symptom scoring system completed an objective and a subjective assessment of these patients. All patients also underwent cholecystokinin octapeptide cholecintigraphy (OP-CCK-Scan). Patients were reviewed after six months (non-operative group) or six months post-cholecystectomy.

Results: 34 cases were included in the study. Following objective and subjective symptom assessment these patients were then categorised. The association between subjective and objective scores was almost linear with a Cramer coefficient of 0.93. 17 patients were classified as having definite biliary pain. All of these underwent surgery and all were significantly improved at mean follow-up of nine months. 70% of these group had an abnormal OP-CCK Scan. In these patients classified as having possible biliary pain 37% had an abnormal OP-CCK Scan. Most of these patients were managed non-operatively and 50% had improved at six month review, although none were cured. Six patients were classified as having non-biliary pain, 30% of these had abnormal OP-CCK-Scans. All but one of these patients was managed non-operatively, though this group did not improve with time. Finally, in a group of asymptomatic controls with gallstones all patients had normal OP-CCK Scans.

Conclusions: The use of a biliary symptom questionnaire whether objectively or subjectively scored results in accurate categorisation of patients into a group unlikely to have post cholecystectomy symptoms and two other groups in which post cholecystectomy symptoms are more probable. In these patients with definite biliary pain the OP-CCK Scoring trend to support the clinical categorisation of patients but appear to offer no additional benefit in terms of outcome prediction. Those patients with possible biliary pain are more likely to have a normal OP-CCK Scan. It is in this group of patients that cholecystokinin octapeptide cholecintigraphy may help identify those patients more likely to suffer from the post-cholecystectomy syndrome.

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INCIDENCE OF HELOBACTER PYLORI (HP) IN PATIENTS WITH SYMPTOMATIC CHOLECYSTOLITHIASIS

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The incidence of HP colonisation in the antrum of the stomach in patients with symptomatic cholecystolithiasis was determined (n=117, m:f = 1:2.25, median age 53 years, range 21-86 years) in preparation for a prospective study. The results were compared to a control group of healthy patients with the exact same age and sex distribution.

Material and Methods: The HP status was determined using positive microbiological proof and/or the 13 C-urea-breath test. In addition, 51 surgical gallbladders were examined for the presence of HP. In 51 patients, a follow-up clinical examination and laboratory status was performed 7 months after the cholecystectomy and the post-operative course analysed with respect to any complaints reported.

Results: 1. HP was found in 54 (46.2%) of 117 patients with cholecystolithiasis, whereas HP was only found in 27 (24.4%) of the control group (p<0.05). 2. No evidence for HP could be found in preparations of the gallbladders removed. 3.) 25.5% of the 51 cholecystectomy patients examined post-operatively complained of mild yet disturbing symptoms where no evidence of a biliary origin of these complaints could be found. No association between HP status and the post-operative course could be elicited in the small patient collective.

Routine preoperative upper gastrointestinal endoscopy (UGE) in patients with documented and symptomatic gallstone disease is carried out before cholecystectomy. Of 1100 patients, who had consecutive cholecystectomies performed, 250 had gastrointestinal disease, discovered at endoscopy. Only 5 of those had an associated gastrointestinal operation at the time of cholecystectomy. Mainly, upper gastrointestinal disease was treated conservatively, 50% of the cases had delayed cholecystectomy due to the diagnosis of ulcers. Four unexpected cancers of the stomach (T1S and T1) were found. 11 patients were ruled out of alternative treatment such as extracorporeal shock-wave lithotripsy (ESWL).

Despite the current trend toward critical analysis of costs of medical care, we believe in the clinical value of routine UGE before cholecystectomy or ESWL, complemented by indicated endoscopic retrograde cholangiopancreatography.
LONG TERM (10 YEARS) FOLLOW-UP OF CONVENTIONAL
CHOLECYSTECTOMY

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INTRODUCTION: Long term follow-up of different (new) treatment modalities for gallstone disease (with or without removal of the gallbladder) is limited. However stone recurrence, biliary and postcholecystectomy symptoms should also be evaluated to select the optimal procedure. Therefore, long term follow-up of conventional cholecystectomy (the gold standard) was studied with emphasis for postcholecystectomy symptoms. PATIENTS AND METHODS: 351 patients (263 female and 88 male) underwent a conventional cholecystectomy more than 10 years ago. Follow-up was obtained, (using questionnaires) in 93% and bloodsamples of symptomatic patients alive in 69%.

RESULTS: The operative mortality was 0.3%, the procedure related morbidity 5% and follow-up was obtained in 325 patients of whom 82% were symptom free. Overall, 60 patients (18%) had complaints after 10 years and stone recurrence had been found in 5 patients (1.5%). Ten other patients (3%) had biliary tract related complaints although bloodsamples revealed no abnormalities. Additionally, 45 patients were found to have atypical symptoms at the time of follow-up.

CONCLUSION: Ten years after surgery, conventional cholecystectomy showed to cure 82% of the patients. Five % had biliary tract related complaints although bloodsamples revealed no abnormalities. Additionally, 45 patients were found to have atypical symptoms in the time of follow-up.

We performed an experimental study to see whether a high-carbohydrate (CHO) diet induces pigment stone formation in hamster. In addition, we studied the effect of biliary tract infection induced by portal bacteremia on this high-CHO diet induced stone formation. Ninety male hamsters were divided into 3 groups (Group 1: control chow fed group, Group 2: high-CHO fed group, Group 3: high-CHO fed plus portal bacteremia group). The high-CHO diet was 65% CHO (43% in control chow), mainly composed of rice, and portal bacteremia was induced by injection of endogenous E. coli into the portal vein. The hamsters were sacrificed after 12 weeks of feeding. The stones were analyzed by infrared spectrophotometry and the hepatic bile was analyzed by using commercial Kit. No stones were found in Group 1 but black-colored stones were found in 24 out of 30 animals in Group 2 (p<0.0001 vs Group 1). In Group 3, 12 animals survived and all of them developed stones. There was no significant difference between Group 2 and 3 in stone formation. The stone composition was similar to that of human calculus bilirubinate stones. In hepatic bile analysis, the phospholipid and total bile acid level in group 2 were higher than those of Group 1 (p<0.05). In conclusion a high-CHO diet is a possible important etiologic factor of gallstone formation, especially calculus bilirubinate stones. In addition an increased level of phospholipid and total bile acid in hepatic bile may contribute to high-CHO diet induced gallstone formation.

