was used to identify factors that increased length of stay beyond the median for the overall population.

Results We identified 719 exacerbations between 1/4/2013- 31/3/2014. The number of exacerbations ranged from 157–228/quarter with the winter quarters (Q3/4) being associated with the highest exacerbation frequency. Exacerbators had a median (IQR) age of 46 (31–64) years, length of stay of 2 (1–5) days, Charlson score 4[4–4]. The majority of patients were female (72%). The percentage of repeat attender was 12% of the total population with the highest percentage in the winter quarters. Logistic regression models identified that ethnicity (non-white/Caucasian), baseline admission CRP, neutrophil count, age, coding of status asthmaticus and Charlson co morbidity index significantly increased length of stay beyond the median of 2 days. In contrast neither admission or highest ever blood eosinophil count influenced the median length of stay.

Conclusions We have identified a number of factors associated with an increased length of stay in asthma hospital exacerbations in Leicester. Our observations support the notion that age, comorbidity and biochemical features of infection rather than eosinophilic inflammation increase length of stay. Further research is required to examine the mechanisms that underpin asthma admissions in this population and to reduce length of stay.

COPD phenotyping

P58 A COMPARISON BETWEEN THE CLINICAL FEATURES OF PISZ AND PIZZ PATIENTS WITH ALPHA-1 ANTITRYPSIN DEFICIENCY

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Introduction Alpha-1 antitrypsin deficiency (AATD) is a hereditary disorder affecting about 1 in 3000 people in the UK commonly associated with early-onset emphysema. There are two common deficiency alleles - PiS and PiZ. PiZZ patients have severe AATD, with levels of 10–15% normal. PiSZ patients have less severe deficiency (≈ 40% normal) and are generally thought to have a minimal risk. We hypothesised that if PiSZ patients were at lower risk of COPD than PiZZ, and their lung disease would be more characteristic of usual COPD than that of PiZZ patients.

Method 104 PiSZ patients and 638 PiZZ patients from the UK AATD registry (ADAPT) were compared for their demographics, lung function, risk factors for COPD (e.g. smoking, occupation), co-morbidities associated with COPD, index status (i.e. if diagnosed due to lung disease or family screening) and CT densitometry (where available). Outcome in terms of lung function decline and mortality was also assessed. Univariate statistics were used to guide subsequent regression analyses.

Results Emphysema was more likely in PiZZ than PiSZ patients (OR 11.0 (5.7–21.3); $p < 0.001$) in the regression analysis after accounting for age, pack years and lung index status. PiZZ patients also had significantly worse FEV1 and DLCO than PiSZ patients in similar regression models (both $p < 0.01$). Emphysema was more severe in both upper and lower zone (both $p < 0.01$), and proportionately greater in the lower zone (UZ/LZ VI = 1.5 v 1.2) in PiZZ patients. Mortality and DLCO decline were also greater in PiZZ patients.

Conclusion PiSZ patients have a milder form of AATD associated with better lung function. The data suggests the pattern of emphysema is closer to usual COPD than classical AATD. Further analyses comparing PiSZ to PiMM are now ongoing.

P59 UTILITY OF FIB4 SCORE AND LIVER DISEASE IN ALPHA-1 ANTITRYPSIN DEFICIENCY (A1ATD)

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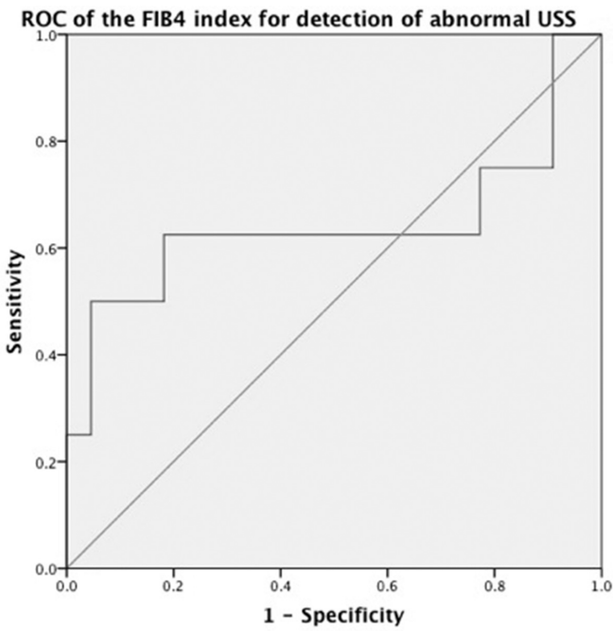
Introduction A1ATD is an autosomal co-dominant condition where homozygosity for the Z-allele results, classically, in emphysematous lung involvement, and liver fibrosis dependant on polymerisation rate of aberrant protein.[1] The FIB4 score non-invasively estimates risk of liver fibrosis,[2] but has not previously been investigated in A1ATD. We completed preliminary assessment of the utility of FIB4 in our A1ATD cohort. Whilst the standard of care in A1ATD should be joint respiratory-hepatology services, not all patients are able to access this. A simple tool to guide referral to hepatology services could therefore be clinically useful to the respiratory community.

Methods We report data from 30 PiZZ patients with ultrasound (USS) characterisation of liver disease. An abnormal USS was considered as any abnormality other than cysts, thus including features of cirrhosis and fatty infiltration. FIB4 was calculated as [Age (years)xAST(U/l)]/[Platelets (10^9)xALT(U/l)]. The most recent lung physiology was recorded as FEV1 (%predicted), diffusion coefficient (KCO,%predicted) and residual volume (RV,% predicted). Body mass index (BMI) was calculated.

