mortality ratios (SMRs) were estimated adjusting for age, sex and quintile of an area-based measure of socio-economic status, the Scottish Index of Multiple Deprivation 2006 using the population of Scotland in 2004 as the standard.

Results There were 1267 and 10 100 records that mentioned liver disease as the primary underlying cause of death in the diabetes and general populations, giving crude mortality rates of 122.4 and 50.9/100 000 person years, respectively. The major single cause of liver-related death was alcoholic liver disease which accounted for 38% and 63% of liver disease deaths among people with diabetes and the general population respectively, with HCC accounting for 24% and 9% of liver disease deaths in these populations. SMRs (95% CI) for underlying (primary) cause of death for people with diabetes compared to the general population were 169 (160–178) for all liver disease, 116 (106–126) for alcoholic liver disease and 318 (283–356) for HCC. SMRs were similar for any mention of liver disease on death certificate. SMRs for women with diabetes were higher than men. Further analyses will stratify by type of diabetes.

Conclusion Analysis of a very large population based data set has shown that people with diabetes have a raised mortality rate from liver disease compared to the general population. Management of people with diabetes should include strategies to reduce risk of liver disease.

P09 HEPATOCELLULAR CARCINOMA IN PRIMARY BILIARY CIRRHOSIS: DEFINING RISK IN AN ERA OF URSODEOXYCHOLIC ACID USE

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Introduction Hepatocellular carcinoma (HCC) is a rare complication in primary biliary cirrhosis (PBC). Current clinical guidance from the British Society of Gastroenterology advises that only male patients with histologically advanced PBC are at sufficient risk of HCC to justify enrolment in surveillance programs. In this study, we review our experience of HCC in PBC and investigate the utility of serum (s-) bilirubin as a selection criterion in determining enrolment in an HCC surveillance program.

Method Patients with HCC and PBC managed in our centre were identified from the Hepatobiliary Cancer, Liver Transplant and Liver Histopathology Databases. Demographic, clinical, biochemical and outcome data were obtained by retrospective review of the patient's case notes.

Results 32 cases of HCC in PBC patients from 1999 to 2010 were identified, including 1 with concomitant alcohol-related liver disease and one patient with an autoimmune hepatitis–PBC overlap syndrome. No patient had documented hepatitis b surface or hepatitis c antibody positivity. 81% of patients were female. 92% of patients had received ursodeoxycholic acid (UDCA). Liver biopsy result was available in 15 patients, with 7 having stage 3–4 PBC. Median age at diagnosis of HCC was 66 years (range: 42–86) and median time from diagnosis of PBC to development of HCC was 13.5 years (4.3–16). Identification of HCC was made during surveillance in 16 and assessment for liver transplantation in four patients, following hepatic decompensation in four, and incidentally in five, including in the liver explant of three patients. Median α-fetoprotein at diagnosis was 28 kIU/l (IQR: 5–204), and was elevated (>20 kIU/l) in 15 patients (50%). At diagnosis of HCC, median Mayo Risk Score, MELD, MELD-Na, UKELD and Child–Pugh scores were 6.87 (6.08–8.09), 10 (8–14), 14 (10–19), 50 (48–55) and 7, respectively, with no difference between survivors and non-survivors (p=NS) or males and females (p=NS). Median s-bilirubin was 27 μmol/l (14–54), but in 13 (41%) patients the s-bilirubin was normal. 89% (25/28) patients had evidence of portal hypertension defined by the presence of varices, splenomegaly, or ascites; including nine patients with normal s-bilirubin. There was no correlation between the presence of jaundice and outcomes or the presence of portal hypertension (p=NS). However, those patients diagnosed with HCC during surveillance were less likely to be jaundiced (31%), when compared with those with symptomatic presentations (75%).

Conclusion In our patient cohort, s-bilirubin is not an appropriate indicator of HCC risk in PBC, as most PBC patients were not jaundiced when diagnosed with HCC by surveillance. Therefore, a normal s-bilirubin should not be used to exclude patients from HCC surveillance. Further we propose that surveillance should not be limited to male patients. We hypothesise that UDCA is modifying s-bilirubin levels in PBC without altering portal hypertension or HCC risk.

P10 HIGH TROPONIN I IN ACUTE LIVER FAILURE: A MARKER OF MYOCARDIAL INJURY OR METABOLIC STRESS?

