Poster sessions

P266 LATE VENTILATION IS ASSOCIATED WITH HIGH IN-HOSPITAL MORTALITY IN PATIENTS HOSPITALISED WITH ACUTE EXACERBATIONS OF COPD

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Background Patients with severe acute exacerbations of COPD (AECOPD) often require treatment with non-invasive ventilation (NIV). The BTS audit reported that patients who develop respiratory acidosis and require NIV after 24 h in hospital have a high mortality risk but this relationship has not been investigated prospectively.

Methods Consecutive patients hospitalised with AECOPD and receiving assisted ventilation (NIV or IPPV) were identified. Demographic information, time from admission to commencement of ventilation, arterial blood gases at admission and at time of development of respiratory acidosis (if different), and outcomes of treatment were recorded.

Results 195 of 920 patients admitted with AECOPD were initially treated with NIV and four were ventilated invasively. Mean (SD) age was 73.6 (9.8) years, and most: were female (61.4%); had experienced frequent exacerbations in the previous year (median 3, IQR 1–4); were of normal weight (mean (SD) BMI 25.1 (7.0) kg/m2); and had severe airflow obstruction (mean (SD) FEV1 38.1 (16.1) % predicted). 27.6% of patients had received NIV previously for treatment of AECOPD, and 81 (40.7%) patients had coexistent pneumonia on admission.

Median duration of ventilation was 4 days (IQR 1.5–5) and four of the patients who initially received NIV progressed to invasive ventilation. 49 (24.6%) patients died in-hospital. The risk of death increased with longer time from hospital admission to ventilation commencement (Abstract P266 figure 1), with more than 60% of patients who required ventilation after day 2 of their hospital admission not surviving to discharge.

Conclusion Mortality in AECOPD is particularly high in patients who deteriorate and require ventilation after day 2 of the admission. The time from admission to needing ventilation (NIV or IPPV) should inform clinicians considering the prognosis of patients hospitalised with AECOPD.

REFERENCE


P267 ASSOCIATION OF THE LENGTH OF NON-INVASIVE VENTILATION (NIV) WITH ARTERIAL BICARBONATE LEVEL IN COPD PATIENTS WITH ACUTE HYPERCAPNIC RESPIRATORY FAILURE (AHRF)

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Introduction Following the British Thoracic Society (BTS) NIV audit 2011 we noted that our institution’s length of stay was longer than the national average. Factors related to length of stay are complex and related to a lot of non-medical factors, however length (duration) of NIV treatment is not. Although the associations of mortality of COPD patients requiring NIV are well-documented (Non-invasive ventilation (NIV) in chronic obstructive pulmonary disease (COPD) exacerbations with AHRF with pH<7.26. Thomas

Abstract P266 Figure 1 Time from admission to commencement of ventilation, and the associated in-hospital mortality.

Abstract P267 Figure 1 Scatter plot of Length of NIV against HCO3. p Value for HCO3 is 0.00117, which suggests that HCO3 is significant and has a positive effect on the length of NIV.
A, et al. Thorax. 2010;65:4, A33), the determinants of the length of NIV have not been clearly elucidated, which we decided to investigate.

**Methods** A retrospective analysis of the initial ABG values on 67 episodes of NIV for COPD at a dedicated respiratory NIV unit from 1 November 2010 to 30 June 2011 was carried out. Analysis of blood gases and duration of use of NIV was documented and analysed.

**Results** In an 8-month period, 67 patients were admitted to the NIV unit with AHRF with COPD. There were 6 (8.95%) in-hospital deaths in this group. Mean (range) pH on admission was 7.26 (7.08–7.34), mean (range) pCO2 was 9.75 kPa (6.05–15.5), mean (range) arterial bicarbonate level (HCO3) 27.2 mmol/l (19.9–45.2). The mean peak Inspiratory Positive Airway Pressure (IPAP) used was 18.7 cm H2O and peak Expiratory Positive Airway Pressure (EPAP) was 5.4 cm H2O. Plotting a graph with HCO3 and length of NIV we see that it has a linear relationship (see Abstract P267 figure 1). Length of NIV increases by 0.294 days for every 1 mmol/l increase in HCO3 above the mean.

**Discussion** This scientific survey indicates that the length of NIV therapy in COPD patients in AHRF increases with a higher HCO3. Though outcome and mortality is closely linked to the pH, length of NIV is more closely linked to the HCO3. This is explained by the fact that people with higher HCO3 are likely to have had chronic respiratory failure for longer and likely to take longer to recover from the respiratory failure.

