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➢ Time-dependent impact of irreversible electroporation on pancreas, liver, blood vessels and nerves: a systematic review of experimental studies.
A Randomized Controlled Trial of Postoperative Thoracic Epidural Analgesia Versus Intravenous Patient Controlled Analgesia after Major HPB Surgery

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Background
The optimal postoperative analgesic regimen for HPB surgery patients remains controversial. The primary objective of this single-center randomized trial was to compare thoracic epidural analgesia (TEA) to intravenous patient controlled analgesia (PCA) for adequacy of pain control over the first 48 hours after surgery.

Methods
Using a 2.5:1 randomization strategy, 140 patients undergoing HPB resections were randomized to TEA (N=106) or PCA (N=34). Patient-reported pain was measured on a Likert scale (0-10) at standard time intervals. Cumulative pain area under the curve (AUC) was determined using the trapezoidal method.

Results
Demographic, comorbidity, clinical and operative variables, including incision type, operative time, EBL and postoperative drain placement were equivalent. The median AUC of the postoperative pain scores was significantly lower in the TEA group (81.15 vs 109.6, p=0.029) with a 35% reduction in patients with pain episodes >= 7/10 (43% vs 66%, p=0.05). Anesthesia related events were comparable (10.4% vs 3.1%, p=0.29). Grade >=3 surgical complications occurred in 7 TEA group patients (6.6%) and 3 PCA group patients (9.4%, p=0.7). Median length of stay (6 days vs 6 days), readmission (1.9% vs 3.1%), and return to the OR (0.9 vs 3.1%) were similar (all p>0.05). There were no mortalities.

Conclusion
In major HPB surgery, TEA provides a superior patient experience through improved pain control without increased length of stay or complications.
A systematic review into patient reported outcomes following pancreaticoduodenectomy for malignancy

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Background
Pancreatecoduodenectomy (PD) is used to treat malignancies of the pancreas and periampullary region. This procedure carries significant morbidity and mortality.[1] There are several studies investigating the impact on Quality of Life (QoL) following PD.[2] This can be measured using patient reported outcomes (PRO). By performing a systematic review we hope to appraise how consistently PRO are currently being measured within the published literature.

Methods
A comprehensive literature search was performed of the MEDLINE, Embase, Cochrane Library, AMED, PsycINFO, CINAHL and British Nursing Index databases. The results were screened systematically by two authors based on predefined inclusion and exclusion criteria. The quality of PRO in the included studies was scored using a set criteria.

Results
Twenty one articles were included for review. The European Organisation for Research and Treatment of Cancer QLQ-C30 questionnaire[3] was used in 8 studies. The Short Form Health Survey (SF-36)[4] was the 2nd most commonly used instrument and was utilised by 2 separate publications.

Conclusion
With improving outcomes following PD, there is an increasing need to gauge postoperative physical and psychological burden. We suggest that it is essential that PRO be measured in future trials. Standardisation in methodology will enable future systematic reviews to investigate improvements in QoL. It is our opinion that only then will we see significant improvements in patient satisfaction and long term outcomes.

References:
Adjuvant therapy confers no survival benefit following curative surgery for peri-ampullary adenocarcinoma: a Meta-Analysis

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Background
Peri-ampullary cancers are uncommon malignancies, often amenable to surgery. The use of adjuvant chemo- and chemo-radiotherapy in improving survival for peri-ampullary cancers has had variable results. The aim of this meta-analysis was to determine the survival benefit from adjuvant therapy in these cancers.

Methods
A systematic review of the literature was undertaken between the 1st January 2000 and 31st December 2015. The pooled overall survival associated with the use of either adjuvant chemo- and chemo-radiotherapy, as opposed to post-surgical surveillance for peri-ampullary cancers was elicited. Included articles were screened for tumour stage, prognostic factors and toxicity-related events.

Results
Of the 14 full text articles included, 6 were randomised control trials. A total of 1671 patients (904 controls and 767 who underwent adjuvant therapy) were included. The median 5-year overall survival was 37.5% compared 40% in the control and adjuvant groups, respectively (HR 1.08, p=0.067). In 31.4% of adjuvant patients, one or more WHO grade 3 or 4 toxicity-related events was noted. High T-stage was associated worse survival (coefficient -0.14, P=0.04), whilst nodal status and grade of differentiation were not.

Conclusion
No associated survival benefit of adjuvant therapy in the treatment of peri-ampullary cancers was found. Further studies should aim to investigate if patients with advanced disease would benefit from adjuvant strategies, to prevent exposing patients to significant toxicity.
Cholecystectomy for acute cholecystitis in octogenarians according to Tokyo guidelines 2013: our experience.

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Background
The progressive percentage increase in the number of interventions on elderly patients (pts) is due to the demographic increase of old people in the western countries. The aim of this study was clarify the perioperative outcome of octogenarians with acute cholecystitis (AC) treated by cholecystectomy.

Methods
Pts aged 80 years or older who received cholecystectomy from September 2011 to December 2016 due to AC were retrospectively reviewed. Comparison was made between younger and older pts.

Results
Among the 705 cholecystectomies 233 pts were admitted for AC during the study period. Fifty-three (22,7%) were octogenarians [GO] and the median age was 85.2 years. One hundred eighty pts (77,3%) were younger than 80-years-old [GY] and the median age was 60,6 years. Duration of surgical procedure was 98.4±35.6 min and 103.8±43.9 min in GO and GY, respectively (p=ns). Elderly pts had more complications (37.7% vs 22.8%; p=ns) and a longer median length of stay (7.1±6.8 vs 6.4±12.5 days, p=ns). The overall mortality was 3,0% (5,7% vs 2,2%; p=ns). On multivariate analysis age older than 80 years was not an independent risk factor for postoperative complications and mortality rate.

Conclusion
The results of this study suggest that cholecystectomy for AC in octogenarians is a relatively safe procedure with an acceptable risk of complications and postoperative hospital stay. In our opinion Old age (≥80) doesn’t represent a contraindication for surgical procedure.
Cholecystectomy for acute cholecystitis: our experience

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Background
Laparoscopic cholecystectomy (LC) is the goldstandard for acute cholecystitis (AC), but timing of surgery remains controversial. Aim of this study is evaluating the outcome of patients that underwent surgery after emergency department (ED) admission.

Methods
A retrospective study on 233 patients who had cholecystectomy for acute cholecystitis was performed. We divided patients in two groups: early cholecystectomy within 72 hours (GA), delayed cholecystectomy after 72 hours (GB), according to Tokyo Guidelines 2013. In GB we considered also patients discharged to scheduled delayed elective surgery. Patients' demographics, clinical parameters, intra and perioperative data were analyzed. SPSS was used for statistics; significance was defined as p<0.05.

Results
Mean surgery time in GA was 100 min vs 101 min in GB. LC was 28/49 in GA and 151/184 in GB. Conversion rate was 32.1% in GA, 20.5% in GB. Number of admission (NA) was 1.2 in GA and 1.7 in GB, and mean Overall Length Of Stay (LOS) was 9.1 days in GA, 5.4 in GB. Mortality was 4/49 in GA, 6/184 in GB. Morbidity 14/49 in GA, 48/184 in GB.

Conclusion
The comparison of the two groups demonstrate a higher rate of mortality and morbidity in GA. GB had an higher NA and mean LOS. In conclusion an early approach to acute cholecystitis seems to be the treatment of choice.
Collaborative Storage and Research Use of Human Biospecimens between MSKCC and AUB

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Background
As biospecimens are ultimately institutional resources, biologic specimens—tissue, blood or other body fluids—with benign or malignant disease that are left over after all intended diagnostic tests for clinical care are stored at our facilities. This project aims to procure and maintain a repository of human biological specimens for distribution to investigators, while maintaining confidentiality of patients.

Methods
Left over biospecimens are procured and stored in the pathology department by the Tissue procurement service in a manner consistent with high standards for the protection of human participants in research. Patients are approached by consenting professionals to obtain the consent as part of the informed consent process. The objective and nature of the study is explained, as well as the voluntariness of the process.

Results
In the course of 3 years, over 500 samples were collected from the patients to perform research studies. The sample types vary, the organ from which samples were procured include among others: thyroid samples, breast, brain, stomach, pancreas, liver, intestine, colon, and rectum. They include a vast variety of pathologies.

Conclusion
The stored biospecimens will play a vital role in the development of anticancer interventions benefitting from the size, diversity, and richness of demographic and clinical information linked to the specimens. Our repository of human biospecimens has grown and will continue to grow as more samples are being stored daily.
Combined ultrasound assisted drainage and focused open necrosectomy in the management of sepsis in patients with necrotizing pancreatitis

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Background
Minimally invasive approaches considerably changed the surgical management of necrotizing pancreatitis and sepsis. The aim of the study was an evaluation of the efficiency of the combined ultrasound percutaneous drainage (USPD) and focused open necrosectomy (FON) compared to conventional open necrosectomy (CON) in the management of necrotizing pancreatitis and sepsis.

Methods
Patients were prospectively included in FON and CON groups between 2004 and 2016. Sepsis-3 definition and C-reactive protein (CRP) level >150 mg/ml, Procalcitonin (PCT) level> 2.0 ng/ml and SOFA score >2 proved the development of sepsis.

Results
From 182 patients, 84 underwent FON and 98 – CON strategies. The most frequent etiology was alcohol (56%-65%), and gallstones (21%-23%). More than half suffered >50% of pancreatic and peripancreatic necrosis. Sepsis developed in 79% in the acute necrotic collection phase, but decreased to 37% after USPD in the walled-off necrosis phase. The median CRP dropped from 257 mg/L before the definitive surgery to 46 mg/L on postoperative day 7, being markedly lower in FON group 46 mg/L vs. 108 mg/L in CON group, p=0.001. Similarly, the median PCT was 3.2 ng/ml-3.96 ng/ml, plummeting on postoperative day 7 in FON group 0.15 ng/mL vs. 0.61 ng/mL, p<0.001. The mortality rate reached 6% in FON group vs. 9.3%. in CON group.

