

Non-Invasive Ventilation for Acute Hypercapnic Respiratory Failure: an audit in Grantham

Dr D van Berkel, Dr H Saman
United Lincolnshire Hospitals NHS Trust

Aim

BTS annual audits have highlighted numerous national variations in the practise of BIPAP, an intervention that can confer an absolute reduction in acute COPD exacerbation mortality of 10%.

The aim was to compare the current practise on the HDU at Grantham and District Hospital (GDH) of BIPAP initiation and management with the new 2016 British Thoracic Society (BTS) guideline, as well as local United Lincolnshire Hospitals NHS Trust (ULHT) 2013 guidelines.

The last local audit of BIPAP at GDH in 2013 showed non-adherence to previous BTS recommendations including time on mask, documentation of escalation plans and initiation of IPAP pressures.

The overall outcome of this repeat audit was to ascertain the best targets for effective quality improvement in this area.

Results

Sample set consisted of diagnosis of COPD of 50% (72% BTS 2013) with an average age 72 years and mortality of 19% (27% BTS 2013).

1. BIPAP is initiated when pH <7.35 and pCO₂ >6.5 (after an hour of maximal medical therapy).

13% did not comply with this standard (1 episode complied with extended new BTS guidance; 1 episode was inappropriate).

44% had an initial pH ≤7.26 but none were considered for immediate intubation (but only 1 episode was documented L3 ceiling).

Methods

Retrospective review of medical records and nursing charts of patients receiving NIV on HDU between October 2015 and October 2016. A random sample of 22 were taken from an identified 50 episodes.

Results

2. BIPAP is started at settings of IPAP 15 and EPAP 3 and up titrated to IPAP of 20-30 over the first 10-30 minutes.

	BTS 2012	ULHT 2013	ULHT 2016
Median IPAP at 1hr	16.5	12	12
Median EPAP at 1hr	5	5	5
Reaching IPAP >20mmHg at 1hr	10%	0%	6%

3. BIPAP is continued for 24 hours allowing for minimal breaks only.

25% fell below 6 hours set as minimum ULHT standards.

	BTS 2012	ULHT 2013	ULHT 2016
Time spent on mask in first 24 hours (median)	15	16	11.5

4. At commencement of BIPAP, an escalation plan or ceiling of care must be clearly documented in the medical notes.

	BTS 2012	ULHT 2013	ULHT 2016
Ceiling of Care Documented	76%	47%	81%
Level 2	66%	66%	77%
Level 3	17%	11%	23%

Conclusion

- Monitoring ABGs largely taken at appropriate timings indicating baseline knowledge with regards to the importance of monitoring response on NIV.
- Overall improvement in pH and pCO₂ over the first 6 hours of NIV initiation, compared to the local 2013 ULHT audit.
- Marked improvement in ceiling of care documentations, largely encouraged by changes in HDU clerking proformas.
- Need to make more importance of the prognostic value of a low pre-treatment pH with regards to initial management for respiratory failure and communication of prognosis.
- Creation of new 'NIV paperwork' to be used by nursing staff in order to actively encourage the correct use and escalation of pressures and ensure accurate ABG monitoring.
- Use of education targeting all aspects of the 'NIV team' to encourage more active analysis and reaction to monitoring ABG results.

References

- Non Invasive Ventilation Study by National Confidential Enquiry into Patient Outcome and Death <http://www.ncepod.org.uk/niv.html>
 British Thoracic Society NIV Audit 2013 (national audit period 1 February – 31 March 2013) Dr Mike Davies
 British Thoracic Society NIV Audit 2012 (national audit period 1 February – 31 March 2012) Dr Mike Davies
 BTS, The Use of Non-Invasive Ventilation in the management of patients with chronic obstructive pulmonary disease admitted to hospital with acute type II respiratory failure (With particular reference to Bilevel positive pressure ventilation), October 2008, <https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btsrecs-guideline-for-non-invasive-ventilation/>
 Davidson AC, et al. BTS/ICS guideline for the ventilatory management of acute hypercapnic respiratory failure in adults. *Thorax* 2016;71:i1-i35. doi:10.1136/thoraxjnl-2015-208209
<https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btsrecs-guideline-for-non-invasive-ventilation/>
 United Lincolnshire Hospitals NHS Trust Clinical Guidelines. Dr Boldy et al. Guidelines for commencing non-invasive ventilation (NIV) in the non-ITU setting. Sept 2013.