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**Abstract P269 Table 1 Mean door-to-mask times for individual sites**

<table>
<thead>
<tr>
<th>On call system</th>
<th>Site 1</th>
<th>Site 2</th>
<th>Site 3</th>
<th>Site 4</th>
<th>Site 5</th>
<th>Site 6</th>
<th>Site 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9-5</td>
<td>24 h</td>
<td>24 h</td>
<td>9-5</td>
<td>24 h</td>
<td>24 h</td>
<td>9-5</td>
</tr>
<tr>
<td>N =</td>
<td>15</td>
<td>8</td>
<td>16</td>
<td>8</td>
<td>16</td>
<td>33</td>
<td>10</td>
</tr>
<tr>
<td>Minimum (time in minutes)</td>
<td>50.0</td>
<td>28.0</td>
<td>5.0</td>
<td>24.0</td>
<td>40.0</td>
<td>7.0</td>
<td>27.0</td>
</tr>
<tr>
<td>Median (time in minutes)</td>
<td>150.0</td>
<td>220.5</td>
<td>168.0</td>
<td>102.5</td>
<td>154.5</td>
<td>300.0</td>
<td>90.0</td>
</tr>
<tr>
<td>Maximum (time in minutes)</td>
<td>305.0</td>
<td>1440</td>
<td>1091</td>
<td>261.0</td>
<td>362.0</td>
<td>1050</td>
<td>1400</td>
</tr>
<tr>
<td>Mean (time in minutes)</td>
<td>157.7</td>
<td>391.9</td>
<td>252.9</td>
<td>133.5</td>
<td>146.3</td>
<td>362.4</td>
<td>272.9</td>
</tr>
<tr>
<td>SD</td>
<td>78.58</td>
<td>360.1</td>
<td>240.8</td>
<td>92.63</td>
<td>85.55</td>
<td>248.0</td>
<td>374.1</td>
</tr>
<tr>
<td>SE</td>
<td>20.29</td>
<td>73.50</td>
<td>52.54</td>
<td>32.75</td>
<td>41.37</td>
<td>88.17</td>
<td></td>
</tr>
<tr>
<td>Lower 95% CI</td>
<td>114.2</td>
<td>239.9</td>
<td>143.3</td>
<td>56.05</td>
<td>100.7</td>
<td>274.5</td>
<td>86.85</td>
</tr>
<tr>
<td>Upper 95% CI</td>
<td>201.2</td>
<td>544.0</td>
<td>362.4</td>
<td>210.9</td>
<td>191.9</td>
<td>450.4</td>
<td>458.9</td>
</tr>
</tbody>
</table>

**Conclusion** The introduction of a proforma with monthly feedback reports did not improve door-to-mask times. Less than half the patients managed with NIV received this within 3 h. There remains an unacceptable variation in the standard of patient care that may result from different operational practices across hospitals. There is a need to define optimal service delivery to ensure that all patients receive best care regardless of their place of admission.

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**P269 FEASIBILITY AND ACCEPTABILITY OF NON-INVASIVE VENTILATION (NIV) AS AN AID TO EXERCISE IN PATIENTS ADMITTED WITH ACUTE EXACERBATION OF CHRONIC RESPIRATORY DISEASE**

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**Introduction** Patients with acute exacerbations of chronic respiratory disease are often too breathless to exercise, leading to muscle deconditioning. Using NIV to assist exercise during an exacerbation might prevent this, but it is not known if this is acceptable to patients.

**Methods** 12 in-patients with an acute exacerbation (including Bronchiectasis and CF) were recruited. If they were unable to cycle for 5 min at 20 Watts unassisted they then cycled with NIV for up to 20 min. NIV settings were adjusted to patient comfort. Patients were asked to rate their level of distress and willingness to repeat the intervention.

**Abstract P269 Table 1 Times cycled and change in parameters with exercise**

<table>
<thead>
<tr>
<th></th>
<th>Without NIV</th>
<th>With NIV</th>
<th>Difference (95% CI)</th>
<th>p Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time cycled (s)</td>
<td>184.42 (65.22)</td>
<td>331.08 (229.09)</td>
<td>146.67 (77.0 to 258.62)</td>
<td>0.04*</td>
</tr>
<tr>
<td>Resting SpO2</td>
<td>94.83 (2.17)</td>
<td>94.83 (2.55)</td>
<td>0.00 (1.92 to 1.92)</td>
<td>1.00*</td>
</tr>
<tr>
<td>Resting HR</td>
<td>94.33 (15.99)</td>
<td>93.83 (18.45)</td>
<td>0.50 (5.75 to 6.75)</td>
<td>0.86*</td>
</tr>
<tr>
<td>Change in SpO2</td>
<td>–7.33 (5.12)</td>
<td>–3.83 (4.90)</td>
<td>FN</td>
<td>0.029†</td>
</tr>
<tr>
<td>Change in HR</td>
<td>16.33 (11.54)</td>
<td>16.33 (7.46)</td>
<td>FN</td>
<td>0.93†</td>
</tr>
<tr>
<td>End Borg Dyspnoea</td>
<td>3.72 (1.90)</td>
<td>3.86 (1.87)</td>
<td>FN</td>
<td>0.52†</td>
</tr>
<tr>
<td>End Borg RPE</td>
<td>11.36 (2.29)</td>
<td>11.00 (2.86)</td>
<td>FN</td>
<td>0.93†</td>
</tr>
</tbody>
</table>

All data presented as mean (SD) or median (range).

*Paired t test.
†Wilcoxon signed rank test.
‡F test.
FN, failed normality test.
P267 Association of the length of non-invasive ventilation (NIV) with arterial bicarbonate level in COPD patients with acute hypercapnic respiratory failure (AHRF)

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