Conclusion
Combined USPD and FON is an effective strategy for the management of sepsis in patients with necrotizing pancreatitis.
Defining risk factors and outcomes in 537 patients with simultaneous liver and pancreas resection.

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Background
As HPB surgery has become safer, a larger number of combined liver/pancreas (L/P) resections are being performed.

Methods
All elective operations with both a hepatectomy (partial lobectomy(PL), left lobectomy(LL), right lobectomy(RL), or trisectionectomy(TS)) and simultaneous pancreatectomy (pancreatoduodenectomy(PD), distal(DP), or total pancreatectomy(TP)) were identified in the 2005-2014 American College of Surgeons National Surgical Quality Improvement Project database. Operations were categorized based on combined magnitude of resection as basic (PL/LL & DP), major (RL/TS & DP or PL/LL & PD/TP), and extreme (RL/TS & PD/TP). Risk factors and outcomes were assessed with standard statistical methods.

Results
537 patients underwent combined L/P operations with 241 basic(B), 275 major(M) and 21 extreme(E). The number of operations has increased from 103 (2005-2009) to 434 (2010-2014). Increasing magnitude of resection was associated with longer median operative time (B: 283/ M: 372/ E: 484 minutes), median length of stay (B: 7/ M: 9/ E: 12 days), severe complication (SC) rates (B: 21.2%/ M: 37.8%/ E: 52.4%, p<0.001) and 30-day mortality rates (B: 1.2%/ M 6.2%/ E 18.2%, p=0.008). After controlling for cancer types, multivariate analysis demonstrated that E/M vs. B was predictive of SC (OR 2.74, p=0.029).

Conclusion
Simultaneous L/P resection is an increasingly frequent procedure associated with significant morbidity and mortality when complex liver and complex pancreas resection are combined.
Enhanced recovery after surgery for pancreaticoduodenectomy: Possible, but justified?

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Background
Enhanced recovery after surgery (ERAS) is proven to reduce hospitalization and perioperative complications. With the postoperative journey following pancreaticoduodenectomy (PD) being complex, the implementation of ERAS for these patients has been met with hesitancy. We present our experience in implementing an enhanced recovery protocol after PD.

Methods
A systematic ERAS protocol was developed and implemented for all patients undergoing PD. A prospectively maintained database allowed comparison of ERAS against pre-ERAS patients.

Results
57 patients were included with 36 ERAS patients and 21 pre-ERAS patients. No differences were found in age (66.3 vs 61.2, p = 0.24), BMI (24.4 vs 24.9 p = 0.59), pathological diagnosis (66% vs 71% pancreatic adenocarcinoma), vascular reconstruction (13% vs 14%, p = 0.857) or Charlson score (5.3 vs 4.7, p = 0.820). Pancreatic texture and duct diameter were similar. One mortality occurred in the ERAS group.

The incidence of postoperative complications was identical. Grade B or C pancreatic fistulation occurred in 19% of patients in each group (p = 0.97) whilst delayed gastric emptying occurred in 22.2% vs 19.1% (p = 0.77). Unplanned readmissions was comparable (34.3% vs 38.6% p = 0.81) as was length of stay (18.8 days vs 17.7 days, p = 0.59).

Conclusion
The implementation of an ERAS protocol failed to reduce the incidence of complications, unplanned readmissions or decrease the length of stay in patients undergoing PD.
Evaluation of Thromboprophylaxis after Highly Advanced Hepatobiliary-Pancreatic Surgery

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Background
For most major abdominal operations, routine post-operative venous thromboembolism (VTE) chemoprophylaxis has been proven to be both safe and effective, and is now considered the international standard of care for cancer surgery.
Hepatopancreatobiliary (HPB) surgeons have frequently withheld VTE chemoprophylaxis owing to the perceived risk of peri-operative haemorrhage.

Methods
From 2012 to 2016, 140 patients were underwent high-level hepatobiliary pancreatic surgeries. For VTE prevention, four thousand international units per day of enoxiaparin were administered for all patients from two days to fourteen days after surgery.
We analyzed the rates of postoperative bleeding events and morbidity to evaluate the safety and efficacy of postoperative thromboprophylaxis.

Results
60 patients were underwent hepatectomy. Bleeding event were not admitted in all cases of hepatectomy.
80 patients were underwent pancreatectomy. Pseudoaneurysmal bleeding after pancreateoduodenectomy due to pancreatic fistula were admitted 3 patients and underwent with microcoil embolization.
1 patient, a cerebral hemorrhage was admitted early after operation and cancel administer an enoxiaparin.
The case of VTE with symptom was not admitted.
Postoperative complication with enoxaparin were not observed.

Conclusion
Prevention of VTE in our institution is feasible.
Chemical thromboprophylaxis did not increase the risk of hemorrhage and can be safely used even after high-level hepatobiliary pancreatic surgeries.
Extended right hepatectomy and VCI resection to achieve R0 resection of a VCI leiomyosarcoma

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Background
Leiomyosarcoma (LMS) of the vena cava inferior (VCI) is an extremely rare disease. The only curative treatment is achieved by R0 resection of the tumor.

Methods
Here we present a case of a 10x8x8cm LMS of the VCI that was successfully R0 resected with extended right hepatectomy and enbloc VCI resection. Preoperative right portal vein embolization was performed to enlarge the future liver remnant. Complete VCI resection was performed transdiaphragmatically with clamping of the right atrium. The reconstruction was made with reimplantation of the left hepatic vein, two renal veins and right iliac vein on a 20mm goretex graft. Biliary reconstruction was made with Roux-Y cholangiojejunostomy with individual anastomosis of the Segment 2 and 3 bile ducts.

Results
Postoperative course was eventless and the patient is tumor free 6 months postoperatively.

Conclusion
R0 resection of VCI LMS can be achieved in tertiary HPB centers with capacity of multidisciplinary approach.
From an isolated island to mainland - how we started laparoscopic liver resections in a very young HBP department

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Background
In August 2013 a new department of Surgical Oncology with a focus on HBP surgery was founded inside our General Surgery Hospital. The division was established by a group of 2 enthusiastic young surgeons trained in western academic institutions.

Methods
The first cases of anatomical liver resections were made by open approach and until 2016, only liver biopsies or atypical peripheral metastasectomies were performed by laparoscopy. In 2016 we performed 7 cases of anatomical laparoscopic liver resections which we case-matched with 7 cases performed by our mentors, in our "mother" department, the University Hospital in Antwerpen Belgium (UZA).

Results
The procedures time was almost similar and postoperative evolution was also comparable as results in terms of complications and blood loss. A longer admission time was observed in all our cases compared to the belgian counterparts.
Due to the presence of our surgeons in Belgium during some of the cases of laparoscopic liver resections and being part of the team at the beginning of the learning curve, our surgeons also faced near the belgian counterparts the shortcoming and tries of the period, making it more easy to apply it at home.

Conclusion
Due to the presence of our romanian surgical team at the beginning of laparoscopic liver resections era in UZA, our surgeons learned how to start this new chapter in our home institution, managed to solve the intraoperative complications and postoperative events and strengthen a new department in our hospital.
Future Liver Remnant Hypertrophy with Yttrium90Radioembolization in a Patient with Gastric Neuroendocrine Tumour Liver metastasis

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Background
Here we report a case of extensive gastric neuroendocrine tumour liver metastasis where an adequate future liver remnant (FLR) could be achieved with multiple Yttrium 90 (Y 90) radioembolizations before definitive surgery.

Methods
A 56 year-old male was admitted to our centre with a right lobe liver metastasis of gastric neuroendocrine tumor. A resection area of 1564 cm³ (85% total liver volume) with multiple lesions and only 276 cm³ (15%TLV) FLR were determined by computed-tomography (CT) before Y 90 radioembolization.

Results
After 3 embolizations in a years span, control CT scans showed adequate FLR (42%TLV). Total gastrectomy and right trisectionectomy were performed at the same session. Patient did not have postoperative liver failure however he had a prolonged recovery period requiring respiratory failure. At postoperative 7th month, he is without tumor and has normal liver function tests.

Conclusion
Preoperative Y 90 radioembolization may be an optional procedure to provide an adequate FLR in patients with extensive liver malignancies.
Gallbladder Adenosquamous Carcinoma Associated with Biliopancreatic Maljunction: aggressive resection and survival

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Background
Pancreaticobiliary maljunction (PBM) is a congenital malformation in which the pancreatic and bile ducts join outside the duodenal wall. It has been reported to be associated with an increased risk of gallbladder carcinoma. Gallbladder adenosquamous carcinoma is rare, with a worse prognosis compared to patients with adenocarcinoma. We report a case of adenosquamous carcinoma of gallbladder associated with PBM.

Methods
A 56-year-old woman was admitted to the hospital complaining of pain in right hypochondrium. Ultrasonography and computed tomography revealed an elevated lesion inside the gallbladder and dilated extrahepatic bile duct. Magnetic resonance cholangiopancreatography and endoscopic retrograde cholangiopancreatography showed PBM with biliary dilatation of 15mm in the largest diameter.

Results
Cholecystectomy, bile duct resection with a Roux-en-Y hepaticojejunostomy and hepatic resection (S4b-S5) with regional lymphadenectomy was performed. Histology demonstrated an adenosquamous cell carcinoma of the gallbladder with invasion to the muscle layer and two metastases of the resected lymph nodes (T2N1M0). Fourteen months after the operation, the patient is doing well with no signs of recurrence.

Conclusion
PBM is a high risk factor for the development of gallbladder carcinoma because of a continuous reflux of pancreatic juice into the biliary tract. Aggressive surgical resection without residual tumor (R0) provides a chance for long-term survival in patients with gallbladder adenosquamous carcinoma.
Hepatic portal venous gas without gastroenterological symptom may be a good sign.