EFFECT OF CARBOHYDRATE-RICH DIET AND PORTAL BACTEREMIA ON PIGMENT STONE FORMATION AND BILE COMPOSITION IN HAMSTER

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Since free radical signal in pigment gallstones (PS) appears in vivo, the role of superoxide free radical (SORF) in the formation of PS was explored in this study. In S group, a stricture at the common bile duct (CBD) of guinea pigs were created by ligation. In +V group, 16mg/kg of Vit.E and C were injected daily since 3 days before CBD ligation. In C group, only laparatomy was performed as control. One week after operation, the incidence (INC) of PS, total bilirubin (TB), indirect reactive bilirubin (UCB), ionized calcium (ICa) contents, and SORF scavenge rate (SR) of gallbladder bile were measured and listed below. When the UCB and ICa contents increased and SR decreased, the INC elevated (S vs C). Once the SR recovered, even the UCB and ICa remained high, the INC was supressed (S+V vs S).

| C group       | Mean ± SD | S group       | Mean ± SD | S+V group    | Mean±SD |
|---------------|-----------|---------------|-----------|--------------|---------|
| INC           | 0/15      | 14/16         | 5/14      |
| TB (µM)       | 13.7 ± 8.1| 40.8 ± 30.3   | 13    | 69.2 ± 40.3 |
| UCB (µM)      | 5.2 ± 3.4 | 12.6 ± 8.9    | 13    | 16.9 ± 11.5 |
| ICa (µM)      | 281 ± 113 | 765 ± 441     | 14    | 720 ± 304   |
| SR            | 9.48 ± 0.48| 683 ± 311     | 14    | 921 ± 0.82  |

(♂: S vs C, S+V vs S, Chi-square (INC) or t-test, p<0.05)

CONCLUSION: the presence of superoxide free radical was essential in pigment gallstone formation. (*Supported by National Natural Science Foundation of China)
F093

CALCIUM SALTS OF FATTY ACIDS IN GALLSTONES. ARE THEY MARKERS OF BILE INFECTION BY E.COLI?
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A content of calcium salts of fatty acids, mainly consisting of calcium palmitate (CP) greater than 10% of stone dry weight was found in 79 of 960 consecutive patients with gallstones, who underwent surgery. In these patients stones were homogeneously brown pigment stones in 48 cases, black and brown in 9 and cholesterol or mixed stones in 2 cases. In the other 19 cases CP was found in the brown periphery of composite stones or in same brown stones, associated with mixed or cholesterol stones in the same site. Bile infection by E.coli was associated with both brown pigment and calcium palmitate containing stones. In particular E.coli overgrowth was found in 100% of brown pigment stones in the common duct, all with considerable CP content and in 98% of brown gallbladder stones.

It is suggested that: 1) Stones with a CP content greater than 10-15% are associated and usually determined by bile infection. These stones are mainly brown pigment (97.4%, 75 of 77) and are mainly found in the common duct postcholecystectomy. 2) Not the simple bacterial overgrowth is associated with bile contamination and in 51.3% of stones patients with hepatocellular carcinoma (HCC) and 8 patients with cholangiocarcinoma (CCA). Patients received one or two doses of 131I-Lipiodol via hepatic arterial injection. The mean total administered activity was 953(SD 477) MBq in HCC and 723(SD 559) MBq in CCA. One patient with CCA retained 131I-Lipiodol. The cumulative radioactive dose was 9.6 Gy to tumour, 6.4 Gy to liver and 1.5 Gy to lung. The patient remains asymptomatic 30 months from the start of treatment, whereas the remainning 7 patients have exhibited tumour progression. The mean survival in CCA was 11.6 (SD 14.5) months. All 15 patients with HCC retained 131I with tumour/liver ratios of up to 30:1. The mean cumulative radiation dose was 34 (SD 32) Gy to tumour, 3.5 (SD 1.4) Gy to liver and 4.7 (SD 2.1) Gy to lung. The mean dose per administered activity was 3.8 (SD 4.3) cGy/MBq. Partial response (reduction in tumour size > 50%) was observed in 6 patients (40%). The mean survival was 8.3 (SD 8.6) months.

131I-Lipiodol can deliver highly selective internal irradiation to foci of HCC with evidence of objective response and may be the treatment of choice for patients with cirrhosis and a small tumour.

F094

GALLBLADDER MOTILITY DETERMINED BY INFUSION CHOLESCINTIGRAPHY BEFORE AND AFTER TOTAL GASTRECTOMY
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The aim of this study was to determine gallbladder (GB) motility in patients before and after total gastrectomy and to compare the mobility pattern to a stimulated and nonstimulated control group. Infusion cholecystography was performed with the patient supine using a ROTA scintillation camera connected to a MicroDelta computer system. Data acquisition was performed during a 3 hour period of 4ml99m-Tc-EHIDA continuous infusion, preceded by a bolus injection with increased concentration. Stimulation was done by drinking fresh eggyolk. There were 12 pts. in the control (C) group without stimulation, 10 pts. on the control group with stimulation (CS) and 5 pts. before total gastrectomy (BTG) and the same 5 pts. after total gastrectomy (ATO).