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Introduction ALF is a life-threatening multi-system illness resulting from massive hepatic necrosis. Acute liver failure (ALF), in its more severe forms is invariably complicated by progressive haemodynamic disturbances with a pattern of distributive shock; elevated cardiac output and decreased peripheral vascular resistance being the standard apart from hypoxic hepatitis of cardiac origin. A recent study demonstrated a relatively high incidence of elevated troponin I (TI) in patients presenting with ALF; elevated levels were associated with poorer outcome attributed to myocardial damage. Data pertaining to invasive haemodynamic monitoring or cardiac imaging studies have not been described in conjunction with TI measurement.

Method We prospectively collected invasive haemodynamic data (transpulmonary thermodilution cardiac output measurements PICCO) and echocardiographic studies in a cohort of patients with ALF. These data were analysed along with TI levels, taken routinely on admission to a tertiary liver centre. TI levels were considered positive if >0.05 μg/l or "high" if over the 50th centile.

Results A total of 191 patients who fulfilled criteria for ALF and subacute liver failure (ALF/SALF) were enrolled from 2007 to 2010. 121 patients had an elevated T I > 0.05 μg/l on admission (102/19-ALF/SALF, p=0.128 χ^2 test). 122 patients underwent echocardiogram; 50 of the TI negative group (TI-neg) and 72 in the TI positive group (TI-pos); p<0.001 χ^2 test. Median TI levels was 0.075 μg/L (0–8.52) in those who survived and 0.180 μg/l (0–50) in those who either died or were transplanted; p=0.051, Mann–Whitney U test. There was no statistically significant association identified in regard of regional wall motion abnormalities between TI pos/ neg groups (7/78 vs 1/36, p=0.461 χ^2 test) or TI high (>0.7) or low groups (<0.21) (6/66 vs 2/48; p=0.563 χ^2 test). A borderline association was noted between TI pos and left ventricular dysfunction (LVD) (15/70 vs 1/36, p=0.050, χ^2 test), LVD was seen in (22%) high TI vs (6%) in the low TI group. No difference in haemodynamic parameters were noted between the TI neg and pos groups for MAP (70 (50–124) vs 70 (45–180); p=0.221), Cardiac index (4.45 (3.0–6.9) vs 4.5 (2.0–7.67); p=0.336) Blood volume-ITBVI (720 (488–1186) vs 783 (426–1392); p=0.207) Lung water-EVLWI (9 (6–18) vs 9 (5–34); p=0.998; all Mann–Whitney U test). Subjects with elevated TI had an elevated median creatinine kinase (CK) (329 (6–37840) IU/L vs 81 (14–1417) IU/L (p=<0.001, Mann–Whitney U test). Elevated CK in this cohort may not be representative of cardiac damage as elevated levels secondary to rhabdomyolysis were often seen in patients presenting with recreational drug use.

Conclusion Troponin I elevation observed in ALF/SALF may not represent true myocardial injury and may be better viewed as a marker of metabolic stress. TI is not associated with directly measured haemodynamic abnormalities in ALF patients. Novel serum markers are needed to better reflect cardiovascular compromise in ALF.

P11 RETROSPECTIVE ANALYSIS TO IDENTIFY THE INCIDENCE AND PREVALENCE OF PRE-EXISTING CHRONIC LIVER DISEASE IN PATIENTS PRESENTING WITH HYPERACUTE, ACUTE AND SUB-ACUTE LIVER FAILURE

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Introduction Liver failure can be classified as hyperacute liver failure (HALF), acute liver failure (ALF), sub-acute liver failure (SALF), acute on chronic liver failure (ACLF) and chronic liver failure. The classification is dependent based upon presentation and the existence of diagnosed or undiagnosed cirrhosis. In individuals presenting with ALF/SALF, liver biopsy is not routinely performed except in exceptional cases because of the increased risk of bleeding due to their coagulopathic state. Hence, the incidence and prevalence of chronic liver disease in patients presenting with ALF/SALF has not been explored.

Method We retrospectively analysed, prospectively collected data from all patients undergoing liver transplantation for ALF/SALF from 2000 to 2010. A single liver histopathologist, blinded to the clinical diagnosis, reviewed the hepatectomy explant specimen. Based on the severity of hepatocyte necrosis, nodular regeneration and chronic inflammatory change four different histopathogical diagnosis were made; ALF, SALF, ACLF and ALF on a background of chronic inflammatory change.