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Background
Hepatic portal venous gas (HPVG) is relatively rare radiological sign and has been considered lethal. However, recent reports have shown that not all patients require urgent operative intervention. We aimed to clarify what distinguishes emergency laparotomy from non-operative management in HPVG patients.

Methods
17 HPVG patients were diagnosed by abdominal computed tomography (CT) between April 2014 and November 2016. Clinical findings were assessed including management and mortality. Also, Wayne algorithm (J Gastrointest Surg 14:437-448, 2010) was applied to determine its feasibility.

Results
5 patients who were in serious condition experienced gastrointestinal (GI) tract trouble beforehand. Unfortunately, all patients were not eligible for operation. 4 postoperative HPVG patients were recognized and observed. Only one patient with ischemic bowel underwent surgical intervention. Patients without GI symptoms were observed without any complication. Frequent underlying pathologies were cardiovascular disease and diabetes mellitus. Serum lactate was within normal limit in 12 out of 15 patients measured (80%). HPVG distribution did not correlate with clinical condition. Wayne algorithm showed 10 severe, 4 moderate and 3 mild possible mesenteric ischemia. However, it did not associate with the actual treatment strategy.

Conclusion
HPVG without GI tract symptom may be a good sign. Although Wayne algorithm may provide useful score for decision making, bed-side evaluation is mandatory.
Hepatolithiasis following “non-Roux-en-Y” hepatico-jejunostomy for common bile duct injury

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Background
Hepatolithiasis (HL) is defined as gallstones present in all bile ducts peripheral to the confluence of the right and left hepatic ducts, irrespective of the coexistence of gallstones in other parts of the biliary tract. HL is frequently found in patients with recurrent pyogenic cholangitis.

Methods
Case presentation

Results
A 65-year-old woman presented with intermittent fever, jaundice, abdominal pain, and nausea. Eighteen years ago she underwent open cholecystectomy for acute cholecystitis. In the first post-operative days she was noted to be icteric. Abdominal ultrasound showed intrahepatic biliary ductal dilatation. Re-operation was indicated due to suspicion of iatrogenic common bile duct injury, which was confirmed intra-operatively at time of surgical re-exploration. Hepatico-jejunostomy (HJ) “non-Roux-en-Y” was performed. Despite this surgical biliary bypass, this patient continued to have recurrent bouts of cholangitis over the ensuing eighteen years. Given the patient’s recurrent symptoms and results of MRI consistent with HL, surgical treatment was indicated. A left hepatectomy was performed with Roux-en-Y HJ biliary reconstruction. Post-operative course was uneventful. Patient is symptoms free without any attack of cholangitis.

Conclusion
The primary goal in treating HL is to eradicate existing infection, recurrent cholangitis and subsequent hepatic fibrosis, prevent progression of the disease to cholangiocarcinoma. Hepatectomy and/or Roux-en-Y HJ is the best choice for treatment of HL.
Impact of extent of surgery on prognosis of patients with distal cholangiocarcinoma

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Background
Minor resection with local excision of extrahepatic bile ducts, standard pancreaticoduodenectomy or an extended pancreatic resection with additional resection of proximal extrahepatic bile ducts and/or portal vein and/or liver are used to treat distal cholangiocarcinoma. It is still unclear which surgical approach is able to achieve superior survival in this disease with a dismal prognosis and a lack of curative alternatives to surgery.

Methods
75 patients who underwent surgery for distal cholangiocarcinoma in curative intention were analysed retrospectively. Potential prognostic factors for survival were investigated including the extent of surgery using purposeful selection of covariates in multivariable Cox regression modeling.

Results
Histological venous invasion (yes=1, no=0) multiplied by extent of surgery graded in points, preoperative biliary stenting, lymph-node staging, perineural invasion and postoperative complications graded in points according to Clavien-Dindo were indentified as independent significant risk factors for survival. Patients receiving preoperative biliary stenting showed significantly prolonged duration between onset of symptoms and date of operation. Minor versus standard versus extended surgery did not influence the rate or severity of postoperative complications significantly.

Conclusion
The extent of surgery is an independent risk factor for survival only in patients with concomitant histological venous invasion.
Interactive 3D learning module for vascular anatomical variations in HPB surgery

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Background
Hepato-pancreato-biliary (HPB) vascular anatomic variations are seen in nearly half of humans. These variations can sometimes be difficult to imagine three dimensionally by trainees. We developed a computer module that contains 3D interactive models of main vascular anatomical variations of HPB system a surgeon may encounter in daily practice.

Methods
We used 3D modeling and illustration softwares including Maya®, Blender® and MS Powerpoint®. Variations of celiac trunk, portal vein and hepatic veins were created in conformity with three reference articles on vascular anatomical variations. Finally, some interactive futures were added to the software. The module was made available to Turkish General Surgeons in DVD format.

Results
The software contains the usual anatomy and 36 variations of the celiac trunk and its branches, the usual anatomy and 4 variations of portal venous system and hepatic veins of each. Every 3D model of anatomical structures such as segments of the liver or a vessel can be made invisible or transparent. This feature allows the user to figure out how posteriorly situated organs or vessels are positioned three dimensionally. Furthermore, the whole package or every single structure can be rotated, panned and zoomed in and out. This feature allows the user to understand how regional anatomy or a structure is seen from the back, the top or the bottom.

Conclusion
This interactive 3D software will help surgeons imagine and better understand vascular anatomical variations of HPB system.
Isolated and percutaneous liver perfusion for unresectable metastatic liver tumors: A systematic review.

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Background
Background: Liver metastases may be difficult to manage by operative or ablative therapy. Isolated hepatic perfusion (IHP) and its alternative, Percutaneous Hepatic Perfusion (PHP), is a regional therapy which allows the delivery of high doses of chemotherapeutic agents and at the same time systemic toxicity is avoided. We conducted a systematic review of the literature in order to evaluate the efficacy of IHP or PHP on tumor response rates and overall survival.

Methods
Methods: MEDLINE (1950 to 2011), EMBASE (1980 to 2011), and the Cochrane Library were searched to identify studies of outcomes in patients submitted to IHP or PHP for unresectable metastatic liver disease. Cohort studies that matched our inclusion criteria and reported the outcomes following the procedure were included. The MOOSE guidelines were used as a basis for this review.

Results
Results: Sixteen studies met the inclusion criteria. Case-control studies resulted to conflicting results compared IHP with systemic chemotherapy regarded overall response rate and overall survival. Severe complications and especially hepatotoxicity where reported, which in some studies reached up to 65%. Although PHP resulted in less hepatotoxicity events, was associated with high rates of myelotoxicity.

Conclusion
Conclusions: IHP has showed some encouraging results, although the morbidity of the procedure is relatively high. Currently there is not enough good evidence that IHP better than systemic chemotherapy.
Laparoscopic resolution of complication post metastasectomy

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Background
Male patient 43 year old who underwent laparoscopic metastasectomy for histopathologic diagnosis

Methods
To the 10º postoperative day presents diffuse abdominal pain with signs of peritoneal irritation and arterial hypotension
Re laparoscopy is decided.

Results
The laparoscopy shows coleperitoneum. By discarding intestinal or gastric perforation, intraoperative cholangiography is performed, which evidences biliary leak at the site of hepatic resection

Conclusion
Laparoscopy is an acceptable method in the management of complications after hepatic surgery and should be performed in centers specialized in hepatic biliary pancreatic surgery
Left trisectionectomy plus caudate lobectomy (S1) and resection of biliary duct for Bismuth type IV peri-hilar cholangiocarcinoma

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Background
Extended left hemihepatectomy or left trisectionectomy is a challenging procedure that can be applied in patients affected peri-hilar cholangiocarcinoma involving right second order bile ducts. This procedure requires an extensive preoperative evaluation with future liver volume calculation and liver function assessment.

Methods
A 68-years-old male with a peri-hilar cholangiocarcinoma (Bismuth type IV) with jaundice (pre-operational bilirubin 6.8 mg/dL). Future remnant liver volume for S6-7 was 35%A left trisectionectomy plus S1 and common bile duct resection was planned without preoperative biliary drainage.

Results
The video shows the surgical technique including en bloc lymphadenectomy, left trisectionectomy with en bloc S1 resection and common bile duct resection. The reconstruction was performed with single bilio-enteric anastomosis of right posterior bile duct. Postoperative course was eventful and patient was discharged in 10th postoperative day. Pathology report confirmed the R0 resection with negative lymph-nodes (0/24).

Conclusion
An extended resection with a locoregional lymphadenectomy is the potentially curative option for patients with a peri-hilar Bismuth type IV cholangiocarcinoma.
Liver trauma in equestrian accidents. A case report.

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Background
Equestrian sports may carry a risk of liver injury. Horse kick injuries usually occur when rides are dismounted, most frequently when grooming without wearing protective equipment. Equine-associated liver injuries are not well studied due to the relative infrequency of these patients. Some of these patients need surgery to repair liver injuries but most of them can be managed with close observation.

Methods
We present a case of hepatic trauma due to equine injury.

Results
21-year-old-female, abdominal pain after being kicked by a horse in the right side of the abdomen. On admission: tachycardia (120bpm) and hipotension (90/40), diffused abdominal tenderness, haemoglobin level of 12g/dl with elevation of liver transaminases.
CT: laceration grade IV of the right liver (AAST scale).
Laparotomy was performed. 2 litres of hemoperitoneum were evacuated and a resection of segment VI was carried. No more abdominal injuries were found. After surgery, haemoglobin levels were 9.2g/dl after receiving 2 transfusions of concentrated red blood cells.
The patient was discharged after 6 days, without complications.