Gallbladder filling (GBF) in group C lasted 75.5 +/- 20.5 min., and gallbladder emptying (GBE) lasted 58.8 +/- 28.0 min. The ascending-descending TA curve ratio, determined as slope ratio was X=1.26+/-0.9 (integral X=2.22+/-1.1. Mean ejection fraction (EF) was 42.1% +/- 7.2 (SE=2.1). In the CS group BF filling lasted 66.3 +/- 27.0 min and GBE 35.1 +/- 12.1 min. The ascending-descending TA curve ratio was 0.81 +/- 0.6 (integral 3.1 +/- 1.6. The mean EF was 77.5 +/- 19.2%. In the BTG group GBF lasted 62.5 +/- 27.6 min, GBE 41.5 +/- 29.0 Min. The ascending-descending TA curve ratio was 0.99 +/- 0.6 (integral 3.93 +/- 2.8. The mean EF was 89.5 +/- 8.4%. In the ATG group GBF lasted 77.2 +/- 15.1 min. GBE 16.7 +/- 6.8 min, the ascending/descending TA curve ratio was 1.72 +/- 1.1 (integral 1.9 +/- 0.9). The mean EF was 90.0 +/- 0.4. All stimulated patients had a shorter GBE time (p) in comparison to the nonstimulated group. The short GBE time in the ATG group (p) can be explained by an very low EF (p).

Our results demonstrate clearly that after TG the GB has impaired emptying which is not significantly influenced by oral stimulation which might contribute to gallstone formation.

F095

131I-LIPIODOL TARGETED INTRAHEPATIC IRRADIATION OF PRIMARY LIVER TUMOURS
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The therapeutic potential of 131I-Lipiodol was investigated in 15 patients with hepatocellular carcinoma (HCC) and 8 patients with cholangiocarcinoma (CCA). Patientes received one or two doses of 131I-Lipiodol via hepatic arterial injection. The mean total administered activity was 953 (SD 477) MBq in HCC and 723 (SD 559) MBq in CCA. One patient with CCA retained 131I-Lipiodol. The cumulative radiative dose was 9.6 Gy to tumour, 6.4 Gy to liver and 1.5 Gy to lung. The patient remains asymptomatic 30 months from the start of treatment, whereas the remaining 7 patients have exhibited tumour progression. The mean survival in CCA was 11.6 (SD 14.5) months. All 15 patients with HCC retained 131I with tumour/liver ratios of up to 30:1. The mean cumulative radiation dose was 34 (SD 32) Gy to tumour, 3.5 (SD 1.4) Gy to liver and 4.7 (SD 2.1) Gy to lung. The mean dose per administered activity was 3.8 (SD 4.3) cGy/MBq. Partial response (reduction in tumour size > 50%) was observed in 6 patients (40%). The mean survival was 8.3 (SD 8.6) months.

131I-Lipiodol can deliver highly selective internal irradiation to foci of HCC with evidence of objective response and may be the treatment of choice for patients with cirrhosis and a small tumour.

F096

REPEATED INTERMITTENT DEARTERIALIZATION IN THE TREATMENT OF LIVER TUMOURS
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Hepatic artery ligation or dearterialization may result in objective tumour regression but fails to provide prolonged disease control partly due to the promptness with which collaterals develop after permanent interruption, whether it comes from embolization or surgery. By performing intermittent blockade of the hepatic arterial circulation, formation of collaterals is reduced. Repeated intermittent dearterialization of short duration has been accomplished with the use of an implantable occluder accommodated around the hepatic artery.

Different occlusion periods have been investigated for development of collaterals and the effect on liver tumours have also been evaluated. Collaterals seem not to develop if occlusions are performed for less than 2 hours each day (primary and secondary cancers) or 16 hours every second month (liver carcinoid). Occlusions have been continued for 1-17 months (1-2 hours daily) and for more than 5 years in patients with liver carcinoid (16 hours). Nineteen patients have been treated according to this protocol (2 hepatocellular (HCC), 11 colorectal, 6 liver carcinoid). Both patients with HCC responded and have had a sustained complete remission for 4 years. All patients with carcinoid metastases had symptomatic relief and responded with either reduction of measurable disease (3) or with reduction of urinary 5-HIAA (4) or both (3). In patients with liver metastases from colorectal cancer, who also received cyclic intraperitoneal infusion of 5-Fu, the effect was more variable with a crude response rate of 28%. Median survival was 17 months (range 2-23) for all patients, and seemed to be comparable to intrahepatic infusion but with much less toxicity.

An implantable occluder greatly facilitated the performance of repeated and transient occlusions and a complete arrest of the flow through the hepatic artery was generally achieved. Patient acceptance has been excellent and many of them have performed the occlusions by themselves. Continued occlusions have been possible for an extended period of time and complications and toxicity have been few. Liver carcinoid (prolonged relief of symptoms and disease control) and HCC (especially with a concurrent cirrhosis) seems to be well suited for this treatment. Some patients with liver secondaries from colorectal cancer (vascular tumours) may have a beneficial palliation in combination with intrahepatic chemotherapy.
F097

SELECTIVE INTERNAL RADIATION THERAPY FOR TREATMENT OF INOPERABLE HEPATOCELLULAR CARCINOMA (HCC)

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Eight patients with histologically proven, alpha-fetoprotein (AFP) >20ng/l, inoperable HCC were treated with either intra-arterial Yttrium-90 microsphere (Y-90) or Lipiodol-lodine (Lip-I\textsubscript{131}). Five had Y-90 and 3 had Lip-I\textsubscript{131} treatment. Y-90 resin based microspheres have radioactive Y\textsuperscript{90} attached to the matrix which measure 29 to 35 microns. Y-90 emits high energy electron (2.3 MeV) which has a half life of 64.2 hours. During laparotomy, cholecystectomy and insertion of a Port-A-Catheter into the gastrohepatic artery were done and Y-90 were injected into the common hepatic artery through the catheter. We had given various doses ranging from 2 GBq to 3GBq depending on the relative uptake of the tumour and normal liver which were measured intra-operatively by a beta probe and counter. All five patients had tumour regression and decrease of AFP to less than 20% of pre-treatment level. The average duration of hospitalization was 2 weeks. There was no side effects with respect to the internal radiation. The median survival of the five patients was 6 months from time of diagnosis. Three patients who had inoperable HCC diagnosed intra-operatively was offered Lip-I\textsubscript{131} treatment. Lip-I\textsubscript{131} is made by converting the iodin moiety of Lipiodol to I\textsubscript{131} through an atom-atom exchange method. Cholecystectomy and insertion of a Port-A-Catheter were done in the usual way and on post-op days 12, 16, 20, 3 fractionated dose of Lip-I\textsubscript{131} were given by injection into the arterial port. The total dose ranged from 50 to 100mCi of I\textsubscript{131}. Dosimetry was documented with serial gammascans. Tumour regression and decrease of AFP level to less than 10% of pre-treatment level were again observed in 2 patients who had completed the course of treatment. The first patient survived 13 months from time of diagnosis and the other two are still surviving at 4 and 5 months respectively. Again, the treatment was relatively free of side effects and the duration of hospitalization was 3 weeks on average. In conclusion, selective internal radiation therapy is a feasible and effective treatment for inoperable hepatocellular carcinoma.

