

Abstract P143 Figure 1 The observed oxygen dissociation curve of critically ill patients with varying levels of hypercapnia.

to allow comparison. Observed data was stratified into strata based on pCO₂ to investigate the influence of hypercapnia on the ODC.

Results No clinically significant impact of pCO₂ on the relationship between pO₂ and oxygen saturation was observed in samples obtained from critically ill adults (mean difference 0.35 kPa (SD=0.2 kPa) for a given oxygen saturation). Interestingly, we did not observe “right shift” of the ODC in response to elevated arterial pCO₂, and there was no impact of either acute (HCO₃⁻ <28 mmol/L) or chronic (HCO₃⁻ ≥28 mmol/L) hypercapnia on the relationship between haemoglobin saturation and pO₂.

Conclusions These data suggest that the relationship between haemoglobin saturation and pO₂ described by data from small scale studies may not reflect physiology observed in critically ill adults, and further that the right shift of the ODC reported in experimental hypercapnia, induced in healthy subjects, is not reproduced in the critically ill.

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P144 THE PREVALENCE OF DYSFUNCTIONAL BREATHING AND ITS ASSOCIATION WITH PERSONALITY TYPE IN A UNIVERSITY POPULATION

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Background Dysfunctional breathing (DB) is an umbrella term used to describe an abnormal breathing pattern which can be psychologically or physiologically based. DB has been shown to be exacerbated at times of increased stress and to be related to anxiety disorders; both factors are common within

a university setting, particularly around exam time. Personality types, specifically type A personality, share common risk factors with DB, suggesting a possible association. The prevalence of DB within a university population has not been previously investigated.

Aims To investigate the prevalence of dysfunctional breathing within a university population and assess any association between DB and type A personality.

Methods A cross sectional study was undertaken involving participants recruited at Brunel University. The primary outcome measure was the Nijmegen questionnaire (validated diagnostic tool for DB), and the secondary outcome measure was the breath hold test (BHT) (clinical diagnostic tool for DB). Additionally, the Behaviour Pattern Scale was used to classify participants as type A or type B personality.

Results 40 participants completed the study. 17.5% (7/40) were positive for DB on the Nijmegen questionnaire (≥23/64). Positive scores only occurred in women; consistent with previous data on gender and DB. 7.5% (3/40) had a positive result using the BHT (<20 s). 50% of participants were type A and 50% type B personality. Pearson’s Chi-Square test was used which demonstrated a significant association between DB (Nijmegen questionnaire) and type A personality (p=0.037). No association was found between the Results of the BHT and personality type (p=0.548), or between the Nijmegen questionnaire and BHT Results (p=0.453). At baseline there were no significant differences in participant characteristics, other than gender, between the groups that received a positive or negative DB diagnosis.

Conclusion Dysfunctional breathing may affect a significant percentage of people in a university population; and a significant association with type A personality type has been shown. Raising awareness of DB in the university population may lead to earlier diagnosis and timely referral to physiotherapy or counselling services as appropriate. A larger study is needed to further validate these findings.

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; FEV₁ (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) x10⁹ 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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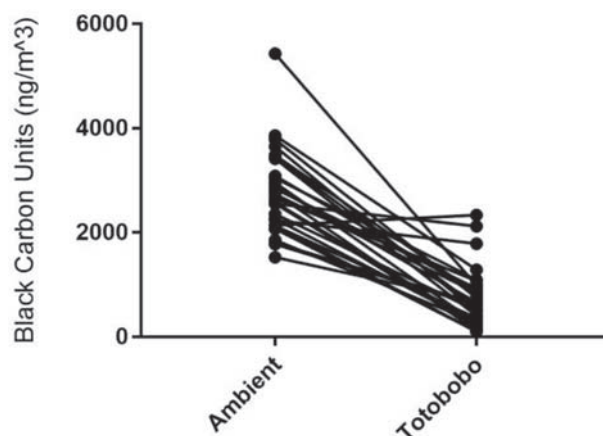
Introduction Inhalation of diesel soot (black carbon) is associated with respiratory morbidity and mortality. Numerous facemasks that claim to reduce inhaled dose are available commercially, often aimed at the cycling community. To date

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/m³) 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/m³ (±175 ng/m³, p<0.0001; 71% reduction, figure 1). The FFP3 mask had a mean difference of -1613 ng/m³ (±204 ng/m³, p<0.0001; 44.2% reduction); Dettol Protect+mask with the USB ventilator on had a mean difference of -331.9 ng/m³ (±74.89 ng/m³, p<0.0001; 42% reduction). With the ventilator off, the Dettol Protect+had a mean difference of -530 ng/m³ (±147 ng/m³, p<0.01; 42% reduction). The Respro City had a mean difference of -261 ng/m³ (±113 ng/m³, p<0.05; 30% reduction), and the surgical mask had a trend for increased spacer black carbon +2252 ng/m³ (±1071 ng/m³, 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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