Conclusion
Liver injuries in equestrian accidents should be suspected and carefully managed. When haemodynamic instability appears, surgical intervention is mandatory for bleeding control. If there is no instability, conservative management could be taken. Radiological intervention such as embolization is an increasingly viable alternative in the non-operative management in stable patients.
Long-term effects and the quality of life following definitive bile duct reconstruction


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Background
The short-term results of reconstruction of the hepatic duct injury are excellent; the long-term outcome is however doubtful.

Methods
The cohort of 236 patients was admitted after the injury in public hospitals and successfully reconstructed by hepatico-jejunostomy between 1990-2005. Out of these 139 patients were repaired at public hospital and referred because of stricture (Gr. A, N=59) or of an anastomosis dehiscence (Gr. B, N=80); 97 were unrepaired and referred because of the clip occluding the duct (Gr. C, N=39) or because of bile leakage from an open duct Gr. D, N=58). All were surveyed in 2015 by WHOQOL-BREF.

Results
The mean time of follow-up was approximately 150 months. The time without symptoms amounted to more than 5 years in 78.6% of patients from group C, but less than 68 % in the others (p<0.001). The mean time of renewing the anastomosis ranged from 8.9 to 4.7 years (p<0.04). The infection after the index operation, the failure of reconstruction in public hospitals, and a female sex, were the adverse factors influencing the time without symptoms on multivariate analysis. Patients of group C had better quality of life in scope of physical health (median 67.85) and psychological condition (median 79.16) than the others (p <0.001). The overall mortality was 15.2 %.

Conclusion
The result of reconstruction depends on causes of the referral that in turn arise from the subsequent intervention taken in the hospitals.
Management of iatrogenic injuries due to endoscopic sphincterotomy; surgical or conservative

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Background
Endoscopic retrograde cholangiopancreatography related perforations (ERCP-rP) are still controversial; some authors suggest routine conservative management, others advocate surgical exploration.

Methods
January 2010 to October 2015, 20 patients identified retrospectively. Demographics, time to diagnosis, type of perforations, treatment strategy, surgical procedure, complications, hospital stay and outcome were recorded.

Results
Of 20 patients, 5 patients were underwent surgical treatment, others were managed conservatively. Mean time to diagnosis was 7.8 hrs (range: 1-36 hrs). In those who underwent surgical treatment, types of perforations included Type I and III in one patient each and type II injury in 3 patients. Surgical procedures included laparoscopic and open cholecystectomy with t-tube drainage in 2 patients each and primary repair of duodenal injury with hepaticojejunostomy in one patient. Conservatively managed patients had type II and type IV injury in 8, 4 and 3 patients respectively. Of these 15 patients, 60% (n=9) underwent percutaneous procedure. The mean length of hospital stay was similar for conservatively and surgically treated patients (12 vs. 12.4 days, respectively, p=0.790). One patient (5%) with Type I injury died of multiorgan deficiency.

Conclusion
With clinical follow-up, medical treatment can be beneficial for the majority of patients and surgical procedure should be kept for patients with Type I (definite) and type II/III ERCP-rP of whose clinical parameters are likely to fail medical management.
Mechanical jaundice as a complication of the liver hydatid disease: management tactics

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Background
One of the most severe complications of liver hydatid diseases (LHD) is involving the bile ducts, occurs in 1.3-55% cases; mortality attains 4.2-8.1%. Patients are often operated on the peak of obstructive jaundice and hepatic failure, increasing complications and recovery cost.

Methods
28 (6.1%) of 462 patients with LHD had cyst’s burst into biliary tree in age 22 to 62. The standard exams consisted from general examination, blood analysis, blood biochemical tests supplemented with enzyme linked immune assay (ELISA), as well as retrograde pancreatocholangiography (RPCG). In 20 (72%) cases after EPST it has been done an extraction of chitin coat and elimination of mechanical block with biliary tract lavage. Further all these patients were performed a postponed opened operation. In 8 (28%) cases the attempts of chitin coat removal were not successful, patients were urgently operated.

Results
The sensitiveness of ELISA method was about 96.3%. In 20 of 28 patients (71.4%) we have reached total elimination of mechanical obstacle by EPST with decreasing of bilirubine at day 6-7. 8 patients (29.6%) with unsuccessful attempts, have been operated afterwards, and bilirubin level got to normal at postoperative day 11-12.

Conclusion
Thus, the complex approach including RPCG is not only high-specific diagnostic method, but also is the treatment one, and allows to eliminate mechanic jaundice, to adequately clean bile ducts, and diminishing the risk of complications.
Metastasises of kidney clear-cell carcinoma: structural and treatment results

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Background
to analyze the structural properties of metastatic (MTS) renal cell carcinoma (RCC) and the results of treatment.

Methods
142 patients with RCC were treated from April 2011 to present. 14 (9.9%) patients with MTS RCC lesions of various organs diagnosed during this time, 1 patient was diagnosed with MTS 2 times (metachronous). All lesions were as RCC MTS. The analyzed parameters: 1. target organs; 2. synchronous/metachronous metastases; 3. timing of metastasis; 4. treatment strategy; 5. generalization.

Results
Target organs of RCC MTS (n=15): pancreas - 8(53.2%) (single - 6, multiple - 2); liver - 3(20%); spleen - 1(6.7%); liver+spleen+lungs - 1(6.7%); adrenal gland - 1(6.7%); m. gluteus maximus - 1(6.71%) case. Simultaneous detection of the primary tumor and MTS diagnosed in 5 cases; metachronous - in 10. In 1 case diagnosed failure of both kidneys with MTS in both adrenal glands. Timing of metastasis (n=10), from 8 months to 16 years (excluded patients with simultaneous detection of primary tumor and MTS), an average 5.3 years. Treatment strategy: surgery (n=11) (one-stage - 10, two-stage - 1): nephrectomy+resection - 2; resection surgery - 8; pancreatectomy - 1; cryoablation - 1; RFA+chemotherapy - 1; chemotherapy - 2 (significant spread of the process (liver+spleen+lungs and m. gluteus maximus). Further metastasis after surgical treatment isn't currently registered. In case of spread of the process (liver+spleen+lungs) - death.

Conclusion
RCC MTS should be suspected even in the remote period after surgery.
Minimally invasive treatment of bile leakage in pancreatobiliary surgery

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Background
Postoperative bile leakage (BL) is a well-known important complication after liver, biliary tract and pancreatic surgery. The aim of this study is to evaluate the efficacy of the mini-invasive management of bile leakage after HPB operations.

Methods
A total of 295 patients with bile leakage after various hepatopancreatobiliary surgical operations between January 2005 and December 2016. BL was defined by the presence of bile in the abdominal drains, radiologically or surgically drained bilioma or biliary peritonitis. 205 patients presented with bile leaks after cholecystectomy. There were 51 patients after liver resections and 34 patients after various types of reconstructive operations on bile ducts and pancreas.

Results
Three main approaches of mini-invasive treatment of bile leakage was used: 1) percutaneous puncture with or without drain under CT-scan or ultrasound guidance in 115 patients; 2) endoscopic management in 145 patients (in 115 patients were managed with ERCP alone and nineteen were treated with a percutaneous intervention followed by ERCP. Endobiliary stent placement was performed after ES in 24 patients and without ES in twenty seven patients 3) relaparoscopy has been performed in 33 patients, in cases of biliary peritonitis.

Conclusion
bile leakage remains a major concern after hepatobiliary and pancreatic operations. The endoscopic and relaparoscopic approach of ERCP should be considered a primary modality for the diagnosis and treatment of bile leakage.
Multiple artery-first approach combined with a C-form resection in radical antegrade modular pancreatoduodenectomy

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Background
To firstly propose and describe the surgical technique of radical antegrade modular pancreatoduodenectomy (RAMPD) with a C-form resection, using a multiple artery-first approach.

Methods
Between January 2010 and December 2015, 115 consecutive patients underwent PD with curative intent. Patients were classified into two groups: conventional PD (coPD) group (n = 58) and RAMPD group (n = 57). The clinicopathological data was collected to assess the feasibility and validity of RAMPD.

Results
There were 68 male and 47 female patients. The median age was 58 years (range 41-76 years). Operative time (306 versus 265 min for coPD group versus RAMPD group; P = 0.003), intraoperative blood loss (700 versus 400 ml. P = 0.002), postoperative haemorrhage (11 versus 3 per cent; P = 0.040), surgical complications (31 versus 15 per cent; P = 0.011) and R1 resection margin (11 versus 3 per cent; P = 0.040) were significantly reduced after RAMPD.

Conclusion
RAMPD with a C-from resection, using a multiple artery-first approach is a safe and feasible technique, and we advocate this procedure as a promising option for PD.
Oncological and long term outcomes after pancreateoduodenectomy for ampullary carcinoma: A 9-year experience from a tertiary referral centre in the UK.

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Background
Ampullary cancer is thought to have a better prognosis following resection compared to other cancers of the pancreatic head. Various factors have been shown to affect survival.

Methods
A retrospective study was conducted from a prospectively maintained database over a 9 year period (2007 – 2015), with additional input from hospital medical records and information from GPs. 63 patients underwent major pancreatic resection for ampullary carcinoma. The staging distribution was: stage 1A - 3.1%; stage 1B - 20.6%; stage 2A - 11.1%; stage 2B - 36.5%; stage 3 - 23.8%; stage 4 - 4.7%.

Results
51 patients (80.9%) had a R0 resection. The mean number of nodes sampled were 21 (+/- 10.8) nodes. The median follow-up period was 23 months (0-104). It was noted that 33 patients (58%) received adjuvant chemotherapy. Recurrence was found in 17 (29%) patients and metastasis developed in 21 (36%) patients within the follow-up period. The 1-, 3-, and 5- year survival rate was 82.5%, 55%, and 41% respectively. 27 (46%) patients have died, of which 19 (70%) were cancer-related and 4 (15%) were non-cancer related deaths. Factors that had a significant impact on survival were lymph node involvement and resection margin status.

