WHY
Regional Acute Non-invasive Ventilation Training and Competencies?
Joint Project

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• Non-invasive ventilation (NIV) is increasingly being used in acute hospitals and a recent audit has highlighted the importance of giving NIV in an appropriate environment by appropriately trained staff.

• A serious incident reported to the National Reporting and Learning System (NRLS) described that a mask for NIV was attached to a patient’s face but the ventilation machine had not been switched on. The patient became severely hypoxic and died. A similar case has also been reported to MHRA.

• A review of NRLS data since 2012 identified three additional fatal incidents in which the oxygen supply was found to be disconnected when patients were receiving NIV. In these cases, the length of time that the oxygen tubing was detached was unknown as no regular checking of oxygen tubing was completed, and no patient observations were recorded.
Staff education improves NIV outcomes in COPD patients presenting with acute hypercapnic respiratory failure

Targeted cyclical didactic educational sessions for staff involved in the provision of acute NIV services improves adherence to national guidelines and potentially leads to improved patient outcomes. However, adhering to the recommended weaning protocols may be difficult to achieve in a busy district general Hospital with a significant number of admissions with acute exacerbation of COPD.

doi:10.1136/thx.2010.151043.8 S Roychowdhury, O Kankam, C Jackson, D Sword, K Prasad, V Stark. The Ayr Hospital, NHS Ayrshire & Arran, Ayr, UK
Acute NIV practices at a district general hospital and the impact of regular electronic feedback on patient outcome

Aim:
To assess initiation of acute NIV in a District General Hospital setting, to provide prompt structured feedback to doctors initiating NIV and to assess whether feedback leads to improvement.

Method:
A total of 72 acute NIV initiations were prospectively assessed between January and June 2014. Data from patient records was collected using a structured pro-forma to assess nine parameters (described below). A feedback email with total score out of nine along with brief written feedback was sent to all doctors initiating NIV.

Conclusion:
Better adherence with BTS guidelines led to improvements in patient outcomes. Structured feedback led to improvement in NIV initiation scores.

TJC Ward, VW Sandoo, SF Hussain. Kettering General Hospital NHS Foundation Trust, Kettering, UK 10.1136/thoraxjnl-2014-206260.249
Total score for NIV initiation (out of 9)
Rolling average (last 6)

Figure 1 - Rolling average of last 6 scores - total out of 9 parameters assessed
Effect of BTS-recommended medical leadership on the "door-to-mask" time of acute NIV set ups

Introduction:
"Door-to-mask" time has been discussed as a performance/quality indicator of acute NIV services. We compare the "Door to-mask" time by analysing the “% of patients receiving NIV within 3 h” of diagnosis of AHRF at two acute hospitals in central England: Hospital A, which appointed a Lead NIV Consultant in 2009–10 as per BTS recommendations and Hospital B without a Lead Consultant.

Conclusions:
The service at Hospital B did not show any measurable improvement in ‘door-to-mask time’ between periods 1 and 2, but Hospital A did. As there were no significant differences like the demography, work load, frequency of on calls or number/grades of staff between the periods 1 and 2, this improvement could be a reflection on the role of a Lead NIV consultant at Hospital A as per BTS recommendations. Furthermore, reduction of variance around the median "Door-to-mask" time is observed to be a consistent feature of the improvement, which needs evaluation as an independent performance/quality indicator of acute NIV services.

H Boryslawskyj, F Rauf, B Beauchamp, A Oakes, N Santana-Vaz, B Chakraborty, R Mukherjee. School of Clinical and Experimental Medicine, University of Birmingham, Birmingham, UK; Birmingham Heartlands Hospital, Birmingham, UK; School of Mathematics, University of Birmingham, Birmingham, UK 10.1136/thoraxjnl-2014-206260.415
Acute NIV and mortality - failure of delivery or patient selection?

The mortality of patients receiving acute NIV is low (2). Most deaths had an underlying diagnosis of COPD, they were an elderly frail group, deemed inappropriate for escalation to critical care. There were multiple risk factors for NIV failure on initiation of therapy. Whilst a trial of NIV may have been appropriate based purely on blood gases, it was at high risk of failure and discussion about end of life care may have offered an alternative approach.

1. S Zaidi et al 10.1136/thoraxjnl-2013-204457.323
BTS Audit Findings 2013

Overall, 66% patients treated with acute NIV were discharged from hospital. The median length of stay was 9 days. Respiratory follow up was organised in 71%. 32% were discharged with oxygen therapy and 16% were treated with home ventilation (or referred to a home ventilation centre).

The remaining 34% of patients treated with NIV died during the admission, representing a slight increase over the preceding 3 audits. Understandably, NIV failure was associated with a worse outcome. Late NIV failure (>24 hours) was especially ominous.

Following NIV failure, 81 (3%) proceeded to intubation. Death due to a respiratory cause was not increased in this group (27%), although it should be noted that they were younger (63 – 14 years) and had less prior functional limitation (45% either unrestricted or limited by strenuous exertion only) than the wider patient cohort.
Median pre-NIV pH values

- 2011: 7.26
- 2012: 7.24
- 2013: 7.20
Hospital mortality (%)

- **2011**
  - non-respiratory: 0
  - respiratory: 30

- **2012**
  - non-respiratory: 5
  - respiratory: 25

- **2013**
  - non-respiratory: 10
  - respiratory: 30
In the severe acidosis group, hospital mortality was 28% in a HDU/ICU setting, and 40% if started outside HDU/ICU. Whilst initial blood gas measurements were similar, evidence of consolidation was more likely in those receiving ward-based care (37% vs. 26%). The differing outcomes could reflect differences in the delivery of care, but equally may represent a more severely ill patient group within the ward environment.
Across all audit periods, acute NIV is usually employed as the ceiling of therapy in a ward-based setting. Its utilisation does reflect the evidence-base for the majority of patients, but is often attempted in situations where there is a high risk of failure (severe acidosis and consolidation). Such treatment plans and outcomes perhaps reflect the evolution of acute NIV services within the UK. The development of UK acute NIV services was driven, at least in part, by key evidence demonstrating that the early use of NIV in a ward setting clearly benefited patients with COPD exacerbations complicated by acidotic ventilatory failure.
What can we conclude?

- Acute NIV is evolving in the UK
- Patients are probably more unwell in ward based settings than in the past
- Leadership is important
- Education of staff delivering NIV improves results but must be cyclical to catch the ever changing staff
- Standardisation of NIV delivery and feedback is important
What we propose...

• A regional learning package and competencies
• An e-learning theoretical package and certificate
• Locally delivered practical tutorials based on the completion of the e-learning package
• Resources
  – Train the trainers
  – Access to the e-learning package
  – Monitoring
What do we need?

• Support to go ahead with this project

• Local NIV Leaders or champions

• Your BTS national NIV audit results
Comments please...