F098

EXPERIENCE WITH LIVER RESECTION FOLLOWING HEPATIC ARTERIAL CHEMO-EMBOLIZATION FOR HEPATOCELLULAR CARCINOMA

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Thirty patients with huge primary liver cancers underwent percutaneous transcatheter hepatic arterial chemotherapy and embolization (THACE). The tumors were significant regression after THACE, converted them into resectable lesions, and successfully resected them afterwards. Patients received 1-5 treatment of THACE before surgery. The tumor diameters reduced by 31.6±15.2% (2.3±1.2cm). Tumor necrotic area ranged from 40-100%. Adhesions of the tumor to the surrounding tissues were the main operative findings but they do not significantly complicate the surgery. In 5 cases there was 100% tumor necrosis. In 7 patients, their AFP levels decreased to normal after THACE but of these, 5 still harbored cancer cells in the resected specimen. Hence, resection of the tumor is needed. The 1-, 2-, and 3-year survival rates were 88.89%, 77.03% and 77.3% respectively. This mode of treatment appears promising for patients with advanced or initially considered as a huge unresectable liver cancer.

F099

HEPATIC CRYOSURGERY IN THE TREATMENT OF PRIMARY LIVER CANCER

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Cryosurgery with liquid nitrogen (-196°C) was performed on 87 patients with pathologically proven primary liver cancer (PLC) from November 1973 - June 1991. Of them, subclinical stage amounted to 31.0% (27/87), moderate stage 59.8% (52/87), and late stage 9.2% (8/87). There were 30 cases with small PLC (<5cm). Liver cirrhosis was observed in 83.9% (73/87). Cryosurgery for PLC was mainly indicated for (1) patients associated with severe liver cirrhosis in whom hepatic resection would be contraindicated; (2) residual tumor at the cut surface or in the rest of liver after the main tumor resection; and (3) unresectable recurrent PLC after major hepatic resection. The liver was exposed by laparotomy. Flat surface cryoprobes were used to treat surface lesions. Single and multiple trocar cryoprobes were used for freezing tumors deep within the hepatic parenchyma. Intraoperative ultrasound was used to monitor hepatic cryolesions. The 1-year, 3-year, and 5-year survival rates were 60.5%, 32.0%, and 20.2%, respectively, for the whole series. Among the 30 patients with tumor nodules ≤5cm in diameter, the 1-year, 3-year, and 5-year survival rates were 92.6%, 66.6%, and 50.8%, respectively. There were no operative mortality and complications, such as rupture of tumor, delayed bleeding, bile leakage or abdominal infection. There results indicate that hepatic cryosurgery is a safe and effective treatment for unresectable PLC.

F100

PERCUTANEOUS CHOLECYSTOSTOMY IN THE TREATMENT OF ACUTE CHOLECYSTITIS IN HIGH RISK PATIENTS

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Cholecystectomy is the treatment for acute cholecystitis, but in patients with sepsis and risk factors, such as age over 65 and other pathological conditions, operative mortality can reach up to 20%. PATIENTS AND METHODS. From June 1868 to December 1990, 32 percutaneous transhepatic cholecystostomy (6-8F) have been carried out in these high risk elderly patients. Emergency drainage (within 24h.) because of septic shock was performed in 20 (62.5%) and delayed in 12 (37.5%) due to failure of conservative treatment. Average age was 76.03 y. Risk factors other than age appeared in all but one patient (87 y.).

RESULTS. Average lengths of drainage were 16.85 d. Complications related to the technique appeared in two cases (6.2%) of pericholecystic hematoma; three tube dislodgement (9.3%) and one catheter obstruction. Four tubes were relocated. Correlation between bile and blood cultures was highly significant (95.6%), E. Coli being the organism most frequently isolated (56.2%). Mortality was 6.2% (two cases) and non related to the procedure. Nineteen patients (59.4%) underwent delayed cholecystectomy. In these cases, morbidity was 5.2% and operative mortality was null. The eleven remaining patients refused or were not considered suitable for further surgery.

CONCLUSION. Percutaneous cholecystostomy can be an alternative procedure in the management in high risk patients with acute cholecystitis and sepsis because its morbidity and mortality can be favorable compared to emergency operations in such circumstances.
F101

SINGLE-DOSE CEFUROXIME VERSUS MULTIPLE-DOSE CEFAZOLIN FOR PROPHYLAXIS IN HIGH RISK CHOLECYSTECTOMY

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The efficacy and safety of single-dose cefuroxime and multiple-dose cefazolin for surgical prophylaxis were compared in 295 patients undergoing biliary surgery in a prospective, double-blind, randomized, parallel-group study. Patients had at least one of the following risk factors: obesity, diabetes mellitus, acute cholecystitis, jaundice, hyperamylasemia; or they were ≥ 60 years old; or imaging evidence suggested the need for surgery. Patients received either cefuroxime 1.5 g and then placebo every 6 hours or they were ≥ 60 years old; or imaging evidence suggested the need for surgery. Of the bacteriologically-evaluable patients, 105 of 110 (95%) cefazolin-treated patients were assessed daily while hospitalized and again within 30 days of surgery. Of the clinically-evaluable patients, no signs or symptoms of systemic or wound site infections were noted in 107 of 116 (95%) cefuroxime and 111 of 117 (95%) cefazolin-treated patients (P = 0.416, Mantel-Haenszel test). Of the bacteriologically-evaluable patients, 105 of 110 (95%) cefuroxime- and 110 of 112 (98%) cefazolin-treated patients were classified as bacteriologically successes (P = 0.248, Mantel-Haenszel test). Both drugs were well tolerated. We conclude that single-dose cefuroxime and multiple-dose cefazolin are equally effective for surgical prophylaxis in patients with risk factors for infection undergoing elective cholecystectomy.