Results A total of 196 patients with a clinical diagnosis of ALF/SALF (152/44, M/F 130:68, a median age 35 (16–69) underwent liver transplantation from 2000 to 2010. 149 patients had both a clinical and histopathological diagnosis in keeping with ALF. Twenty-nine of the 44 SALF patients had a compatible histopathological diagnosis of whom 19 were seronegative one with grade 3–4 siderosis, five autoimmune hepatitis (AIH) and five drug induced (non-paracetamol). Discrepancy between clinical and histopathological findings were observed in 18 patients; three in the ALF group diagnosed histopathologically as SALF (2 Budd Chiari and 1 AIH) and 15 in the SALF group diagnosed histopathologically as ALF (nine sero-neg, four AIH, two drug related). Amongst the clinical ALF group, 11 patients (10 Wilson's, 1 hepatitis B) had evidence of ACLF on histology and five patients (1 HBV, 2 seronegative , 1 Budd Chiari (B. C.) and 1 paracetamol overdose with an h/o excess alcohol) showed evidence of acute liver injury on a background of chronic inflammatory changes without fibrosis or cirrhosis. On comparing the two group's with a clinical diagnosis of ALF/SALF, as expected ALF patients were younger (mean (M) age 31.7 vs 45.3 SALF, $p<0.0001$), had higher INR (M-6.64 vs 4.2, $p<0.0001$) and a lower bilirubin (197 vs 405 $p<0.0001$) Analysis of the survival outcome in patients with a clinical diagnosis of ALF/SALF showed no difference between the two groups—log rank score 0.4, $p=0.5$. INR correlated negatively with survival in the ALF group ($r=-0.244$, $p<0.003$), whereas it was age and creatinine in the SALF group ($r=-0.699$, $p<0.0001$ and $r=-0.341$, $p<0.02$). Survival among ALF/SALF/ACLF was again not significant (log rank score 2.045, $p=0.5$).

Conclusion The incidence and prevalence of acute liver injury on a background of chronic inflammatory change is uncommon. In our HALF/ALF/SALF group, apart from Wilson's and one case of HBV no patient had evidence of cirrhosis. The clinical diagnosis of ALF/SALF using accepted criteria (history+imaging) seems to be accurate in the majority of patients without the recourse to a liver biopsy. However, liver biopsy may still be required to define optimal treatment strategies, for example, lymphoma.

P12 A PRAGMATIC TRAFFIC LIGHT SYSTEM FOR TRIAGE OF LIVER DISEASE: RESULTS IN A COHORT OF 710 SUBJECTS

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Introduction At a time when mortality for many diseases is falling, deaths from liver disease have increased fivefold over the last 30 years and have almost doubled over the last 10 years. In order to reduce liver deaths we need to pick up liver disease at a much earlier stage in the community so we need easier more accurate diagnostic methodologies. We used two serum markers and standard tests to develop a simple traffic light diagnostic modality.

Aim To develop a simple one-step traffic light diagnostic modality that could be used to triage liver disease of all aetiologies in the community.

Method Subjects were out-patients or in-patients at Southampton University Hospitals Trust between 2003 and 2009. Serum fibrosis markers hyaluronic acid and collagen P3NP were combined with FBC, INR and LFTs in a test cohort (n=119) with a firm diagnosis of the stage of fibrosis. On the basis of the test data, a simple clinical traffic light algorithm was created using HA, P3NP, INR, Albumin, and platelets. An evaluation cohort of 591 subjects, of whom 278 had independent staging of fibrosis, was used to AUROC validate the model and compare a modified binary logistic model—in the abstract data sets are combined.

Results

Abstract P12 Table 1 Original traffic light all subjects with staged fibrosis n=39

	Green	Amber	Red	
No fibrosis	31	26	20	77
Progressive fibrosis	22	48	109	179
Cirrhosis	2	4	135	141
	55	78	264	397

Survival in all subjects n=710.

Conclusion The traffic light system detected 98% of subjects with cirrhosis and 88% of subjects with progressive fibrosis, in the latter mortality over 5 years was not increased. We envisage this system being used to inform subjects about the need to moderate high risk behaviour, and triage subjects with severe disease to secondary care. Repeat testing at 5-year intervals in increased risk groups should have the potential to pick up most cases of significant liver disease before a fatal presentation to hospital. The traffic light system has been applied to the detection of liver disease in a community sample of 10 000 in the ALDES study funded by NIHR.

P13 ALLO- AND AUTO-ANTIBODY RESPONSES IN ALCOHOLIC LIVER DISEASE AS BIOMARKERS OF PROGNOSIS

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Introduction Alcoholic liver disease (ALD) frequently has a poor prognosis and in many populations, including in the UK, its impact is growing as a result of alcohol consumption patterns. Whereas abstinence from alcohol is clearly the optimum approach to treatment, patients need to survive the initial episode of liver disease in order to benefit. Although the trigger for ALD is self-evident, the