

**P145 MEDICAL CO-MORBIDITIES IN PATIENTS REFERRED FOR SPECIALIST ASSESSMENT OF INDUCIBLE LARYNGEAL OBSTRUCTION AND DYSFUNCTIONAL BREATHING**

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**Introduction** As part of our tertiary multi-disciplinary complex breathlessness service we run a weekly 'one-stop assessment day' for new referrals. Referral requests include assessment of refractory breathlessness felt due to inducible laryngeal obstruction (ILO) and/or dysfunctional breathing. Patients undergo clinical history and evaluation, spirometry, fractional exhaled nitric oxide (FENO), blood testing and laryngoscopy (with challenge if appropriate).

**Aims** To evaluate initial clinical plans of those attending one-stop assessment days and understand the prevalence and type of medical comorbidities.

**Methods** Patient demographics and clinical data were retrospectively collated from clinical records of individuals who attended for assessment between November 2016 and June 2017.

**Results** Full assessments were available for 79 patients [72% female; mean (SD) age 45.6 (13.6) years; FEV<sub>1</sub> (n=40) 2.6 (0.7) L; FVC (n=40) 3.3 (0.9) L; FENO (n=33) 39.0 (41.2) ppb; blood eosinophils (n=68) median (range) 0.2 (0.1–2.9) x10<sup>9</sup> cells/ml]. Fifty two percent had endoscopically confirmed inspiratory ILO, and of these 15% had an associated dysfunctional breathing pattern. Initial clinic plans included instigation of medical treatment (n=12), further investigations of untreated co-morbidities (n=33), speech and language therapy treatment (n=30), physiotherapy assessment and treatment (n=9) and onward referral to non-respiratory specialists (n=5). Of those requiring further investigation 73% were asthma related and 21% were for reflux. Medical treatments instigated were mainly related to asthma or bronchiectasis (92%). Secondary analysis of those needing further investigation or medical treatment revealed 39% had inspiratory laryngeal obstruction, 13% had exaggerated expiratory closure, and 23% had noted laryngeal hypersensitivity alone.

**Conclusion** There is a significant proportion of individuals who have untreated or under investigated co-morbidity (predominantly asthma) when referred for specialist complex breathlessness assessment. Those with untreated disease demonstrated abnormal responses in the upper airway and further support the relationship between ILO and asthma. Optimised medical intervention is important to ensure any aggravants of secondary diagnoses (e.g., ILO) are addressed adequately and their impact is minimised.

**P146 CAN MASKS PROTECT YOU FROM AIR POLLUTION?**

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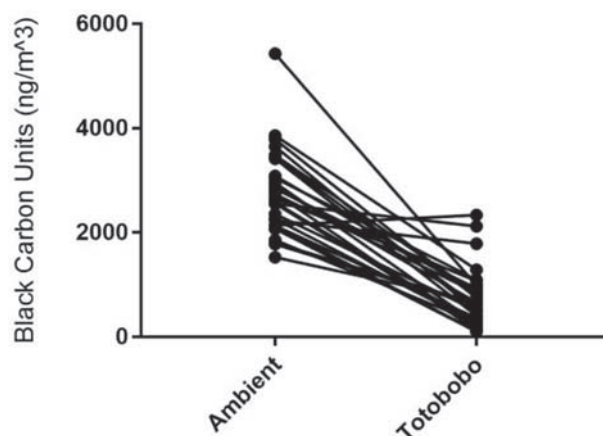
**Introduction** Inhalation of diesel soot (black carbon) is associated with respiratory morbidity and mortality. Numerous facemasks that claim to reduce inhaled dose are available commercially, often aimed at the cycling community. To date

it remains unclear whether these actually reduce exposure. In this study we sought to assess the effectiveness of some of masks available in the UK.