F102

MRI DIAGNOSIS OF CHOLECYSTITIS

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The utility of MRI in the diagnosis of cholecystitis was evaluated in 31 individuals (5 healthy, 13 with acute cholecystitis, and 13 with chronic cholecystitis). In the healthy volunteers the MRI scans were performed after an overnight fast for 12-14 hours, 2 hours after breakfast, 4 hours after lunch and 3 hours after supper. In all the patients MRI scans were performed randomly. Imaging was performed in all cases with the 0.5T RESONA unit. Spin-echo sequences were used. On the T1-weighted image (TR/TE=500/20, 620/25), T2-weighted image (TR/TE=1800/80, 2000/100), and proton-weighted image (TR/TE=1800/20, 2000/30) the liver/bile signal intensity contrast was significantly higher in acute cholecystitis than it was in chronic cholecystitis or in normal volunteers. There was no overlap in the 95% confidence intervals between acute cholecystitis and chronic cholecystitis or normal gallbladder on T1- and T2-weighted images. So in the clinical setting of acute cholecystitis the levels of 2.1 or more of the liver bile contrast on the T1-weighted image and 0.384 or more on T2-weighted image can be used as diagnostic criterion for acute cholecystitis. The concentration of total protein, total bilirubin, cholesterol and fatty acid in bile in acute cholecystitis was significantly lower than that in chronic cholecystitis, which may be the cause of the high liver bile signal intensity contrast in acute cholecystitis on all the MRI sequences. In acute cholecystitis there are some morphologic features known to be specific for the diagnosis of acute cholecystitis by CT and sonography that can also be detected by MRI: dilatation of the gallbladder, thickening of the gallbladder wall, wall and pericholecystic effusion and loss of wall sharpness. The MRI appearance of hemorrhagic cholecystitis was specific. On T1-weighted and proton weighted images in the gallbladder there is an irregular hyperintense area, and on the T2-weighted image the irregular area was hypointense in its center and hyperintense in its periphery relative to the bile.

F103

ROLE OF KUPFFER CELLS IN HOST DEFENSE - TNF & IL-6 PRODUCTION IN SEPSIS

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Liver, down stream from the gastrointestinal tracts, makes it the first line of defense. Hepatic Kupffer cells (KC) comprise 70% of the tissue-fixed macrophages. In sepsis KC become activated and produce a myriad of cytokines which can impact both locally on adjacent hepatocytes and systematically on distant target tissues. This study is designed to investigate production of tumor necrosis factor (TNF) and interleukin-6 (IL-6) in relevancetotheroleliverplaysinsepsis. Sepsis were produced by cecal perforation and perforation (CLP). At 5hr and 15hrafter CLP, AMproduced the highest TNF activity (54.69+8.16) as compared to PM (74.96+6.68) and AM (44.26+5.44). At 15hrafter CLP, KC<peritonealmacrophage (PM), and alveolarmacrophage (AM) were modulated of hepatocytefunctioninacutephaseresponse. When hepatic KC fail to clear endotoxins in the circulation, it may spillover to the lungs and induce pulmonary injury by TNF production.

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CHOLECYSTECTOMY CAUSES ARISE IN MEMBRANE SATURATION

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The effect of surgical trauma on the saturation of membrane fatty acids (FA) was investigated.

Red cell phospholipid FA were measured perioperatively by gas chromatography, in 16 cholecystectomy patients (3M:13F; mean age 57). Results (molar%, median(IQR)) show saturated FA (SFA), monounsaturated FA (MUFA), n-6 polyunsaturated FA (PUFA) & n-3 PUFA. Statistics by Wilcoxon test comparing with preoperative:

|                | PRE OP | DAY 1     | DAY 2     | DAY 4     |
|----------------|--------|-----------|-----------|-----------|
| SFA            | 41.4   | 48.7      | 52.1*     | 48.8      |
|                | (34.6-49.1) | (36.9-54.6) | (39.3-56.4) | (36.5-55.9) |
| MUFA           | 20.5   | 24.5*     | 27.1*     | 22.6      |
|                | (17.5-25.0) | (19.6-27.2) | (18.3-28.1) | (17.5-28.6) |
| n-6            | 28.2   | 23.7      | 16.2*     | 18.3      |
|                | (19.4-35.1) | (17.1-32.1) | (13.2-33.9) | (13.0-33.2) |
| n-3            | 6.6    | 2.6       | 1.0**     | 3.1       |
|                | (2.7-12.3) | (1.5-9.5)  | (0.0-8.1)  | (0.9-10.9)  |

* This study shows significant changes in the saturation of membrane FA after surgical trauma. Such changes affect cellular function and if reflected in other cells, may explain some of the changes in cellular function that are known to occur during trauma. They may open up new modes of perioperative therapy.
Since SMS results in a sustained decrease in portal pressure, we have examined its efficacy as an adjuvant to injection sclerotherapy (IS) in the long term management of portal hypertension. Three weeks after their first variceal bleed, 22 cirrhotic patients underwent a thorough investigation of the severity of their liver disease, including assessment of reticuloendothelial system (RES) activity (single photon emission computed tomography), hepatocyte function (aminopyrine breath test) and wedged hepatic venous pressure (WHVP). Sixteen patients were randomised to IS and SMS, and 16 to IS alone. The efficacy of the two treatments were evaluated 6 months later. In patients receiving IS and SMS compared to those receiving IS alone there were significant reductions in mortality (0/16 vs 5/16; p = 0.0434 Fisher's Exact Test), number of variceal rebleeds (16; p<0.001 U Test) and 0 vs number of IS sessions required to obliterate the varices (40 vs 89; p<0.05). Combined IS and SMS also resulted in a sustained decrease in WHVP (25.1±1.3 to 19.2±1.2 mm Hg p<0.002) but significantly stimulated hepatic RES activity (19.8±1.3 to 29.8±1.5; % injected dose 99Tc sulphur colloid) and hepatocyte function (15±0.2 to 3.7±0.6% cumulative excretion 14 CO2 breath test). No significant changes in WHVP, RES activity or hepatocyte function were observed in the IS group. These results suggest that SMS may be a valuable adjuvant to IS in the long term management of portal hypertension.