Conclusion
The oncological long term outcomes from this study are within the national and international standards. Survival is better compared to other malignancies of the pancreatic head. The surgeon must aim to perform a maximally radical operation, with clear resection margins significantly improving outcomes.
Pancreas-preserving total Duodenectomy: a surgical treatment pathway for duodenal wall polyps

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Background
Treatment of duodenal wall polyps is a multistep procedure with several therapeutic options and guided by endoscopic biopsies. However, in a significant proportion of patients the histology is misleading and patient with PPTD requiring additional surgery to achieve oncologic radicality.

Methods
Between 1997 and 2014 20 patients with hereditary (n = 7) and non-hereditary (n = 13) duodenal wall polyps underwent PPTD at the department of Surgery of the University Medical Center Hamburg-Eppendorf (UKE). Both groups are analysed retrospectively regarding differences of morbidity and mortality according to the Clavien-Dindo classification.

Results
No statistical significant differences regarding morbidity and mortality were seen in both groups. However, in three patients of non-hereditary group compared to one patient of the hereditary group final histology revealed malignancy (p=0.63).

Conclusion
There is a non-significant trend towards malignancy in patients with non-hereditary duodenal wall polyps, despite the extensive preoperative workup with repeated gastro-duodenoscopies. For this reason, patient with non-hereditary duodenal-wall polyps should be diagnosed and treated with special care, and may be brought to a more aggressive surgical therapy in cases of equivocal preoperative findings. To facilitate therapeutic decisions and to optimize treatment results we introduce a clinical useful treatment pathway, which merge genetic, clinical and pathological data.
Pancreatic panniculitis in acinar cell carcinoma of the pancreas with liver metastases

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Background
Pancreatic panniculitis appears in 16% of patients having acinar cell carcinoma. High serum levels of lipase are common for manifestation. We want to present the importance of serum-lipase in a patient with synchronally hepatic metastasized acinar cell carcinoma and pancreatic panniculitis.

Methods
Case report of a 72-year-old man with a history of pancreatic panniculitis in acinar cell carcinoma with liver metastases.
A systematic literature search on PubMed and the Cochrane library using the MeSH “Panniculitis” and “Acinar Cell Carcinoma” was carried out following the PRISMA guidelines.

Results
Hemihepatectomy right was performed 9 days after the pancreaticoduodenectomy with pylorus preservation in March 2015.
Serum-lipase was 5580 U/L before surgery and decreased post-operatively to normal serum levels until November 2015.
Computer tomography was performed in December 2015 resulting in hepatic progress.
Pancreatic panniculitis was firstly described in both legs in January 2016. Acute arthritis with articular effusion of the left elbow could be documented in February.
The patient departed in February 2016. Serum-lipase grew to a maximum of 19940 U/L at the last control.
The literature research carried out 3 of the 16 publications in which lipase values are described in relation to the clinical course.

Conclusion
Presence of subcutaneous panniculitic nodules must be the start of further diagnosis. There is a relation between serum-lipase and clinical condition.
Percutaneous Ablation of RAS Mutant Colorectal Liver Metastases is Associated with a High Rate Local Tumor Progression

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Background
To evaluate the predictive values of RAS mutation status on local tumor progression (LTP) after percutaneous ablation (PA) of colorectal liver metastasis (CLM)

Methods
A retrospective analysis of patients who underwent CT-guided PA of CLMs from 2004 through 2015 and had known RAS mutation status was performed. Patients were evaluated for LTP at CLMs treated with ablation. Multivariable Cox regression analysis was performed to determine factors associated with LTP-free survival.

Results
92 patients underwent PA of 137 CLMs. Thirty-six (39%) had mutant RAS. LTP rates were 14% (8/56) for patients with wild-type RAS and 39% (14/36) for mutant RAS (p=0.007). On analysis by individual CLM treated with ablation, LTP rates were 9.3% (8/86) for CLMs in patients with wild-type RAS and 33% (17/51) for CLMs in patients with mutant RAS (p=0.0004). LTP occurred earlier and at significantly higher rates for CLMs <2 cm in patients with mutant RAS, irrespective of PA margins, than for CLMs <2 cm in patients with wild-type RAS (p<0.001). Actuarial LTP-free survival were worse in patients with mutant RAS than wild-type RAS (3-year LTP-free survival rate: 35% versus 71%, p=0.001). In multivariate analysis, negative predictors of LTP-free survival were minimal PA margin <5 mm (hazard ratio [HR] 2.48, 95% confidence interval [CI] 1.31-4.72; p=0.006) and mutant RAS (HR 3.01, 95% CI 1.60-5.77; p=0.001).

Conclusion
The presence of mutant RAS is associated with an earlier and higher rate of LTP among patients undergoing PA of CLMs.
Perihilar Cholangiocarcinoma - Correlation of Bismuth Type IV with T- and UICC-stage

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Background
Perihilar cholangiocarcinoma (PHCC) is the most frequent bile duct cancer. Bismuth-Corlette classification (BC) is often regarded as relevant for therapy by nonoperative disciplines. Thus, patients with BC type IV (tumor extension on right and left main bile duct) are sometimes considered as irresectable and a palliative therapy is initiated without an assessment of a surgeon.

Methods
All patients with a PHCC (n=118) were prospectively evaluated in a database in the period from 2008 to 2015 and retrospectively analysed with the focus on performed resection, the BC (pathologic result), the TNM classification and the UICC stage.

Results
In 88 of 118 patients (74.6%) resection could be performed with curative intent. Type IV of BC was present in 47/88 cases (53.4%) and was by far the most common (type I n=4, II n=7, III n=26). Of these 47 patients with BCC type IV following T-stages: T1 n=2 - T2a n=10 - T2b n=29 - T3 n=4 - T4 n=2 and UICC-stages: I n=1 - II n=25 - IIIa n=3 - IIIb n=16 - IVa n=2 - IVb n=0 were achieved. R0 resection was performed in 33/47 (70.2%) patients. A negative lymph node status (N0) was seen in 30 of the 47 patients.

Conclusion
PHCC with type IV BC are most often resectable, and often low T- and UICC-stages are present as well. Any patient suspected of having a PHCC should be presented at a center for liver surgery to evaluate exploration. In the vast majority of cases, resectability can only be clarified through exploration and depends on the T-stage.
Perioperative outcomes after pancreatoduodenectomy for ampullary carcinoma: A 9-year experience from a tertiary referral centre in the UK.

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Background
Pancreatoduodenectomy for ampullary carcinoma is performed with curative intent and is associated with increased survival. However, it is associated with significant morbidity and mortality.

Methods
A retrospective study was conducted from a prospectively maintained database over a 9 year period (2007–2015). 63 patients underwent major pancreatic resection for ampullary carcinoma. Jaundice was present at presentation in 55(87%) patients and biliary stents were placed pre-operatively in 37(59%). The mean age at operation was 66. Mean operative time was 309mins with a median estimated blood loss of 550mls.

Results
The median hospital stay was 15days. 16(25%) had no post-operative complications; 32(51%) had a Clavien-Dindo grade of 1 or 2; and 14(22%) had a grade 3 or higher, with many patients suffering more than one complication. Pancreatic leak was present in 17(27%) patients of which 7(11.1%) were grade A; and 10(15.9%) had a clinically relevant grade B or C pancreatic fistula. Post pancreatectomy haemorrhage was found in 6(9.5%) patients while 8(13%) suffered delayed gastric emptying. The perioperative mortality was 6.3%.

Conclusion
The results presented in this study are in concordance with international standards. Pancreatoduodenectomy remains to be the only potentially curative procedure for ampullary carcinoma. However, it does results in significant morbidity and mortality. Thus, these procedures should be performed in specialist centres under the full support of a multidisciplinary team.
Preoperative biliary drainage reduce postoperative liver failure on patients undergoing major liver resection for perihiliar colangiocarcinoma

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Background
Preoperative jaundice in liver surgery could be deleterious for major liver resection (MLR). Preoperative biliary drainage (PBD) is recommended in order to improve liver function, reduce morbidity and avoid postoperative liver failure (POLF). Our aim is to evaluate the role of PBD in the incidence of POLF in patients undergoing a MLR due to perihiliar cholangiocarcinoma (PHC).

Methods
A retrospective cohort of 42 patients with PHC who were submitted to MLR between 2000 to June 2015 were included for the analysis. PBD was performed for reduce Total Bilirubin (TB) previous to surgery. Successful PBD was defined as TB < 3 mg/dl.

Results
Median age 64 years. Thirty one (73.8%) were male. Fourty (95%) were jaundiced at the time of diagnosis. Thirty four (81%) underwent a PBD and 16 (55.8%) of them had a successful drainage, with TB < 3 mg/dl, previous MLR. Sixteen (38%) were submitted to an extended liver resection. Eight (19%) patients developed POLF and was associatted with TB > 3 mg/dl at the time of the intervention (p < 0.001). Postoperative mortality at 90 days occurred in 9 in the (TB > 3 mg/dl) while only 1 in the other group (TB < 3 mg/dl).

Conclusion
This study shows the benefit of preoperative biliary drainage, significantly decreasing morbidity and mortality associated to POLF. At the same time confirms as in other studies that the aim of this preoperative procedure should be to obtain a preoperative TB lower than 3 mg/dl.
Preoperative endoscopic versus percutaneous transhepatic biliary drainage in resectable perihilar cholangiocarcinoma: a randomized controlled trial

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Background
Biliary drainage is used to treat jaundice and create an optimal clinical condition prior to liver resection for perihilar cholangiocarcinoma (PHC). The optimal drainage technique is undecided.

Methods
This multicenter randomized controlled study compared two drainage approaches in patients with potentially resectable PHC requiring major hepatectomy. Patients with obstructive jaundice and a bilirubin level above 50 µmol/L were randomly assigned to undergo either endoscopic (EBD) or percutaneous transhepatic biliary drainage (PTBD). The primary outcome was the total number of severe preoperative drainage-related complications between randomization and surgery.

