promote PASMC proliferation ($p < 0.001$). In contrast, miR-34a-5p and -3p mimic suppress PASMC proliferation ($p < 0.05$ and $p < 0.001$ respectively). Additionally, transfection with miR-34a-3p increases caspase-3/7 activities in PASMC ($p < 0.0001$).

Conclusions Reduced miR-34a-5p levels associate with increased disease severity and poor prognosis in PAH. MiR-34a-5p and -3p levels regulate PASMC proliferative-phenotype in response to PDGF. This research identifies miR-34a-5p and -3p as potential biomarkers, subsequent network analysis may identify novel disease mechanisms. Further experiments in preclinical models are currently underway.

P246 THE IN VITRO EFFECT OF COMMONLY USED VASODILATORS ON HUMAN PULMONARY ARTERY

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Introduction Acute pulmonary hypertension following cardiac surgery can have a significant effect on post-operative morbidity and mortality. The phosphodiesterase inhibitor sildenafil and the nitric oxide donor Sodium-Nitroprusside (SNP) are commonly used to treat pulmonary hypertension. The aim of this study was to characterise the pharmacological effects of clinically used vasodilators on the human pulmonary vasculature in comparison to the endogenous pulmonary vasodilators Atrial Natriuretic Peptide (ANP) and Brain Natriuretic Peptide (BNP).

Methods Research ethics committee approval was obtained for the use of human tissue for this study. Patients undergoing lung resection were consented for their resected lung tissue to be included in the study. Patients under the age of 18 and who cannot give informed consent were excluded from the study and twelve patients were enrolled in this study.

Pulmonary arteries were dissected from disease free areas of lung resection and 35 PA rings of internal diameter 2–4 mm and 2 mm long were prepared. PA rings were mounted in a multiwire myograph system containing Krebs-Henseleit solution (aerated with 21% O₂: 5% CO₂ at 37°C) for measuring changes in isometric tension. A basal tension of 1.61 g was applied and the rings left to equilibrate for 60 min. After equilibration rings were pre-constricted to 11.21 μ M PGF₂ α (EC₈₀) then concentration response curves were constructed to Sildenafil, SNP, ANP and BNP by cumulative addition to the myograph chambers. The Integrity of the endothelium was confirmed with 1 μ M Acetylcholine and smooth muscle viability was confirmed by exposure to potassium chloride.

Results ANP was the most potent and effective vasodilator whereas BNP had little effect. SNP was marginally less potent and effective than ANP and the maximum effect of sildenafil was about 50% that of ANP. The EC₅₀ for ANP, BNP, Sildenafil and SNP were 1.105 nM, 28.78 nM, 1.06 μ M and 22.6 nM respectively.

Conclusion This study demonstrated the differential effect of commonly used agonists on pulmonary vascular reactivity and this is the first comparison of these agents in human pulmonary arterial tissue. These effects may need to be considered in the clinical setting.

Abstract P246 Figure 1 Combined concentration response curve to ANP (n = 8), BNP (n = 7), Sildenafil (n = 12) and SNP (n = 8), n = number of PA rings used. The EC₅₀ of ANP, BNP, Sildenafil and SNP were 1.1 nM, 28.78 nM and 22.6 nM respectively

Respiratory Physiology

P247 SPECIFICITY OF DYSPNOEA RELIEF WITH INHALED FUROSEMIDE

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Introduction Dyspnoea is prevalent and reduces quality of life in patients with chronic disease. Inhaled furosemide offers a potential complementary novel treatment for these patients. The mechanism of action is unclear but current theory suggests sensitisation of slowly adapting pulmonary stretch receptors (saPSR) altering neural feedback that informs the brain of the level of breathing. Clinical dyspnoea comprises several components including air hunger (AH; an uncomfortable urge to breathe) and a sense of breathing work/effort (WE) which are thought to arise from different neural pathways. We therefore hypothesised that inhaled furosemide would relieve AH but not WE.

