Prospective Audits of Initiation of Non-invasive ventilation at University Hospital Ayr to inform a Regional Post-graduate Training Program

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Introduction
Chronic Obstructive Pulmonary Disease (COPD) accounts for one in eight emergency hospital admissions [1]. In Ayrshire & Arran there is a higher burden of COPD than Scottish national average with 317.9 acute admission relating COPD per 100,000 population as opposed to national average of 252.6 [2]. Non-invasive ventilation (NIV) is widely used to treat acute type two respiratory failure in such patients, improving mortality by up to 50% [3]. Specific guidelines and inclusion criteria exists for commencing NIV treatment. Previously it has been shown that treatment with NIV was often applied to patients who fall outside the inclusion criteria as set by British Thoracic Society (BTS) [4]. We hypothesised our practice in NIV initiation falls short of standards set by the BTS guidelines. We aim to assess this hypothesis and improve our practice via initially an educational talk followed by a regional post graduate training programme.

Materials and methods
Two prospective audit cycles each of 30 patients at University Hospital Ayr; the first August – December 2012, second May – September 2013. Patients started on Bi-level Positive Airways Pressure (Bi-PAP) from A&E or wards were included. Table below shows the parameters that were audited. Initial results presented at medical and A&E meetings, junior doctors made aware of BTS guidelines and an updated "Initiation of NIV" protocol was distributed. Data stored and analysed using Microsoft Excel.

Results
Number of Patients Appropriately Selected for Treatment with NIV
<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did Meet the Criteria</td>
<td>60%</td>
</tr>
<tr>
<td>Did Not Meet the Criteria</td>
<td>40%</td>
</tr>
</tbody>
</table>

Figure 1: Patient Selection for NIV

Local Protocol for Initiating NIV for Exacerbation of COPD

Yes
No

Did the patient: 

- Have a diagnosis of COPD? 
- Have 

- Blood cultures if pyrexial 
- IV fluids 
- Nebulised bronchodilators 
- Steroids 
- Antibiotics 

Especially if Asthma (rather than COPD) or pneumonic consolidation on CXR.

YES

ABG

Commence Trial of NIV

Results cont.

Initial Setup of NIV
<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% correct initial settings</td>
<td>90% correct initial settings</td>
</tr>
</tbody>
</table>

Table 2: Initial NIV settings

Increasing Settings
<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% correctly increased</td>
<td>60% correctly increased</td>
</tr>
</tbody>
</table>

Blood Gas Testing After One Hour
<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Cycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Table 3: Clinical Plan if NIV Fails

Clinical plan if NIV fails

Documented 

Not Documented 

Documented 

Not Documented

Figure 5: Documentation of clinical plan

Conclusion
Despite initial interventions our standards remain sub-optimal. We therefore believe more comprehensive education programme for nursing and medical staff is paramount to improve our service. We are planning such a training programme.

References