Results
We enrolled 54 patients; 27 were assigned to EBD and 27 to PTBD. The total number of preoperative drainage-related complications was higher in the PTBD group (52 versus 38) while the percentage of patients with more than one severe complication was comparable between groups (78% versus 81%). The Data Safety Monitoring Board prematurely stopped the study at 50% of accrual because of increased perioperative 90-day mortality in patients who had undergone PTBD (41% versus 7%). Three patients died before surgery (3 PTBD, 0 EBD) and 10 patients died after laparotomy (8 PTBD, 2 EBD).

Conclusion
The incidence of preoperative complications following EBD and PTBD was comparable, but PTBD was associated with increased perioperative mortality. Initial EBD is therefore advised in resectable PHC and PTBD only when EBD has failed.
Prognostic factors in an 85 patient series of digestive neuroendocrine tumours with surgery or endoscopic resection.

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Background
The aim of this study is to analyze prognostic factors for survival and recurrence in patients with diagnosis of digestive neuroendocrine tumours (DNT) and underwent a surgery and/or endoscopic resection.

Methods
Medical records of 85 patients with DNT were retrospectively reviewed since 1990-2016. The variables studied were: age, sex, form of presentation, localization, metastasis, treatment, type of surgery and state of tumour, including WHO classification (2010).

Results
From 85 patients, 51.8% were male, with a median age of 61 years (29-81). By location, the most frequent tumour was small bowel DNT (27.1%) and appendix (25.9%). Appendicular tumours presents in youngest patients (39 years; 8-78) vs colon (67 years; 36-83) (p=0.004). Regarding the mode of presentation, it was sporadic (36.5%) and appendicitis (21.2%). Surgery was the most common treatment of primary tumour (73.5%) and endoscopic resection was enough in the 8.2%. There was synchronous metastasis in 37.6% (hepatic location 32.9%) and this presents association with location (small bowel and stomach; p<0.001). The 1, 3 and 5-years survival was 89.3%, 75% and 58.4%. Univariate and multivariate survival analysis showed that location, presentation clinic, WHO classification and presence of metastasis are independent predictor factors.

Conclusion
In our experience, location, presentation clinic, WHO classification and presence of metastasis were an independent prognostic factors in DNT survival.
RAS mutation for metastatic colorectal cancer treated with potentially curative intent: Impact of metastasis site.


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Background
Background: RAS mutation status is an important prognostic factor after complete liver resection for colorectal cancer metastasis (LiM).
Objective: To evaluate the impact of RAS status on survival after potentially curative resection for lung (LuM) and peritoneal (PM) metastases from metastatic colorectal cancer.

Methods
Methods: Between 2005 and 2014, all consecutive patients with known RAS status who underwent curative resection for LiM, LuM, or PM were evaluated. Recurrence pattern was evaluated for all patients who had a known status 18 months after surgery.

Results
Results: All 720 patients operated on for unique metastatic sites, 468(65%), 102(14%) and 150(21%) presented with LiM, LuM and PM, respectively. RAS mutation was significantly less frequent for LiM (41% LiM, 64% LuM, 58% PM; p<0.001). Five-year overall survival (OS) was 52%, 63% and 45% for LiM, LuM and PM, respectively. PM presented a significantly worse OS than LiM and LuM (p=0.023; p=0.006, respectively). OS was significantly better for patients RAS wild type for LiM (p<0.001), but no difference in OS was observed regarding RAS status for LuM and PM (p=0.412; p=0.650, respectively). For each metastatic site the risk of recurrence was higher site itself, but there was not difference for recurrence based on RAS status.

Conclusion
Conclusion: Surgical resection of LiM, LuM and PM associated with systemic chemotherapy provide long term survival. RAS mutation status represents a prognostic factor after metastasis resection only for LiM.
Schwannoma, IVC Leiomyosarcoma, and IPMN of heterotopic pancreatic tissue.

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Background
We report a unique first case in which one patient presented with all these rare conditions, discussing presentation, diagnosis and management.

Methods
A 73 year old lady presented complaining of epigastric pain. Abdominal ultrasound revealed a cystic mass arising from within the mesentery. Subsequent CT / MRI confirmed the presence of a well circumscribed, uniformly enhancing, low density mesenteric mass measuring 5 x 5 x 6.7 cm and lying adjacent to the duodenum. Tumour makers were within the normal range. Appearances were thought to be consistent with a benign, cystic lesion, but annual follow-up with CT was recommended. During the second year of follow-up the mass grew to 7.5 x 5.5 x 5.5 cm. Additionally, a enlarged aorto-caval lymph node. Both lesions demonstrated increased uptake of F18-FDG on CT PET, malignancy was thought to be likely and the patient proceeded to surgery. At operation, the mesenteric mass was resected uneventfully. The aorto-caval mass excision required resection of a sleeve of anterior wall of IVC. Incidentally, an indeterminate mass was noted in the jejunum, and was excised.

Results
Histopathology: a mesenteric schwannoma; a leiomyosarcoma of the inferior vena cava; and intraductal papillary mucinous neoplasma, with high-grade dysplasia, arising in heterotopic jejunal pancreatic tissue.

Conclusion
Although these conditions are usually low symptomatic and is often discovered incidentally, surgical management is the only way to confirm diagnosis, manage and curatively treat them.
Skeletal Muscle Index is a useful tool for the nutritional assessment of patients with pancreatic and hepatobiliary cancer

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Background
We aim to examine the association of skeletal muscle index (SMI) with traditional methods of nutritional assessment, anthropometric measurements and hand grip strength in pancreatic and hepatobiliary cancer patients.

Methods
The study sample consisted of 49 patients (24 men, 25 women) with pancreatic and hepatobiliary cancer who were admitted for surgery in the First Department of Surgery, Laikon University Hospital, Athens, Greece between September 2015 and January 2017. The preoperative nutritional assessment was based on albumin and Total Lymphocyte Count (TLC), whereas anthropometric measurements included Body Mass Index (BMI), Waist Circumference (WC), Hip Circumference (HC), Mid Arm Muscle Circumference (MAMC), Corrected Mid Arm Muscle Area (cMAMA) and Calf Circumference (CC). Hand Grip Strength (HS) was measured using dynamometer and SMI was derived from analysis of CT scans.

Results
The mean SMI in men was 48.81 cm²/m² and in women 38.94 cm²/m² (p<0.05). SMI was positively correlated with albumin (r=0.439, p<0.05), WC (r=0.590, p<0.01), HC (r=0.423, p<0.05), MAMC (r=0.436, p<0.05), cMAMA (r=0.399, p<0.05), CC (r=0.531, p<0.01), HS dominant hand (r=0.671, p<0.01) and HS non dominant hand (r=0.694, p<0.01). On the other hand, TLC and BMI showed no significant correlation with SMI.

Conclusion
Preoperative SMI measurement seems to be a useful tool in order to detect malnourished/sarcopenic patients with pancreatic and hepatobiliary cancer.
Solitary fibrous tumors of hepatopancreatobiliary system; 2 Case reports

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Background
A solitary fibrous tumor (SFT) of the hepatopancreatobiliary (HPB) system is a rare neoplasm of mesenchymal origin. SFTs are an uncommon neoplasms of mesenchymal origin that primarily affects the pleura and mediastinum and may occur elsewhere in the body including respiratory tract, pancreas, liver, peritoneum, kidney and salivary glands, breast.

Methods
Case 1: A 56-year-old male was admitted to the Department of General Surgery with upper abdomen pain. On computed tomography, there was a 11.7x7.8x9.5cm mass that appeared to arise from the head of the pancreas. At endosonographic biopsy; A mesenchymal tumor with atypical and indefinite proliferative activity was observed with Suspicious of SFT. A pancreaticoduodenectomy was performed.

Results
Case 2: A 43-year-old female presented with right upper abdominal pain. There was no history of vomiting, jaundice or fever. Patient referred a HPB surgeon for surgery. Liver perfusion MRI showed that the presence of a giant hypervascular 9x8cm mass lesion filling the segment 4. A central hepatectomy was performed.

Conclusion
Because of, SFT of HPB system is an uncommon neoplasm and has non-specific clinical presentation, diagnosing SFT is challenging. Also It's difficult to distinguish radiologically from other HPB lesions. Fine needle aspiration cytology is helpful but histologic examination and immunohistochemistry were necessary to make the diagnosis of SFT. The treatment of extra-pleural SFT is complete surgical resection with negative border as it recommended.
Surgical Therapy for Hepatolithiasis

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Background
Hepatolithiasis [1] is very common in East Asia but infrequent in Western countries. [2] Is defined as the presence of multiple stones inside the bile ducts proximally to the biliary carrefour. Intrahepatic lithiasis could be classified in 2 types: Ectasia of Intrahepatic biliary duct without fibrosis (Caroli’s Disease) and Obstructive dilatation of the intrahepatic bile duct secondary to ischemic stricture. Caroli’s Disease (CD) is a rare congenital condition. [3] Malignancy is a complication of long – term CD, and some patients are presenting with [4] cholangiocarcinoma.

Methods
Between 1998 – 2016, 9 patients were operated on, 7 female and 2 male with a median age of 49.2 y.o (31 – 69). Most frequent symptoms were pain (5/55,5%), Abnormal LFT (3/33%) and Dyspepsia (1/11,1%). Hepatic distribution was: 5 patients in segments II, III and IV, and 4 in segment II and III. Open surgery was perfomed in 7 patients, and laparoscopic approach was carried out in 2.

Results
Operative mortality was zero and morbidity rate was 1/11,1% (reoperated on due to bile leak and biliary peritonitis). Pathological examination showed CD in all cases; one of them had antral methaplasia. The mean follow-up period was 116,2 months (2-221). None presented recurrence of the symptoms.