**Methods** We chose to assess 5 facemasks; i) Totobobo, ii) FFP3 industrial, iii) surgical, iv) Respro City Anti-Pollution, and v) Dettol Protect+. Masks were placed using an air tight seal at one end of a spacer chamber (Aerochamber). Researchers breathed through the spacer, and air within the spacer chamber sampled by an aethalometer (MicroAeth AE51) every 30 s. For each 30 s period, spacer black carbon (ng/m<sup>3</sup>) was compared with ambient black carbon. Each mask was tested for at least 15 min on the pavement of busy roads in Marylebone and Whitechapel. Data are expressed as; i) mean of difference (±SEM) between ambient and spacer air black carbon and ii) as percentage reduction of mean black carbon. Data are compared by paired T-test.

**Results** Totobobo mask was the most effective with a mean difference of -2022 ng/m<sup>3</sup> (±175 ng/m<sup>3</sup>, p<0.0001; 71% reduction, figure 1). The FFP3 mask had a mean difference of -1613 ng/m<sup>3</sup> (±204 ng/m<sup>3</sup>, p<0.0001; 44.2% reduction); Dettol Protect+mask with the USB ventilator on had a mean difference of -331.9 ng/m<sup>3</sup> (±74.89 ng/m<sup>3</sup>, p<0.0001; 42% reduction). With the ventilator off, the Dettol Protect+had a mean difference of -530 ng/m<sup>3</sup> (±147 ng/m<sup>3</sup>, p<0.01; 42% reduction). The Respro City had a mean difference of -261 ng/m<sup>3</sup> (±113 ng/m<sup>3</sup>, p<0.05; 30% reduction), and the surgical mask had a trend for increased spacer black carbon +2252 ng/m<sup>3</sup> (±1071 ng/m<sup>3</sup>, p=0.05).

**Conclusions** Four of the five masks tested reduced spacer black carbon. The USB chargeable fan of the Dettol Protect+mask added minimal benefit. Why the surgical mask did not reduce black carbon is unclear but we speculate that condensation from exhalation impaired particle filtering.



**Abstract P146 Figure 1** Black carbon concentrations of ambient unfiltered air compared to air filtered by totobobo mask.

**A clinical update in interstitial lung disease**

**P147 THE CHANGING SHAPE OF PATIENTS WITH IDIOPATHIC PULMONARY FIBROSIS**

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**Background** Idiopathic pulmonary fibrosis (IPF) is a progressive, irreversible and ultimately fatal disease. An association between diabetes, obesity and IPF has previously been demonstrated.<sup>1</sup> Decreasing body mass index (BMI) is predictive of worse survival in Japanese cohorts.<sup>2</sup>

**Objective** To investigate the metabolic characteristics in our cohort of IPF patients (South West Peninsula, England) receiving anti-fibrotic therapy (nintedanib or pirfenidone), observe how BMI changes over time and relationships with changes in forced vital capacity (FVC) and survival.

**Method** Data was collected from IPF patients at the Regional Exeter ILD Centre at diagnosis (age, gender, FVC, BMI, comorbidities) and subsequent appointments (FVC and BMI). Change between BMI/FVC at diagnosis and most recent BMI/FVC were calculated and standardised to time elapsed between data points (DBMI or DFVC respectively). National data were from Public Health England (2014 datasets).

**Results** We reviewed 90 patients receiving antifibrotics. 76 were male (84%), mean age was 74. Their co-morbidities are illustrated by Table 1. Type 2 diabetes mellitus affected 14

patients (16%), compared with 12% in the age-adjusted general population. Recent BMIs were available for 46 patients. 10 patients (20%) had a normal BMI 18.5–24.99 (compared with a national average of 37%). Mean BMI (28.3) was significantly increased above the national average (27.3;  $p < 0.05$  one-tailed t-test). Pearson correlation coefficient for change in BMI and survival was  $r = -0.55$ , 95% confidence interval  $-0.90$  to  $0.25$  (8 patients). Where DBMI and DFVC were temporally overlapping (19 patients), no correlation was found.

**Conclusions** A large proportion of our IPF cohort were classified as obese. Diabetes was a common comorbidity, and higher than the national average. Over time, most patients demonstrated a reduction in their BMI. In contrast to East Asian data, this reduction in BMI did not correlate with reduction in FVC or survival.

