f). And perfusion notably reduced, in the RUL (Figure 1c. ^{3}He apparent diffusion coefficient (ADC), which estimates acinar airway dimensions, was elevated and heterogeneous (Figure 1c), consistent with hypoplasia. The left lung was well ventilated and perfused with normal ADC values.

Conclusion ^{3}He MRI shows promise in functional analysis of "horse-shoe" lung with hypoplasia. This can prove useful in surgical assessment of these patients and therefore improve their management.

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P286 CORRELATIONS OF FUNCTIONAL MULTI-NUCLEAR MR IMAGING INDICES WITH PULMONARY FUNCTION TESTS IN THE ASSESSMENT OF IDIOPATHIC PULMONARY FIBROSIS

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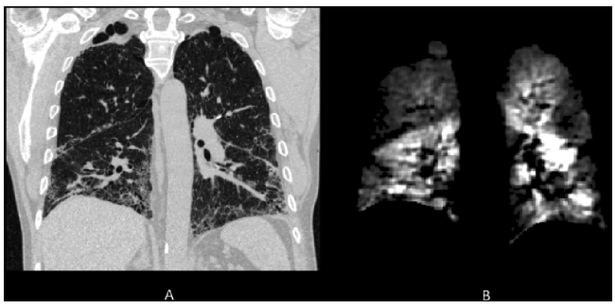
10.1136/thoraxjnl-2015-207770.422

Disease progression in idiopathic pulmonary fibrosis (IPF) is variable and unpredictable. Declining forced vital capacity (FVC) and transfer factor (TLCO) of 10% and 15% respectively are common markers of deterioration, but may be insufficiently sensitive to prognosticate and rely on serial measurements. Echocardiography provides screening for pulmonary artery hypertension (PAH), but is insensitive to pulmonary haemodynamic change before PAH is already apparent. Recently established Magnetic Resonance Imaging (MRI) techniques may provide insight into evaluating IPF. Greater septal thickness as measured by hyperpolarised xenon in patients with IPF compared with with healthy volunteers was previously demonstrated.[1] Here, we investigate the correlation between MRI indices, including hyperpolarised gas ventilation and gadolinium-enhanced perfusion, with pulmonary function parameters in a pilot cohort of subjects with IPF.

Six subjects with IPF were recruited. T1 mapping was performed in all subjects. Imaging sequences following inhalation of hyperpolarised 3-Helium was used to calculate estimates for ventilated volume percentage (VV%) and coefficient of variation of ventilation (CoV). Dynamic contrast-enhanced lung perfusion MRI was performed for pulmonary haemodynamic assessment All subjects underwent pulmonary function testing (PFTs).

VV% strongly correlated with transfer coefficient (KCO) with R = 0.955; p = 0.003, but also FEV (forced vital capacity)/FVC ratio. CoV is a measure of regional ventilation heterogeneity and trended to correlation with transfer factor TLCO (R = -0.775; p = 0.108). Time to peak (TTP) of the gadolinium perfusion signal showed negative correlation with FVC (R = -0.909 with p < 0.05) and trended to a negative correlation with TLCO (R = -0.766, p = 0.131). All p values two-tailed.

TTP correlation with PFT values suggests that changes in pulmonary haemodynamics may be detectable at an early stage of the disease process. VV% and helium mapping may provide information about regional airways ventilation in IPF. MRI based assessments could prove useful in assessing different aspects of lung structure-function for use in future research and potentially in clinical assessment of patients with IPF. Sequential imaging with concurrent PFT and echocardiography would help to further assess the applicability of evolving MRI techniques.



Abstract P286 Figure 1 From the same patient: coronal slice computed tomography (A); 3-Helium ventilation map (B)

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P287 OFFLINE FRACTIONAL EXHALED NITRIC OXIDE AND BREATH FREQUENCY

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10.1136/thoraxjnl-2015-207770.423

Introduction/objectives Fractional exhaled nitric oxide (FeNO) is a noninvasive method of assessing airway inflammation and recommended by NICE (2014) to aid asthma diagnosis and management. Offline measurement techniques demonstrate comparable results to online and are more practical in certain clinical settings, particularly in young children who struggle with online measurements. International guidelines (ATS/ERS 2005) recommend targets for pressure and flow but not for the number of breaths per sample. Young children may take multiple breaths to complete offline reservoir filling, but whether this influences results due to contamination of the sample with ambient gas from equipment deadspace has not been assessed. Our aims were to investigate the magnitude of such effects and form a predictive equation for how increasing breath number dilutes offline measurements.

Methods A prospective observational study was undertaken recruiting 20 volunteers aged 18–42 years (13 female). FeNO was measured online (Medisoft Exp'Air 2001) and offline following exhalation into a one-litre Tedlar bag using one, five or ten breaths to complete bag filling. Airway pressure was maintained above 5 cmH_2O to ensure velum closure and expiratory flow at 50 (+/-5) ml/s.

Predicted percentages of offline FeNO relative to online were calculated by:

- 100 – ((equipment deadspace (53 mls) x no of breaths)/bag volume) *100
- Predicted offline values were compared to measured.

Results The median (IQR) online FeNO in parts per billion (ppb) was 24 (14–30) ppb. There was a significant reduction in offline FeNO with increasing breath number (p < 0.0001). Median (IQR) offline FeNO of 1-breath (22 (15–32) ppb) was