Since it is established that ammonia is produced by the pancreas and duodenum, experiments have been undertaken to investigate whether ammonia is also produced in the pancreas and duodenum and the possible factors that could influence this production.

Material and methods. Fifteen dogs, divided into 3 groups (A,B,C) were used. In all dogs the cranial pancreatic and the duodenal veins were catheterized selectively and the parameters measured were: ammonia, glucose and insulin in fasting state (A), following iv. infusion of hypertonic glucose (B) and iv. infusion of glucose with simultaneous stimulation of the pancreas with secretin (C). The levels of ammonia were compared to those of the systemic circulation and in pairs between the 3 groups.

Results. The concentrations of ammonia in pancreatic and duodenal venous blood are almost equal and are three times that of systemic circulation (p<0.001). The infusion of hypertonic glucose (group B) results in reduction of ammonia by one third in the pancreatic vein and by one fourth in the duodenal vein (p<0.01), with a slight reduction of circulating ammonia. The infusion of glucose and secretin (group C) had the same results with the infusion of glucose alone (p<0.01).

We conclude that ammonia is produced by the pancreas by a mechanism still not known. The relation of ammonia production to the bicarbonate excretion is not proved, since the stimulation of pancreas with secretin has no influence on the ammonia concentrations in pancreatic venous blood (p>0.1).

SANDOSTATIN (SMS) IN THE LONG TERM MANAGEMENT OF PORTAL HYPERTENSION - A PRELIMINARY PROSPECTIVE RANDOMISED CONTROLLED CLINICAL TRIAL
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MESOCAVAL SHUNT VERSUS ENDOSCOPIC SCLEROTHERAPY FOR LONG TERM MANAGEMENT OF VARICEAL BLEEDING
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Ammonia concentration in pancreatic and duodenal venous blood following stimulation:
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ENDOSCOPIC SCLEROTHERAPY COMPARED WITH OESOPHAGOGASTRIC DEVESCALIZATION AND TRANSSECTION IN THE LONG-TERM MANAGEMENT OF BLEEDING OESOPHAGEAL VARICES: A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL
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MESOCAVAL SHUNT VERSUS ENDOSCOPIC SCLEROTHERAPY FOR LONG TERM MANAGEMENT OF VARICEAL BLEEDING
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Sclerotherapy (ST) is usually different in controlling acutely bleeding oesophageal varices. For prevention of rebleeding it may not be as efficient as shunt surgery and therefore we undertook a prospective study comparing mesocavai shunt (MCS) and repeated ST. Forty-five patients who had survived a haemorrhage from oesophageal varices were randomized to repeated ST (21 patients) or MCS (24 patients).

MATERIAL AND METHODS: After workup, randomization was performed. ST was performed every fourth month with flexible endoscope. MCS was performed with 12 mm graft.

RESULTS: There was an equal distribution according to Child's in the different group. There was no difference in survival in patients with Child's A and Child's B in the treatment groups. In patients with Child's C there was a statistically significant prolongation of survival compared to ST.

In the ST group 12 patients had recurrent haemorrhages causing 5 deaths compared with the shunt group in which 4 patients presented postoperative bleeding without associated mortality. There was no difference in the incidence of encephalopathy.

CONCLUSION: The rate of rebleeding is significantly higher in the ST group compared with the shunted group. In patients with Child's C cirrhosis MCS may be an alternative to ST for the prevention of bleeding for oesophageal varices in patients not suitable for transplantation.

Fifty patients (34 male, mean age 46.1 years, range 18 - 65 years) with variceal bleeding were randomised after emergency endoscopic sclerotherapy to continued endoscopic sclerotherapy (ES) using 5% ethanolamine until variceal obliteration followed by regular check endoscopy or to oesophagogastrectomy with transection (OGDT). Child's C score > 11, those over 65 yrs and high risk operative patients were excluded. Thirty-six pts had alcoholic cirrhosis; 7 were Childs A, 24 Childs B and 19 Childs C. Mean follow-up was 16 months (range 3 - 46 months).

All data was analyzed on an intention to treat basis. Mortality during the first month after randomization was higher in the surgical group (2/25 vs 0/25) but late deaths in the OGDT pts were fewer than among the ES group (4 vs 8). Varices were eradicated in 22 of 25 pts in the ES group after a mean of 5 injections (range 2-10). Three pts in the ES group died before eradication at a mean of 96 days. One patient in each group required dilatation for an oesophageal sticture. No pt died from rebleeding.

During follow-up there were no significant differences between the ES and OGDT groups with regard to number of pts rebleeding from varices (5 vs 6), number of bleeding episodes (8 vs 6) number of units of blood transfused per pt (2.9 vs 3.1), total number of days hospitalised (1203 vs 1143), total number of hospital admissions (79 vs 70), mean number of days in hospital per pt (52 vs 45) or mean days per admission (15 vs 16).

We conclude that there is no significant difference between ES and OGDT and that ES is as effective as ODGT in eradicating varices and preventing rebleeding.
Budd-Chiari syndrome is a rare disorder with manifestation of portal hypertension caused by occlusion of hepatic veins (HVs) or suprahepatic inferior vena cava (IVC). However, 260 such cases were diagnosed and treated by us in recent 10 years. There were 172 males and 88 females with an average of 33 and symptoms were present from between 3 days to 26 years. All cases were confirmed by ultrasonography, cavoportalography, or hepaticography. Most of patients (249 cases or 95.8%) had occlusive lesions involving the suprahepatic IVC.

Various procedures were performed in 217 cases including mesoatrial shunt (53), membranotomy (44), cavoatrial shunt (53), balloon catheter dilation (22), cardiac correction (20), mesocaval shunt (11), mesojugular stent (5), combined innominate-atrial shunt (2), cavoatrial shunt (1), etc.