Results The 30 patients had a mean age of 54 ± 12.4 years, 14 were male. Lung function showed mean FEV1 1.85 ± 1.12 L



Abstract P59 Figure 1 ROC of the FIB4 index for detection of abnormal USS

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(61.3 ± 30.9%), KCO 1.05 ± 0.40 mmol/min/kPa/L (66.4 ± 22.2%) and RV 3.58 ± 1.36 L (171.8 ± 50.4%). The mean FIB4 was 1.76 ± 1.36. Eight (26.7%) patients had liver disease on USS. FIB4 cut-off values of 1.45 and 3.25 were utilised, as they are widely validated.[3] Of patients >3.25, 100% had abnormal scans (PPV 100%), and of patients <1.45, 15.8% had abnormal scans (NPV 82%). FIB4 enabled correct identification of patients with abnormal USS with an area under a ROC curve of 0.642. We demonstrate a relationship between liver involvement in A1ATD and BMI. Those with higher FIB4 had higher BMI ($r = 0.453$, $p = 0.008$). We found no relationship between FIB4 and severity of lung involvement.

Conclusions The FIB4 score, calculated from routine laboratory variables and age, may be useful to rule in and out significant liver involvement in A1ATD with reasonable sensitivity and specificity. Further work is required for validation against biopsy, the gold-standard assessment. We confirm a previously noted lack of association between liver disease and emphysema severity,[4] and highlight the association between higher BMI and higher fibrosis risk in A1ATD.

P60 CANNABIS LUNG CAUSING DEBILITATING EMPHYSEMA: ARE WE ON THE VERGE OF AN EPIDEMIC?

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Introduction and objectives Cannabis (or marijuana) is the world's most widely-used illicit drug, according to UN drug report 2012 prevalence of cannabis use between 15–64 years of age is around 1.7% in Europe and 2.6% in USA.[1] It is particularly prevalent amongst adolescents and young adults. As societies reconsider the legal status of cannabis, policy makers and clinicians require sound knowledge of the acute and chronic effects of cannabis. There has been surprisingly little research into its effects on respiratory health. In a rural region of North Wales we have noticed an increasing number of young patients presenting with precocious bullous emphysema associated with very high tobacco and cannabis usage.

Methods A series of 8 patients presenting through the Emergency Department with an exacerbation of COPD were noted to have precocious COPD associated with high cannabis use. The age was between 35–48, all had both physiological and radiological signs of advanced emphysema. All had at least 10–20 years of cannabis usage smoking more than 5 'joints' per day. Of these, 4 patients were significantly impaired to require long term oxygen therapy, and one is actively listed for a single lung transplant. All had normal levels of alpha 1 antitrypsin and chymotrypsin.

Results We found young patients with debilitating COPD secondary to cannabis use i.e. as less as 10 years of use.[2] We postulate that cannabis smoking leads to severe COPD in young patients independent of genetic susceptibility, which is on the verge of increase.

Conclusions The addition of cannabis to the tobacco, and high usage at a young age is leading to increase in the incidence of COPD in general and bullous emphysema as a phenotype in particular. We are concerned that the dangers of cannabis inhalation and these risks are not being appreciated by the wider health community. More research is needed to know the mechanisms of the inflammatory response secondary to cannabis smoking.

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P61 THE PREVALENCE OF HYPERCAPNIA IN PATIENTS WITH ALPHA-1-ANTI-TRYPSIN DEFICIENCY (AATD)

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Introduction Hypercapnia in the acute phase of COPD exacerbation is common, with CO_2 >6 kPA in 44% of patients at some point during their admission. Little data exists on the prevalence of hypercapnia in stable COPD patients, and even less in those with AATD. As emphysema is more predominant in the lower lobes of AATD patients, this is likely to contribute to hyperinflation and hence potentially increase CO_2 levels.

Methods The Birmingham AATD database (ADAPT) is a registry of with over 1000 patients with AATD. The registry has basic demographics, detailed spirometric parameters as well as baseline blood gases. Hypercapnia is defined as CO_2 greater than 5.5 kPa.

Results The blood gas results of 766 (PiZZ genotypes) individual patients were available for analysis. 93 patients (12.14%) had a type 1 respiratory failure, defined as a PO_2 <8 kPa, 69 had hypercapnia (9.01%) and 16 (2.09%) patients fulfilled both criteria. There is a statistically significant difference seen in the hypercapnic vs non-hypercapnic population with regards to FEV_1 (1.07 vs 1.46, $p = 0.01$), FVC (3.45(CI 3.1–3.81) vs 3.82, $p = 0.02$) and BMI (27.1 vs 24.9, $p = 0.02$). There is no difference in the amount of upper zone emphysema (29.54 vs 30.50 (CI 29.12–33.01)) or lower zone emphysema (40.66 vs 49.13 (CI 42.64–47.32)). Chi-squared analysis of lower zone predominance (lower zone – upper zone) showed no statistical difference either ($p = 0.76$). Factors clinically significant in univariate analysis were taken forward to logistic regression analysis where BMI was the only clinically significant ($p = 0.008$) predictor.

Conclusion Hypercapnia is relatively common amongst AATD patients, but Type 2 respiratory failure is uncommon. There is an increased risk of hypercapnia with worse FEV_1, FVC and higher BMI. The presence or location of emphysema did not seem to influence the CO_2 levels.

P62 CORRELATION OF QUANTITATIVE CHEST CT MEASURES WITH LUNG FUNCTION AND FUNCTIONAL PARAMETERS IN A COHORT OF MODERATE TO VERY SEVERE COPD PATIENTS

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Introduction COPD is a heterogeneous condition consisting of a number of different clinico-pathological subgroups (phenotypes), leading to particular challenges in managing the condition. Recognising these phenotypes may assist in directing the choice of treatment options. CT is being investigated as a tool for identifying key morphological features seen in COPD. Computer

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