Conclusion
Surgical therapy is a safe and effective management for hepatolithiasis. The possibility of developing cholangiocarcinoma in inveterate patients is real, and hepatic resection removes the risk.

References:
Technical feasibility of an actioncam for video documentation in HPB surgery

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Background
Intraoperative video recording in surgery has become indispensable for educational, scientific and forensic reasons. While videos of laparoscopic HPB procedures are easy, documentation of open HPB surgery is still technically demanding. Since no perfect camera system exists, modern actioncams may offer a solution to this problem.

Methods
A head-mounted ActionPro X7 camera was tested in 60 consecutive cases of open HPB surgery. Different camera settings and control modes were tested to evaluate its feasibility. A video recording of an open enucleation is presented here in order to demonstrate the Advantages and limitations of a modern actioncam in HPB surgery.

Results
Forty pancreatic and 20 hepatobiliary cases were recorded. Full HD videos were of excellent quality and allowed a first person view of the operation field. Battery life was relatively short and varied from 60 to 130 minutes depending on use of wifi and screen adjustments. Wearing discomfort during prolonged surgery and recurrent connectivity problems when using the wifi-based remote control or mobile app were relative limitations. Large storage space of approximately 4 GB per hour video was necessary.

Conclusion
Modern action cameras can provide high-quality videos in open HPB surgery. Rapid development of technology is expected to easily solve current technical limitations, so that action cameras may offer an inexpensive and widely available alternative for surgical video documentation in the very near future.
The Challenges of Diagnosis and Management of Acute Mesenteric Venous Thrombosis in Patients with Liver Cirrhosis: A Single Institution's Experience

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Background
The aim of this work was to study the diagnostic tools and the optimal management of acute MVT in patients with liver cirrhosis.

Methods
It is a retrospective study including 40 patients with liver cirrhosis who were admitted to the surgical emergency and were eventually diagnosed as acute MVT between January 2011 to March 2016.

Results
Forty patients had acute MVT. Twenty five patients (62.5%) had prolonged prothrombin time, 18 patients (45%) had thrombocytopenia and 22 patients (55%) had low protein C. Triphasic CT scan was the main diagnostic image in 28 patients, with sensitivity 100% and accuracy 96.9% in detection of intestinal infarction. Ten patients (25%) underwent conservative treatment with anticoagulant, while 30 patients (75%) were surgically explored and 28 patients of them had gangrenous bowel loops and underwent primary resection and anastomosis. Three patients underwent second look operation. Three patients had recurrent symptoms after 1 month of the first presentation. The overall 30- and 90-day mortality was 27.5% and 37.5% respectively.

Conclusion
Cirrhotic patients may have hypercoagulable state and the usual laboratory tests for coagulation don’t accurately assess the coagulation status of the cirrhotic patient. Acute MVT in cirrhotic patients has a high early morbidity and mortality that needs early diagnosis and urgent management with selective surgical intervention and proper anticoagulant.
The risk of post-ERCP pancreatitis after single operator peroral SpyGlass cholangioscopy is highest in the beginning of practice

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Background
SpyGlass cholangioscopy (SOC) with intra-ductal visualisation and biopsies is an adjunct to endoscopic retrograde cholangio-pancreatography (ERCP) in the diagnostics of indeterminate biliary strictures. The rate of complications during the learning curve and after establishment of a routine in SOC practice was studied.

Methods
All consecutive SOC performed in a tertiary referral center 2012-2015 were included. Data was collected prospectively for indications, procedure details and complications and supplemented from records for clinical outcome.

Results
1920 ERCP were performed during the study period. Of those 113 patients (5.9%; mean age 58 y, 57% male) underwent SOC ERCP. Median follow-up was 19 months (range 1-48). The indication for SOC was primary sclerosing cholangitis in 43%, indeterminate stricture in 30% and stone disease in 24%. 92% of SOCs were performed in outpatient setting. In the very first 25 SOC, the rate of adverse events was 20%: all 5 patients had a severe post-ERCP pancreatitis (PEP), one of which had fatal outcome. In the next 88 SOCs rate of adverse events was 8% (PEP 3%, cholangitis 3%, bleeding 1%, mortality 0%, none severe). The sensitivity and specificity of SOC biopsies were 75% and 87% for detecting cancer, respectively.

Conclusion
The risk of pancreatitis after SOC decreases to the level seen in standard ERCP as experience accumulates. SOC may be considered a safe diagnostic aid in unclear biliary strictures even in outpatient setting.
The role of abdominal drainage in pancreatic resection – A multicenter validation for early drain removal

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Background
Abdominal drainage in patients undergoing pancreatic resection is under debate. Several studies showed contradictory and inconclusive results. Bassi et al. concluded that patients with a drain amylase of <5000U/L on POD1 have a low risk for clinical relevant postoperative pancreatic fistula (CR-POPF) which would allow safe early drain removal.[1] We aimed to verify this algorithm retrospectively in a large Dutch cohort.

Methods
The national DPCA database was used containing 1402 patients who underwent a pancreaticoduodenectomy, distal pancreatectomy or enucleation. Data on post-operative drain amylase levels and timing of drain removal were collected in 13 hospitals. Univariate and multivariate analysis using a logistic regression model were performed. The primary outcome measure was grade B/C pancreatic fistula (CR-POPF) as defined by the ISGPF.

Results
8.0% of the patients with a drain amylase level of <5000U/L during the first 3 post-operative days developed a CR-POPF. When using a cut-off point of 2000U/L or 1000U/L, this was respectively 5.8% and 4.6% (n=223;p<0.001). Drain removal on POD4 or beyond was associated with more complications (p=0.004). Drain amylase was shown to be the most significant predicting factor for CR-POPF (Wald=43;p<0.001).

Conclusion
Similar to previous studies, our data support that early drain removal after pancreatic resection may be advantageous. The algorithm proposed by Bassi resulted however in a relatively high level of 8% CR-POPF.

References:
The role of hepatectomy for synchronous liver metastases from pancreatic adenocarcinoma

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Background
The role of hepatectomy for patients with synchronous liver metastases from ductal adenocarcinoma of the pancreas (PLM) remains controversial.

Methods
Clinicopathological data of patients who underwent hepatectomy for PLM between 1993 and 2015 were assessed and predictors of overall survival (OS) were identified.

Results
During the study period, 76 patients underwent resection for pancreatic cancer and concomitant hepatectomy for synchronous PLM. Pancreatoduodenectomy, distal pancreatectomy, and total pancreatectomy were performed in 67%, 25% and 8% of patients, respectively. Median PLM size was 1(1-13)cm and 36% of patients had multiple PLM. After a median follow-up time of 130 months, 1-, 3-, and 5-year OS rates were 41%, 13% and 7%, respectively. Postoperative morbidity and mortality rates were 50% and 5%, respectively. In univariate analysis, T4 stage(P=.033), lymph node metastases(P=.016), poorly differentiated cancer(G3)(P=.037), no preoperative chemotherapy(P=.013), and no postoperative chemotherapy(P=.005) were significantly associated with worse OS. In the multivariate analysis, G3 cancer(P=.021), no preoperative chemotherapy(P=.011), and no postoperative chemotherapy(P=0.31) independently predicted worse OS.

Conclusion
Liver resection for PLM is feasible and safe and may be recommended within the framework of an individualized cancer therapy. Multimodal treatment including hepatectomy and systemic therapy may provide prolonged survival in selected patients with metastatic pancreatic cancer.
Treatment of Intrahepatic Cholangiocarcinoma, Experience of a Reference Center

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Background
Although they are the second most frequent primary tumor of the liver, intrahepatic cholangiocarcinomas (IHC) are rare. Complete surgical resection (R0) remains the only therapeutic option that may offer a possibility of cure.

Methods
Retrospective analysis of patients with the diagnosis of IHC between 2010 and 2015 through the use of a computerized database and clinical data.

Results
A total of 46 patients (17 women and 29 men) with an average age of 67 years were diagnosed during this period. The mean lesion size was 82 mm. At the time of diagnosis 10 patients had suspicious hilar adenopathies, 21 metastases and only 12 were potentially resectable. Of the patients considered unresectable (34), 15 underwent palliative CT and 2 underwent radioembolization. Of the 12 patients operated, 6 underwent major liver surgery. Resection with free margins (R0) was achieved in 7 patients. There was no mortality, 6 patients had complications (50%). The median survival time was 6 months for the all series: 4 months for unresectable disease and 25 months for those undergoing surgery (p< 0.001).

Conclusion
The IHC is a disease with poor prognosis and diagnosed in advanced stages. Resection surgery is the only therapy that offers a long-term survival hypothesis.
Vascular reconstruction in patients with perihilar and intrahepatic cholangiocarcinoma.

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Background
The aim of this study was to describe safety and possibility of vascular reconstruction in patients with perihilar and intrahepatic cholangiocarcinoma in single hepatopancreatobiliary (HPB) clinic.

Methods
52 individuals with a diagnosis of cholangiocarcinoma (not including distal common duct cancer) during the period from 2013 to 2016 were radically operated in HPB department of Moscow Clinical Scientific Center. 16 of those had vascular resection and reconstruction, including vena cava resection in 3 patients, portal vein resection alone in 9 patients, combined hepatic artery and portal vein resection in 3 and hepatic artery resection alone in 1.

Results
No significant difference was found in postoperative complications (type III-IV by Clavien-Dindo) between the vascular resection and non-vascular resection group (p>0.05). R0 resection was achieved in 70% that was significantly higher than in previous years. Mortality was 9.2%.

Conclusion
New strategy as implementation of vascular resection and reconstruction for treatment of hilar and intrahepatic cholangiocarcinoma are safe and can improve resection rate.
Venous reconstruction with the parietal peritoneum. The long results in 90 patients.

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Background
We recently described our experience of venous reconstruction during HPB surgery with the parietal peritoneum (PP). Our aim is to evaluate our long term results.

