

models such as the Model for End Stage Liver Disease (MELD) or intensive care prognostic schema accurately predict hospital mortality. Multivariate methods applied to nuclear magnetic resonance (NMR) spectroscopy of serum have demonstrated correlation with MELD score but whether metabolic profiling predicts outcome in these patients is unknown.

Methods 80 patients referred to Kings College Hospital with decompensated cirrhosis were studied with 20 healthy controls. Plasma was drawn on admission for subsequent ^1H NMR spectroscopy using a Carr-Purcell-Meiboom-Gill sequence in a 600 MHz Bruker Avance spectrometer. Full resolution NMR spectra were used in an orthogonal projection to latent structures discriminant analysis (OPLS-DA) to predict hospital mortality.

Results Patients had a median (range) age of 55 (23–75) years with 51 (64%) male. Aetiology of cirrhosis was alcohol related in 40 (50%), autoimmune in 15, viral hepatitis in 10, non-alcoholic steatohepatitis (NASH) in 5, with haemochromatosis and cryptogenic cirrhosis the causes in the remainder. Median (range) MELD score was 14 (6–40) with 18 patients not surviving to hospital discharge. The OPLS-DA model accurately discriminated between patients and healthy controls ($R^2(X)=0.65$, $R^2(Y)=0.84$, $Q^2(Y)=0.76$, cross-validated (leave-one out) sensitivity and specificity 100%, CV-ANOVA $p=10^{-27}$). Metabolites increased in patients were lactate, tyrosine, and glucose with LDL, VLDL and phosphocholines being increased in controls. OPLS-DA accurately discriminated between survivors and non-survivors ($R^2(X)=0.63$, $R^2(Y)=0.64$, $Q^2(Y)=0.37$, sensitivity 100%, specificity 95% CV ANOVA $p=10^{-6}$). Metabolites increased in non-survivors included lactate, tyrosine and phenylalanine with lipid and phosphocholine resonances reduced in non-survivors. Removing 1/3 of patients at random from the learning set, remodelling and predicting outcome for these patients resulted in an AUROC of 0.95 (95% CI 0.87 to 1.00, sensitivity 93%, specificity 86%) for predicting survival using NMR profiling in comparison with 0.78 for MELD ($p<0.001$).

Conclusion Plasma metabolic profiling with ^1H NMR spectroscopy in patients with cirrhosis and acute-on-chronic liver failure can accurately describe a metabolic phenotype of non-surviving patients. Validation of these techniques in larger datasets is required.

Competing interests M McPhail: Grant/Research Support from: Wellcome Trust, UK, D Shawcross: None Declared, I Coltart: None declared, E Want: None declared, K Veselkov: None declared, M Crossey: None declared, C Willars: None declared, G Auzinger: None declared, J O'Grady: None declared, W Bernal: None declared, E Holmes: None declared, J Wendon: None declared, S Taylor-Robinson: None declared.

PTU-047 THE CLINICAL UTILITY AND COST-EFFECTIVENESS OF NON-INVASIVE TESTS FOR DETECTING FIBROSIS IN PATIENTS WITH SUSPECTED ALCOHOL-RELATED LIVER DISEASE

doi:10.1136/gutjnl-2012-302514c.47

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Introduction The use of non-invasive liver tests (NILTs) for assessing hepatic fibrosis carries fewer risks than liver biopsy. However, their clinical utility and cost-effectiveness, in patients with suspected alcohol-related liver disease, are unknown. This study explored whether the Enhanced Liver Fibrosis (ELF) test, FibroTest, and FibroScan are likely to be cost-effective in a UK setting.

Methods Systematic reviews of the clinical effectiveness of the three NILTs under study and of the morbidity/mortality associated with

liver biopsy were undertaken and used, where possible, to populate a mathematical model constructed to simulate the experience of patients suspected of having alcohol-related liver injury. The model used the following strategies: (1) biopsy all; (2) use a NILT for triage and biopsy more selectively; and (3) use a NILT alone to determine diagnosis and subsequent management. Thirty-six separate scenarios were evaluated varying the type and sensitivity of the liver biopsy, the accuracy of the non-invasive tests, and the disutility associated with the biopsy procedure.

Results No clear conclusions could be drawn, following the systematic reviews, about the accuracy of these three NILTs in the diagnosis of alcohol-related liver disease because there was significant heterogeneity in the published studies, particularly in relation to drinking behaviour and diagnostic cut-offs. The assessment was also confounded by the paucity/absence of data on: (1) the sensitivity of the liver biopsy; and (2) the difference in costs and health between abstinent patients and those who continued to drink. There was wide variation in the threshold level for a decrease in abstinence rates using NILTs in both triage and replacement strategies. The maximum threshold value was 6.1 percentage points with the minimum value being zero percentage points. There was also wide variation in the threshold levels for the incidental gains associated with biopsy using NILTs in both triage and replacement strategies. The maximum value was 0.188 QALYs with the minimum value being zero QALYs.

Conclusion The clinical utility and cost-effectiveness of these three NILTs cannot be assessed, at the present time, primarily because information on the key variables needed to populate the model are lacking. Thus, caution should be exercised in their use, in patients with suspected alcohol-related liver disease, at the present time.

Competing interests None declared.

PTU-048 RIFAXIMIN FOR THE TREATMENT OF HEPATIC ENCEPHALOPATHY; A META-ANALYSIS OF RANDOMISED STUDIES

doi:10.1136/gutjnl-2012-302514c.48

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Introduction The non-absorbable antibiotic rifaximin has been used to treat hepatic encephalopathy (HE) since the 1980s. Interest in its use increased following a recent Phase III study showing that treatment with rifaximin over 6-months resulted in a relative reduction in the risk of breakthrough HE of 58% compared to placebo (Bass *et al*, 2010). The aim of this study was to evaluate the efficacy and safety of rifaximin for the treatment of all types of HE in patients with cirrhosis against a variety of comparative regimens.

Methods A language unrestricted search for papers published between January 1983 and September 2011 was undertaken utilising 11 databases. All HE treatment trials were scrutinised and randomised trials identified. Raw data were obtained from six trials. Data were extracted on (1) the numbers of patients showing improvement overall; (2) the means ($\pm 1\text{SD}$) for mental state, asterixis, number connection tests (NCT), EEG and blood ammonia; and (3) adverse events. Fixed effect model meta-analyses were applied, subdivided by population type. Random effects analyses were used when statistically significant heterogeneity of results occurred. Overall relative proportions were calculated for binary outcomes and standardised mean differences (SMD) for quantitative outcomes.

Results 17 trials were identified comparing rifaximin to non-absorbable disaccharides (9 trials), other antibiotics (6 trials) or "no