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**Introduction** We have previously demonstrated that the level of neutrophil gelatinase-associated lipocalin (NGAL) is increased in the bile of patients with pancreatobiliary malignancy. NGAL is expressed by activated neutrophils and many other cell types and is thought to have bacteriostatic, pro-proliferative and pro-metastatic functions. NGAL can be detected in the blood plasma. We hypothesised that the plasma NGAL level is elevated in patients with cholangiocarcinoma (CC) compared with patients with primary sclerosing cholangitis (PSC), and with healthy volunteers.

**Methods** Plasma samples were collected from 97 patients with confirmed CC, 62 patients with PSC and no CC and 82 healthy controls. Plasma NGAL quantification was performed in duplicate on plasma from each subject using a Quantikine ELISA kit (R&D Systems, Minneapolis, Minnesota, USA). CC and healthy control cohorts were compared using the Student t test and receiver operator characteristic (ROC) analysis. Differences between CC and PSC cohorts were then sought. Pearson's correlation analysis was used to assess relationships between the levels of NGAL and other plasma markers.

**Results** Median NGAL concentrations (range) in CC, PSC and healthy controls were 92 ng/ml (14–644), 83 (43–171) and 64 (29–132) respectively. NGAL levels were significantly higher in plasma from CC patients compared with healthy controls ( $p < 0.0001$ ). The area under the ROC curve was 0.71 (95% CI 0.64 to 0.79  $p < 0.0001$ ). NGAL levels were significantly higher in plasma samples from the CC cohort than those from the PSC cohort ( $p < 0.01$ ) with a ROC-AUC of 0.57 (95% CI 0.48 to 0.65  $p < 0.167$ ). There was no relationship between NGAL levels and CRP ( $r^2 = 0.14$ ), white cell count ( $r^2 = 0.09$ ), bilirubin ( $r^2 = 0.01$ ), ALP ( $r^2 = 0.02$ ) or creatinine ( $r^2 = 0.03$ ). There was moderate correlation between NGAL and Ca19-9 concentrations ( $r^2 = 0.38$ ).

**Conclusion** NGAL is expressed at significantly higher concentrations in the plasma of patients with CC compared to plasma from healthy controls and from subjects with PSC. This finding appears to be independent of renal impairment, cholestasis or systemic inflammatory response, suggesting that NGAL may represent a novel plasma biomarker of CC.

**Competing interests** None declared.

#### PWE-134 SINGLE INCISION VS CONVENTIONAL LAPAROSCOPIC CHOLECYSTECTOMY: A META-ANALYSIS AND SYSTEMATIC REVIEW OF RANDOMISED CONTROLLED TRIALS

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**Introduction** To systematically analyse the randomised trials comparing single incision laparoscopic cholecystectomy (SILC) vs conventional laparoscopic cholecystectomy (CLC).

**Methods** The meta-analysis was conducted according to the Quality of Reporting of Meta-analysis (QUORUM) standards. Standard electronic databases were searched to retrieve relevant randomised trials comparing SILC vs CLC and analysed systematically using RevMan®. Summated outcomes were expressed as RR and standardised mean difference (SMD).

**Results** Eleven randomised, controlled trials encompassing 859 patients were retrieved for the electronic databases. In the random

effects model, post-operative pain, post-operative complications, length of hospital stay, cosmesis score, conversion rate, additional ports insertion rate and time for return to normal activities were statistically comparable between two techniques of cholecystectomy. The SILC is associated with longer operative time. However, there was significant heterogeneity among included trials.

**Conclusion** SILC does not offer any significant advantage over CLC to treat benign gallbladder disorders. CLC may assiduously be used for this purpose.

**Competing interests** None declared.

#### PWE-135 RETROSPECTIVE AUDIT OF MANAGEMENT OF PATIENTS ADMITTED TO INTENSIVE CARE UNIT (ITU) WITH SEVERE ACUTE PANCREATITIS (SAP)

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**Introduction** Atlanta classification stratifies acute pancreatitis (AP) into mild and severe. Severe acute pancreatitis (SAP) is best managed in HDU or ITU setting and associated with high mortality and morbidity despite best efforts at attaining early diagnosis and timely intervention.