The overall effective rate was 77.4% and operative mortality of 7.3%. The 5-year patency rate of the mesoatrial shunt, membranotomy and cavoatrial shunt were 71.4%, 66.7%, and 50.0% respectively.

According to our experience, the therapeutic approaches are basically described as follows: 1. Balloon dilation is the first option for those with webs or localized occlusive lesions without distal fresh thrombi. 2. Transcardiac membranotomy is also suitable to the above-mentioned patients. 3. Vascular stenting is used for those with diffuse occlusive lesions in the IVC with involvement of the HVs. 4. Portocaval or mesocaval shunts are employed for those with pure occlusion in the HVs. 5. Mesocaval stent is a good alternative for those with intractable cases, pleural effusion, and high operative risk. 7. Innominate-atrial shunt can be supplemented in those accompanying with superior vena cava syndrome. 8. Radical correction is best indicated for those whose lesions require extirpation. 9. Liver transplantation reserves as the last option.

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The transhepatic tube is normally moved after X-ray control within 3–5 months. In case of severe jaundice with all its sequelae a preoperative percutaneous cholangiography is recommended with remaining catheter till liver function tests turn to levels permitting surgery.

Aprotinin was always administered to minimize blood loss during the last two years. Preoperative antibiotic prophylaxis with mezlocillin or therapy according to antibiogram was routinely used to prevent bacterial complications.

No postoperative deaths occurred, no complications required reintervention. In five cases repeated replacement of the tube was necessary to dilate restenosis due to malignancy. This procedure was easily and always successfully achieved by pushing the tube externally beyond the stenosis under X-ray control.

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ENDOSCOPIC PALLIATIVE STENTING OF MALIGNANT HILAR STRICTURES

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Endoscopic stent insertion has been shown to be an effective palliative therapy for establishing biliary drainage in malignant obstructive jaundice. Metastasis, multifocal disease, or extensive invasion may prohibit curative resection in most patients, and those who are unfit for surgery because of advanced age, extensive metastasis, or other unrelated illnesses should be considered for nonsurgical biliary drainage. Success of drainage procedures are related to the level of biliary tract obstruction, hilar malignancies being less successful overall, compared to distal strictures.

The 307 consecutive patients (172 male/female ratio 0.70; mean age 69 years, range 23–92 years) followed up over a 10-year period (cumulative success rate 85%, mean 1.2 ERCP).

Hilar strictures comprised a heterogenous group of malignant tumors (23% of all malignant biliary strictures) including sclerosing cholangiocarcinomas originating at the confluence of the left and right hepatic ducts (n=163; or 64%); Klatskin tumor, locally invasive gallbladder cancer (n=54, or 13%) as well as metastasis to the porta hepatis (n=60, or 23%). Sixty three patients had type I, 72 type II, 62 type III, and 60 type IV proximal biliary strictures (Bismuth classification).

Mean bilirubin 213 ± 235 μmol/l, mean alkaline phosphatase 566 units/l.

Classification of biliary dilatation revealed a significant correlation (p=0.01) between length and type (according to Bismuth) of lesion, and respective bilirubin decline (overall 90%), bilirubin normalization (overall 66%), early cholangitis (type I 17%, type II 17%, type III 29%, and type IV 40%; overall 25%), procedure related mortality (overall 9.5%), 30-day mortality (type I 14%, type II 17%, type III 32%, and type IV 34%; overall 23%), patient survival (type I lesions median 137 days, type II 120 days, type III 77 days, and type IV 43 days; overall mean 192 days, median 95 days), and terminal clinical features (fever 31%, jaundice 74%). There was no difference in survival between primary cancer (median 94 days for cholangiocarcinoma, and 95 days for gallbladder carcinoma) and metastatic cancer (median 98 days). Acute cholangitis was the most important early complication, directly related to the number of endoscopic procedures and caliber of endoprostheses, and occurred in 23% of patients having one stent (85%), compared to 39% of those with drainage of both liver lobes by at least two stents (15%; p<0.01). Median stent patency was 175 days, overall incidence of stent change 30%. The total number of stents required was directly proportional to patient survival time (mean number 1.5, range 1–14). Cholangiographic appearance (type I–IV, p=0.14), number of simultaneous placed stent (one or multiple, p=0.91), or extent of drainage (one or both obstructed lobes, p=0.65) did not influence stent patency.

Bifurcation strictures of both primary and secondary malignant origin can be successfully treated with single stent insertion with reasonably low risk of cholangitis and low mortality, and with a minimum number and duration of endoscopic procedures. However, patients with multiple intrahepatic strictures and with extension of tumor into the segmental ducts, in the absence of unbearable symptoms, should be not selected for stenting procedures, because the benefits of drainage do not balance the risks of complications.
LOCAL EXTENSION OF PANCREATIC AND PERIAMPULLARY TUMORS IN 55 SPECIMENS AFTER PYLORUS PRESERVING PANCREATECTOMY
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Between Jan. 1982 and Jun. 1991, 146 patients underwent a pancreatic head resection at our Institution. Among the 116 who had a diagnosis of a tumor of the pancreatic area, 108 received a pylorus preserving procedure. We report pathologic features of the last 55 cases of adenocarcinoma whose surgical specimens were carefully analyzed focusing on local extension of the tumor and lymph node involvement. The study comprised 33 tumors of the head of the pancreas 14 of the papilla 4 of the CBD and 4 of the duodenum. Each gross specimen consisted of the head of the pancreas and a variable length of duodenum, always transected 2 cm away from the pyloric ring. The tumor ranged in size from 2 to 7 cm (average 4.1) and on microscopic examination the pancreatic margin, judged jaundice (mean bilirubin 10.8 +/- 12.5 mg/dl). 5 pts. with a more severe jaundice (mean bilirubin 19.1 +/- 12.8 mg/dl) and signs of metabolic failure, underwent preoperatively percutaneous transhepatic drainage. Additional risk factors were: ischemic cardiopathy (3 pts.), essential hypertension (2 pts.), diabetes (3 pts.). One bleeding pancreatic cancer, infiltrating the duodenum, demanded emergency operation. In group B we had 62 PC, 21 AC, 5 duodenal carcinoma and 1 retroperitoneal lipomphoma and in group C 33 PC, 1 AC and 1 carcinoid.