Methods
Since 2010, 90 patients underwent pancreatic (n=65) or liver (n=25) resections for malignancy (n=88) with reconstruction of the mesentericoportal vein (80) or the vena cava (10) with the PP. The PP (mean length=25.2 mm; 10-100) was rapidly harvested from the falciform ligament (n=40), hypochondrium (n=20), diaphragm (n=18), or prerenal (n=11) area. Reconstruction was lateral (86), tubular (4) and urgent in 11. Postoperative anticoagulation was standard and venous patency and stenosis was assessed by routine CT scan. The mean radiological follow-up was 16 (1-48) months and in 32 patients (36%), the follow-up was >24 months.

Results
The mean operative time was 295 (135-600), mean blood loss was 574 ml (20-3000) and 24 (27%) were transfused. One non-related mortality, overall morbidity (n=48; 53%) and the mean hospital stay was 19 (6-75). There was no PP-related or haemorrhagic complications and no reintervention for symptomatic venous thrombosis. The patency rate was 84/90 (93%) including 74/84 (88%) with no or mild stenosis (<25% of the venous lumen) and 10/84 (12%) with moderate stenosis (25-75% of the vascular lumen).

Conclusion
This large experience with long term follow-up of venous reconstruction with the PP confirm a high patency rate without any significant related complications and PP should be the first choice for a lateral reconstruction.
A case for data: Improving surgical performance and patient outcomes through an evidence-based approach to list ordering

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Background
Current approaches to surgical list ordering are driven by a combination of patient characteristics and clinical insight. However, we question if this results in optimal outcomes. Here, we propose and demonstrate the value of an alternative, evidence-based case list.

Methods
We interrogated electronic patient records from all 38 Spire Healthcare hospitals in the UK, over a two-year period (n=478,713). The effect of operating list composition on duration of surgery, length of inpatient hospital stay and need for return to theatre (Clavien-Dindo IIIb or greater complication) was examined using machine learning and Bayesian data analysis approaches. We compared this to known prognosticators of operative outcomes; ASA and age.

Results
There was a substantial effect of operating list order for single-procedure lists: each increase in position on the list decreased operation time and length of hospital stay (p<0.0001). There was no difference in return to theatre. Combining similar procedures on operating lists resulted in shorter operative times and length of hospital stay (p<0.0001 ) with no difference in complication rate. Most importantly, we found the composition of an operating list had a similar effect on outcomes as age and ASA.

Conclusion
These data show, for the first time, a relationship between operating list composition on surgical outcomes. They suggest that the structure of a case list could help prepare surgeons to operate more effectively and yield better outcomes for patients.
A Reliable and Accurate Algorithm to Quantify the Tumor Stroma (QTS) across Tumor Entities

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Background
There a many studies that investigate tumor-infiltrating lymphocytes (TILs) and influence on survival. However, there is great heterogeneity about how to quantify. Therefore, we present a novel Quantification of the Tumor Stroma (QTS) Algorithm to reliably and accurately quantify cells of the tumor stroma.

Methods
Immunohistochemical staining of CD3 and CD8 antigens in metastatic colorectal cancer (mCRC), ovarian cancer (OvCa), hepatocellular carcinoma (HCC), and pancreatic cancer (PCa) was performed (N=80). Reliability of identification of hot spots - region with highest density of TILs - was investigated using two blinded observers. The absolute amounts of cells were compared with the intraclass-correlation coefficient (ICC). CD8+/CD3+ ratio as well as the absolute cell numbers were compared with the ICC. ZEN 2 software counting (ZC), ImageJ software with subjective threshold (ISC) and ImageJ with colour deconvolution (IAC) were compared to a manual counting using a linear regression analysis.

Results
Quantification of hot spots was reliable for one observer. The ICC for the ratio of CD8/CD3 in 1 hot spot compared to the average from 3 hot spots was consistent in all groups. The absolute cell count in 1 vs 3 hot spots presented poor accuracy. Comparison of manual counting to the computed methods showed excellent accuracy of IAC in mCRC and OvCa, whereas of ISC in HCC and PCa.

Conclusion
With the QTS Algorithm quantification of cells in the tumor stroma is reliable and accurate.
Angiogenic miRNAs and related TIE2-expressing monocytes impact outcome in human cholangiocarcinoma

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Background
Angiopoietins (Angs) and angiogenic microRNAs are associated with prognosis in tumors. Monocyte subsets express Ang-receptor TIE2 (TEMs) and exert pro-angiogenic properties associated with prognosis. However, little is known regarding their influence on tumor progression in human cholangiocarcinoma (CCA)

Methods
We analyzed surgical specimens of intrahepatic CCA (n = 88) immunohistologically for distribution of Angs and TEMs. We tested miR targeting genes encoding Angs to be associated with tumor growth (n=44). MiRNA expression and abundance of TEMs were correlated with clinicopathologic characteristics, recurrence and patients' survival.

Results
Absence of TEMs in tumor correlated with elevated CA19-9 serum levels. High Ang1 expression associated with reduced lymphangiosis carcinomatosa (all ρ<0.05). Patients characterized by invading TEMs showed a trend to reduced tumor recurrence and increased survival (p=0.159 and p=0.185). High miR-126 or low miR-128 expression was associated with improved survival (all p<0.05). In a multivariate analysis TEMs, miR-126 and low miR-128 were confirmed as independent prognosticators for survival (all p<0.05).

Conclusion
TEMs define a subgroup of patients with improved tumor characteristics and prognosis. Our study provides first evidence that angiogenic miRNAs associate with survival in CCA. Besides suggested functional links between miRNA expression profiles, angiopoietins and TEMs, our data have possible clinical implications as novel diagnostic tools.
Biocellulosis induces regeneration of the extrahepatic bile duct

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Background
Defects of the extrahepatic bile duct are a major issue in hepatobiliary surgery. In most cases, a bilioenteric anastomosis is the only treatment option. This procedure goes along with several disadvantages like recurrent cholangitis.
Aim of this prospective animal study was the evaluation of biocellulosis as a replacement material for extrahepatic bile duct defects.

Methods
In male pigs, three centimeter of the extrahepatic bile duct were resected. In the resulting defect a corresponding tube of biocellulosis was interposed. The tube was biotechnologically synthesized by Gluconacetobacter xylinus. Furthermore, a commercially available biliary stent was implanted and fixed at the tube.
12 weeks after the implantation, the animals were sacrificed.
In two pigs, stent and tube were removed in a second surgical procedure 12 weeks after implantation and the euthanasia was done four weeks thereafter.

Results
12 weeks after the implantation, the bile duct was completely regenerated. Within the group, where the tube and the stent were removed, we found a completely stable, intact extrahepatic bile duct.
Histologically, there was the typical bile structure with a biliary epithelium as the inner layer.

Conclusion
The interposition of a biocellulosis tube induces the regeneration of the extrahepatic bile duct. The tube itself can be removed easily after 12 weeks. Therefore, no foreign substance remains in situ.
Hepatobiliary application fields are liver transplantation, injuries after cholecystectomy and biliary tumors.
**Cholangiocarcinoma-associated macrophages and tumor necrosis impact survival after surgery**


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**Background**

Tumor necrosis as well as tumor-associated macrophages (TAMs) in tumor invasive front (TIF) have been suggested to have a prognostic value in solid tumors, inclusive hilar cholangiocarcinoma. However, little is known regarding their influence on tumor progression and prognosis in intrahepatic cholangiocarcinoma (iCC).

**Methods**

We analyzed surgically resected tumor specimens of human iCC (n = 88) for distribution and localization of TAMs, as defined by expression of CD68, formation of necrosis and extent of peritumoral fibrosis. TAMs, tumor necrosis and grade of fibrosis were assessed immunohistochemically and histologically and correlated with clinicopathological characteristics, tumor recurrence, and patients’ survival.

**Results**

Patients with tumors characterized by necrosis or low CD68 density showed a significantly decreased recurrence-free and overall survival. Patients with high density of TAMs in TIF or absence of necrosis showed significantly lower incidence of tumor recurrence (both p < 0.05). Absence of tumor necrosis and TAMs in TIF were confirmed as independent prognostic variables in a multivariate analysis (all p < 0.05).

**Conclusion**

High levels of TAMs in TIF or absence of tumor necrosis is associated with a significantly improved recurrence free and overall survival. These results suggest TAMs and necrosis as valuable prognostic markers in routine histopathologic evaluation, and might indicate more individualized therapeutic strategies.
Time-dependent impact of irreversible electroporation on pancreas, liver, blood vessels and nerves: a systematic review of experimental studies.

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Background
Irreversible electroporation (IRE) is a novel ablation technique for treatment of unresectable cancer. Both in experimental and clinical studies, a waiting time between ablation and tissue analysis to allow for cell death through apoptosis, is often reported. However, the dynamics of IRE effect remain unknown. Therefore, this study aims to summarize these effects in relation to time between treatment and histological evaluation.

Methods
A systematic search was performed in Pubmed, Embase and the Cochrane Library for studies using IRE on pancreas, liver or surrounding structures in animal or human studies. Data on pathology and time between IRE and histological evaluation were extracted.

Results
Thirty-six articles were included, regarding IRE in liver, pancreas, blood vessels and nerves. In liver and pancreas, the first signs of apoptosis and haemorrhage were observed 1-2 hours after treatment, and remained visible until 24 hours in liver and 7 days in pancreas after which the damaged tissue was replaced by fibrosis. In blood vessels, the tunica media, intima and lumen remained unchanged for 24 hours. After 7 days, inflammation, fibrosis and loss of smooth muscle cells were seen, which persisted 35 days. In nerves, the time until histological changes was 24 hours.

Conclusion
Tissue damage after IRE is a dynamic process with remarkable differences between tissue types. Whereas pancreas and liver showed the first damages after 1-2 hours, this may take 24 hours in nerves and even 7 days in blood vessels.