Poster sessions

**P123** IMPULSE OSCILLOMETRY (IOS) INDICES IN SEVERE ASTHMA AND HEALTHY CONTROLS AFTER DEEP BREATH MANOEUVRES AND BRONCHODILATOR ADMINISTRATION

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**Introduction** Impulse oscillometry is a non-invasive method used to measure airway impedance. There is increasing interest in utilising frequency dependence of airway resistance/reactance to study small airways disease in asthma. We examined frequency dependant behaviour in severe asthma and the response to deep inspiration and bronchodilators.

**Methods** 27 healthy controls (C) (Mean (sem) age; 48.4 (2.2), Sex M:F; 9:18, post-bronchodilator FEV1% predicted; 108.2 (2.8)% and 66 GINA stage 4–5 severe asthmatics (A) (Mean (Sem) age; 54.1 (1.4), Sex M:F; 31:35, post-bronchodilator FEV1% predicted; 81.02(2.7)%), were recruited from Glenfield Hospital, UK. Impulse oscillometry (IOS) was performed at 5–55 Hz, with impulses triggered every 0.2 s for 150 s, at (1) baseline (base) (2) immediately after five deep breaths (TLC-RV) (pdb) (3) 15 min after 400 mcg inhaled salbutamol (pdb). Markers of total (RS) and large airway (R20) resistance, and frequency dependant behaviour of resistance (R5-R20) and reactance area (AX) were evaluated. Triplicate measurements of 150 s were performed in 18 randomly selected asthmatics from our cohort to assess repeatability.

**Results** Impedance measurements were highly repeatable (an intraclass correlation of 0.9) in the triplicate series. We observed asignificant increase in frequency dependence of both resistance (R5-R20) and reactance (AX) after deep inspiration in asthma, but not in healthy controls, which was reversed by the use of a bronchodilator (Abstract P123 Figures 1A–D). In addition R20 increased in both severe asthma and healthy controls after deep inspiration.

**Conclusions** Deep inspiration significantly increased frequency dependence of resistance and reactance in severe asthma suggesting that the small airways may be related to the aberrant deep inspiratory response in severe asthma.

**P124** NEUROVENTILATORY UNCOUPLING DURING CYCLE AND TREADMILL EXERCISE IN COPD

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**Background** It is widely accepted that neuroventilatory uncoupling drives breathlessness in COPD. COPD patients are more likely to stop exercising because of breathlessness during treadmill exercise than whilst cycling.

**Aim** To test the hypothesis that patients exhibit higher levels of neuroventilatory uncoupling during treadmill exercise than whilst cycling.

**Methods** Diaphragm electromyogram (EMGdi) and parasternal intercostal muscle EMG (EMGPS) activity were recorded in 12 COPD patients (mean (SD) age 66.7 (7.0) years, FEV1 38.7 (14.5)% predicted, 11 male), during incremental cycle and treadmill exercise. For each muscle, the mean peak root mean square (RMS) EMG per breath over the final 30 s of each minute was normalised to peak RMS EMG recorded during maximal inspiratory manoeuvres, and corrected for inspiratory time and respiratory rate (EMGdiindex, EMGPSindex). Borg breathlessness was assessed every minute and at exhaustion.

**Results** EMGPSindex and EMGPS activity per unit ventilation (EMGPSindex/VF) were higher at exhaustion during treadmill exercise (Abstract P124 Table 1). A higher VF at exhaustion whilst cycling approached statistical significance. EMGPSindex and breathlessness were not significantly different at exhaustion when exercise modes were compared.

**Conclusion** A higher EMGPSindex/VF and lower VF at exhaustion during treadmill exercise suggest that neuroventilatory uncoupling is greater than during cycle exercise. This did not translate to greater breathlessness during treadmill exercise in this study, but warrants further investigation in a larger group of patients.

**Abstract P124 Table 1** Ventilation, respiratory muscle activity and breathlessness at exhaustion during cycle and treadmill exercises

<table>
<thead>
<tr>
<th>Mode</th>
<th>Vi (L/min)</th>
<th>EMGPSindex (a.u.)</th>
<th>EMGPSindex (a.u.)</th>
<th>EMGPSindex Ni (a.u.)</th>
<th>EMGPSindex Ni (a.u.)</th>
<th>Borg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle</td>
<td>23.7 (13.5–43.6)</td>
<td>1213.0 (886.5–1945.0)</td>
<td>437.3 (123.4–398.9)</td>
<td>57.0 (25.7–118.9)</td>
<td>16.0 (4.1–64.0)</td>
<td>7 (3–10)</td>
</tr>
<tr>
<td>Treadmill</td>
<td>20.6 (13.1–35.7)</td>
<td>1365.0 (762.4–1884.0)</td>
<td>600.5 (115.5–1414)</td>
<td>67.5 (23.9–104.2)</td>
<td>27.9 (4.6–98.0)</td>
<td>7.5 (4–10)</td>
</tr>
<tr>
<td>p</td>
<td>0.05</td>
<td>0.97</td>
<td>0.01</td>
<td>0.27</td>
<td>0.002</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Data are presented as median (range) and analysed using Wilcoxon signed-rank tests. Vi, minute ventilation; EMG, electromyogram; EMGPS, diaphragm electromyogram; EMGPS, parasternal intercostal muscle EMG; Borg, Borg breathlessness.