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B. PREOPERATIVE EVALUATION OF LIVER LESIONS; MAGNETIC RESONANCE IMAGING (MRI) VERSUS CT-ARTERIOGRAPHY (CTAP)
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In order to determine the best imaging modality for preoperative evaluation of liver lesions, the results of MRI and CTAP studies were compared to each other and to surgical and pathology findings. A total of 34 patients, referred for liver resection were evaluated; 16 with metastatic colorectal cancer, 5 with primary liver tumour, and 1 with FNH. All 24 patients underwent CTAP; 24 out of 24 underwent CTAP, the remaining 4 had conventional CT. All lesions were localized according to Couinaud’s classification and characterized as solid, cyst, or hemangiomata. The results were compared to the “gold standard”, defined as the combination of imaging, surgery and pathology findings.

A total of 142 solid lesions were present, distributed over 95 liver segments. Furthermore, 9 hemangiomata’s were present. MRI detected 136 of 142 solid lesions leading to a sensitivity of 95%. MRI detected solid lesions in 90 of 95 diseased segments, i.e. 94%. In the 20 patients who had CTAP 84 solid lesions were present in 71 segments. CTAP could only identify 57 of 84 lesions, i.e. 68%. Lesions were found in 66 of 71 diseased segments, but in only 50 of 71 the lesions could be called solid with certainty, leading to a sensitivity of 70%.

Ni of 24 patients were inoperable due to extensive tumorspread. The remaining 15 patients were operated on. Ten had a successful resection while 5 turned out to be inoperable: 3 due to inoperable disease, 1 due to untagonized lesion in the left lobe and 1 due to necrosis on the hepatic vein confluentes.

In conclusion, MRI is more useful than CTAP in detecting, localizing and characterizing lesions prior to liver resection.
SIMULTANEOUS COMBINED PANCREAS AND KIDNEY ALLOTRANSPLANTATION IN THE PIG

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We established a model of en bloc simultaneous pancreas and kidney transplantation that decreases preservation time, operation time and clamp time. Our method was developed on 32 Yorkshire pigs with the following technique: The donor aorta - with celiac axis, superior mesenteric artery and left renal artery - is anastomosed en bloc to the recipient's aorta in a side-to-oblique fashion. The portal vein is anastomosed end-to-side to the distal vena cava, and the left renal vein end-to-side to the left common iliac vein. The donor duodenum is anastomosed to the bladder to allow monitoring of the urinary amylase for rejection.

The proposed technique facilitates the vascular reconstructions saving one arterial anastomosis and additionally saves about 50 min of operating and clamp time. None of our recipients has died from a technical complication.

In conclusion, we believe that this technique could be used in humans, especially in adult uremic diabetic patients who receive a combined pancreas/kidney allotransplant from a pediatric cadaver donor.

THE PATTERN OF PLASMA CHOLESTEROL ESTER FATTY ACIDS IS ABNORMAL IN OBSTRUCTIVE JAUNDICE

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We have investigated the effect of obstructive jaundice (OJ) on plasma cholesterol ester (PCE) fatty acids (FA).

PCE FA were measured in 42 patients with OJ (mean age 65, 19F: 23M, mean bilirubin 247µmol/l, 12 benign: 30 malignant) and 42 matched controls, by gas chromatography. The results were compared by Mann-Whitney U tests.

Many FA were abnormal in OJ. Overall the mean number of double bonds per FA was lower in the OJ group (p<0.001). This was a reflection of a fall in total polyunsaturated FA (PUFA) (p<0.001) and a rise in total monounsaturated FA (p<0.001). Total saturated FA were not different between the two groups. The change in PUFA occurred in both the major series of PUFA - n-6 PUFA (p<0.001) and n-3 PUFA (p<0.002).

This study has demonstrated marked changes in FA esterified to cholesterol in plasma in OJ. Such changes, in particular the shift towards more saturated FA, are known to impair cholesterol transport. The biological significance of these changes is unclear but they provide further evidence of the profound metabolic effects of obstructive jaundice.

SURGICAL TREATMENT IN HYDATID LIVER DISEASE

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The experience of surgical treatment in hydatidosis in our service is analysed, studying the changes in our technique and results.

Since 1974-1989 410 patients with 561 cysts were operated. We divided the period of time in two groups: GROUP A: since 1974 to 1984 (322 patients), and: GROUP B: since 1985-1989 (88 patients). We compared both groups and the total resection techniques vs partial ones. Both groups were homogeneous in age and sex.

The incisions made were: right subcostal laparotomy (A=30.7%; B=43.7%); thoracophrenolaparotomy (A=25.8%; B=5.7% p<0.001); bilateral subcostal (A=12.7%; B=32.2% p<0.001) supraumbilical median laparotomy (A=16.5%; B=4.6% p<0.05) supra and infraumbilical (A=3.1% B=9.2% p<0.05). The surgical procedure was: hepatic resection (HR) (A=6.5%; B=15% p<0.03); total cystopexy (TQPO) (A=64.9%; B=57.5%); partial cystectomy (PQ) (A=26.3%; B=27.5%); cysto-jejunostomy (A=2.1% B=9%). The total mortality was: A=2.4%; B=2.1%. Mortality, morbility and reoperations are shown in the Table.

The low morbi-mortality of resections techniques vs PQ is shown, so that we think total resections must be used in the hydatic liver disease (if it is possible).

| MORTAL. | FISTULA | ABCESS | REOP. | NUMBER |
|---------|---------|--------|-------|--------|
| TQPO    | 1.15%   | 3.08%  | 6.15% | 3.08%  | 63.4%(260) |
| PQ      | 4.28%   | 17.0%  | 12.1% | 8.5%   | 26.5%(109) |
| HR      | 2.9%    | 8.8%   | 8.2%(34) |

p<0.05 between TQPO vs PQ; and between TQPO and HR vs PQ