**Aim** To compare management strategies and mortality of patients admitted to ITU with SAP against national standards and study the group who succumbed to their disease in detail in an attempt to define the circumstances that lead to this event and identify the most accurate prognostic indicators in this group of patients.

**Methods** Retrospective audit of management and outcome of consecutive patients admitted to ITU with SAP during the period of 2007–2010. The development of necrosis, infected necrosis (IN) or organ failure (OF) was recorded. Patients were classified into group I (No necrosis or OF), group II (sterile necrosis or transient OF), group III (IN or persistent OF) and group IV (infected necrosis and persistent OF). The four groups were compared regarding the clinical course, radiological/surgical intervention, any post-intervention complications, use of antibiotics/antifungal and nutritional support.

**Results** 51 patients were admitted to ITU with SAP (APACHE II  $> 8$ , modified Glasgow score  $> 3$ ) during the period of 2007–2010. All cases fulfilled the Atlanta criteria of SAP. Median age:  $66 \pm 17.5$ . The pancreatitis was alcohol induced in 12% and due to gallstones in 59% of patients; no cause was found in 25% of patients. Median ITU stay was 3.23 days. The overall mortality rate during the study period (3 years) was 38% ( $n = 19$ ) above national standard of 30%. All seven patients in group IV died, five of them underwent necrosectomy and one had CT guided drainage of infected acute fluid collection. The Abstract PWE-135 table 1 shows the total number of patients and respective mortality of SAP in all four groups. Forty-one patients (80%) received antibiotics and 35 patients (69%) had nutritional support but neither of them seems to have a significant impact on survival ( $p = 0.6$  and  $0.06$  respectively). Outcome (death) correlated with organ dysfunction criteria (Atlanta criteria and APACHE II score).

Abstract PWE-135 Table 1 The mortality of SAP in the different groups

Group	Total number	Mortality	% of mortality
I	12	0	0%
II	2	0	0%
III	30	12	40%
IV	7	7	100%

**Conclusion** While the presence of infected necrosis or persistent organ failure in SAP (group III) is associated with high mortality, the combination of “infected necrosis and persistent organ failure” (group IV) is uniformly fatal. Further research is necessary to confirm the findings in our study and to explore ways of optimising patients in group III to improve survival.

**Competing interests** None declared.

**PWE-136 PRE-OPERATIVE ERCP, CHOLECYSTITIS AND MALE GENDER ARE THE MAJOR PREDICTORS OF DIFFICULT CHOLECYSTECTOMIES/CONVERSION TO OPEN SURGERY**

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**Introduction** Conversion to open surgery used to be a marker of difficult cholecystectomy. With increasing experience conversion rate has reduced significantly, but the difficulties remain the same. Both, conversion and difficult cholecystectomy have impact on operation time. The aim of this study is to identify the major predictive factors for “difficult” cholecystectomies, which are either continued laparoscopically or subsequently converted.

**Methods** A retrospective review of all the consecutive laparoscopic cholecystectomies, performed by a single surgeon, in a district general hospital in the UK, from January to December 2011, was undertaken. Association of intra-operative difficulties or conversion to open surgery, with the following factors was studied—Age, gender, liver function tests, jaundice, cholecystitis, pre-operative ERCP, pancreatitis, and radiological findings.

**Results** During the study period 180 patients underwent cholecystectomy, of which 10 were converted to open surgery (5.6%), while 30 (16.6%) others were deemed “difficult dissections” but the operations were still completed laparoscopically. Previous cholecystitis (n=45) seems to be the most important predictor of difficulty, with 71% of patients requiring conversion or being considered a “difficult dissection.” Another very useful predictor is previous ERCP (n=14), with 64.5% of these patients being either conversions or “difficult dissections.” The conversion rate and difficult laparoscopic dissection rate was 8% and 24% respectively for men (n=37) and 5% and 15% for women (n=143). Among the patients with previous pancreatitis, none required conversion and 29% had difficult dissections. The conversion and difficult dissection rates increased with age (7% and 4% for age<40, 20% and 1% for age 40–60, and 20.5% and 9.5% for age>60 respectively).