## REFERENCES

- Kim YJ, Park J-W, Kyung Y, et al. Association of diabetes mellitus and metabolic syndrome with idiopathic pulmonary fibrosis. *Tuberc Respir Dis* 2009;67:113–120.
- Kishaba T, Nagano H, Nei Y, et al. Body mass index—percent forced vital capacity—respiratory hospitalisation: New staging for idiopathic pulmonary fibrosis patients. *J Thorac Dis* 2016;8(12):3596–3604.

**Abstract P147 Table 1** Characteristics of the exeter IPF cohort (SD=standard deviation)

IPF patients	n=90
Age (years) (SD)	74 (9)
Gender, male	76 (84%)
<b>Current Treatment</b>	<b>n=90</b>
Nintedanib	55 (61%)
Pirfenidone	35 (39%)
<b>Comorbidities</b>	
Ischaemic heart disease	23 (26%)
Hypertension	18 (20%)
Gastroesophageal Reflux Disease	17 (19%)
Type 2 Diabetes Mellitus	14 (16%)
Osteoarthritis	9 (10%)
Hypothyroidism	7 (8%)
Hypercholesterolaemia	6 (7%)
Asthma	5 (6%)
Inflammatory bowel disease	3 (3%)
Other connective tissue disease	3 (3%)
Gout	3 (3%)
Chronic Kidney disease	2 (2%)
Obstructive sleep apnoea	1 (1%)
<b>WHO BMI Classification</b>	<b>n=46</b>
Underweight (<18.5)	0
Normal (18.5–24.99)	10 (22%)
Pre-obese (25–29.99)	17 (37%)
Obese Class 1 or 2 (30–39.99)	18 (39%)
Obese Class 3 (>40)	1 (2%)
<b>Delta BMI</b>	<b>n=43</b>
(change in BMI per month)	
Median (SD)	−0.05 (0.2)
Range	−0.41 to +0.63 per month
<b>Delta FVC</b>	<b>n=44</b>
(Change in FVC per month)	
Median (SD)	−0.3% (0.81%)
Range	−2.44% to +1.5%

## P148 IDIOPATHIC PULMONARY FIBROSIS: “LOST IN THE SYSTEM” IN THE NORTH WEST OF ENGLAND?

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**Introduction** Idiopathic Pulmonary Fibrosis (IPF) is a debilitating lung disease with average life expectancy of 3–5 years. IPF services in England, commissioned by NHS England, occur in a finite number of designated specialist centres. With the advent of antifibrotics early referral is paramount to impact disease pathogenesis. Inequalities in UK healthcare have been documented in lung disease. Our objective was to assess whether we received the expected number of referrals compared to the NICE predicted disease prevalence (0.0277%).<sup>1</sup>

**Methods** This is a single centre review of University Hospital of South Manchester (UHSM) British Thoracic Society (BTS) entries from 2013 to 2017. Patient’s entry postcodes were mapped to individual clinical commissioning groups (CCG). IPF patients within each CCG were compared to the expected disease prevalence (0.0277%).

**Results** UHSM is the largest contributor to the BTS-IPF registry with 457 of the total 1119 patient record (41%). 451 patients from 35 English CCGs were represented. 6 patients were from outside England (Wales and Isle of Man). There are two specialist centres in the North West, Aintree and UHSM. 13 CCGs are located geographically closest to Aintree and 14 closest to UHSM with a further 8 CCGs located equidistant. Patients are referred to either specialist service at the discretion of the clinician and patient preference. The expected number of patients seen at UHSM according to IPF prevalence varied greatly in the 14 CCGs geographically closest with an average of 19 referrals per CCG (range 3–37) compared to the expected 51 referrals. CCGs varied in their referral rates with the top three CCGs Trafford (71%), Tameside and Glossop (65%) and Salford (54%) and the lowest referrals from Central (6%) and North Manchester (19%) (Table 1).