Methods A double-blind, placebo-controlled trial was conducted on healthy volunteers ($n = 16$; 9 males). Test sessions involved 3 inhalations of furosemide (40 mg) or saline (4 ml) separated by 30–60 mins. Order of inhalations was furosemide-saline-furosemide in half the subjects and saline-furosemide-saline in the other half. Before and after each inhalation, AH was induced with hypercapnia (mean $\pm$ SD $\text{PCO}_2 = 49.8 \pm 3.7$ mmHg) and constrained ventilation (mean $\pm$ SD 9.2 ± 1.5 l/min) on one test-day while WE was induced with targeted ventilation (mean $\pm$ SD 16.6 ± 3.1 l/min) and external resistive load (20cmH₂O/L/s) on the other test-day. During saline inhalations 1.5 mg furosemide in 15ml saline was infused to match the expected systemic absorption of furosemide from the lungs over 15 mins of inhalation. Corresponding infusions of saline during furosemide inhalations maintained blinding from noticeable diuresis. Subjects rated AH or WE every 20s on a visual analogue scale (VAS). Hypercapnia (AH) or targeted ventilation (WE) were imposed for 4 mins and the ratings in the last minute were analysed using Linear Mixed Model procedure (SAS 9.4).

Results The final model produced a main effect of mist (furosemide or saline; $p = 0.016$), time (pre or post inhalation;

$p = 0.047$) and a significant condition (AH or WE)*mist interaction ($p = 0.004$). Mean $\pm$ SE AH was significantly lowered by inhaled furosemide relative to inhaled saline (-9.7 ± 2.1 mm VAS; $p = 0.0015$) but mean $\pm$ SE WE was not ($+ 1.6$ mm ± 2.4 ; $p = 0.903$).

Conclusion Inhaled Furosemide is effective at relieving AH, but not WE. This is consistent with a mechanism involving modulation of parenchymal lung mechanoreceptor activity leading to dyspnoea relief that specifically applies to the AH component. The treatment may therefore benefit patients with the most unpleasant form of dyspnoea.

P248 PATIENT ELIGIBILITY FOR ANTI-FIBROTIC THERAPY IN IDIOPATHIC PULMONARY FIBROSIS CAN BE ALTERED BY USE OF DIFFERENT SETS OF REFERENCE VALUES FOR CALCULATION OF FVC PERCENT PREDICTED

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Introduction Antifibrotic drugs for idiopathic pulmonary fibrosis (IPF) patients in England and Scotland are only available to those with FVC percent predicted (FVC%pred) less than or equal to 80%. The prescribing guidance does not state which reference values should be used.

Aims

To find out if the use of different sets of reference values affects the numbers of patients with FVC%pred greater than and less than 80%.

To find out which reference equations were in use at UK centres prescribing antifibrotics for IPF in April 2016.

Methods We searched databases for patients diagnosed with IPF at our interstitial lung disease (ILD) unit from 1/1/2010 to 31/12/2015. We calculated FVC%pred using three different sets of reference values (ECSC, GLI or NHANES). The chief respiratory physiologist in each ILD centre in England was contacted and asked which reference values they used to calculate FVC%pred. In Scotland, four hospitals with an ILD MDT were contacted and asked the same. McNemar tests were used to compare the proportion of patients eligible for antifibrotic prescription when FVC%pred was calculated by ECSC or either NHANES or GLI.

Results See Table 1. We identified 671 unique patients: after exclusions, 528 had complete data.

There was a higher proportion of patients calculated to have an FVC%pred $>80\%$ (ineligible for antifibrotics) using ECSC than GLI: Chi-square 22.0, 1df, $P < 0.0001$. The difference in proportions was greater when ECSC was compared to NHANES: Chi square 33.03, 1df, $P < 0.0001$. Of 30 patients with ECSC FVC%pred 80–85%, 27 [90%: 95% CI: 79–100%) had their FVC%pred fall to $<80\%$ when recalculated with NHANES.

18 of 20 ILD centres in England were using ECSC to calculate FVC%pred; others used GLI ($n = 1$) and Falaschetti ($n = 1$). All four Scottish centres were using ECSC.

Discussion Many patients with ECSC FVC%pred too high for antifibrotics fall into the eligible range when NHANES, the set of reference values used in the ASCEND pirfenidone trial, or GLI, as recommended by the UK Association for Respiratory Technology and Physiology (ARTP) are used.

Conclusions We urge physicians and physiologists to ensure that reference values used to calculate FVC%pred are cited in lung

Abstract P247 Figure 1 Mean $\pm$ SE changes in VAS ratings before and after inhaled furosemide relative to the change before and after inhaled saline for experimentally induced air hunger (AH) and experimentally induced breathing work/effort (WE) in 16 healthy individuals.