**Conclusion** Bile duct stones managed with pre-operative ERCP, cholecystitis and male gender appear to be the major predictors of difficult cholecystectomies/conversion to open surgery. This ability to predict the difficulty of the procedure might help the surgeon prepare for any technical difficulties that may arise, organise the theatre list more efficiently, and offer the patient more accurate information and counselling prior to the procedure.

**Competing interests** None declared.

**PWE-137 THE ROLE OF <sup>99m</sup>TECHNETIUM-LABELLED HEPATO IMINO DIACETIC ACID (HIDA) IN THE MANAGEMENT OF BILIARY PAIN**

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**Introduction** Biliary pain is a common presentation in the acute surgical take and the surgical clinic. In patients with normal

ultrasound findings, symptoms can sometimes be disregarded as being non-specific. We propose that in this cohort, a HIDA scan is a useful investigation, and patients with a positive test have good results following cholecystectomy.

**Methods** We obtained reports of all HIDA scans with an abnormal ejection fraction (EF <40%) performed in our centre from 15 May 2007 to 28 December 2010. This database was cross-linked with a prospectively-maintained database and electronic records of patients undergoing cholecystectomy in the same period. All patients with a positive HIDA who went on to have laparoscopic cholecystectomy (LC) were followed-up by a review of the electronic records, and a telephone interview to assess symptom improvement.

**Results** 50 patients were investigated. Mean age was 48, and majority were female. Ultrasound findings revealed no stone disease and normal gall bladder in 96%. 92% of patients were happy with the decision to proceed with LC, and 87.5% felt that their symptoms were improved (62.5% “Very Much Improved”). Post-operatively, 56.3% had no residual pain whatsoever and 31.3% had only occasional mild discomfort. The histology was pathological in 83%; 29% had stones in the gall bladder. During the HIDA scan, injection of a CCK-analogue caused pain in 56%. Symptoms were “Very Much Improved” after LC in 74% and 44% respectively in the responders and non-responders to CCK-analogue injection. The sensitivity of CCK-analogue injection was 68% and specificity was 50%.

**Conclusion** HIDA scan is a useful clinical tool in the diagnosis and management of patients with typical biliary pain and normal ultrasound. Outcomes following LC in this cohort of patients are favourable, with high patient satisfaction. The injection of a CCK analogue is a sensitive adjunct to the test, but non-response does not rule out benefit from LC.

**Competing interests** None declared.

**PWE-138 THE INCIDENCE AND MANAGEMENT OF CYSTIC DUCT STONES: THE INTRA-OPERATIVE CHOLANGIOGRAM IS MORE THAN JUST A DIAGNOSTIC TOOL**

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**Introduction** Use of the Intraoperative cholangiogram (IOC) was introduced by Mirizzi in 1931, who recommended its routine use. Currently, routine IOC during laparoscopic cholecystectomy (LC) remains a controversial issue. Unsuspected common bile duct (CBD) stones are reported in only between 2% and 3% of cases, whereas “post-cholecystectomy syndrome (PCS),” is reported in 10% - 40%. A potential cause of this is retained stones within the cystic duct (CD) remnant. We aimed to identify the intra-operative incidence of CD stones and the incidence of post-operative complications following routine IOC.

**Methods** We analysed a prospectively maintained database of all LC and routine IOC performed by the senior author. Since 7 April 2010, the incidence of CD stones/sludge was prospectively recorded—once the incision on the CD had been made, the CD and the CBD were “milked” in a retrograde fashion to remove any debris prior to introduction of the catheter for IOC. Impacted CD stones were crushed laparoscopically. We also analysed the entire database prospectively collected since 1999 for the incidence of CBD stones. T-test (continuous) and Chi<sup>2</sup> (categorical) tests were used to analyse predictors of CD stones.

**Results** 248 LC with IOC had been recorded from 7 April 2010. In this cohort, the incidence of CD stones was 13% (N=33/248) and CD sludge was 6% (N=15/248). The presence of CD stones was not