

trained nursing team, to improve outcomes for acutely unwell patients. A close working relationship with the Critical care team, and physical proximity to the Intensive care unit ensures rapid joint assessment and transfer of complex patients requiring invasive monitoring or intubation.

Aims and objectives To compare NIV success and mortality for patients with acute type 2 respiratory failure requiring NIV, before and after introduction of HAMU.

Method Data was collected for all patients in acute type 2 respiratory failure requiring NIV, for nine months before (2011–2012) and after (2012–2013) the HAMU was opened. Baseline characteristics (age, gender, performance and smoking status) were recorded. NIV success and mortality were compared and analysed. Patients requiring intubation on admission were not included.

Results Baseline characteristics in both groups were similar, and comparable to national figures. NIV was successful in 56% (28/53) before, improving to 74% (43/58) after ($p < 0.05$). National success rates from BTS 2013 data were 66.5%. All-cause mortality improved from 42% (22/53), to 24% (14/58) ($p < 0.05$). National all-cause mortality rate was 34% in 2013. Transfer to Critical care was low in both groups (1/53 pre, and 1/53 post).

Conclusions NIV success and mortality rates improved significantly following opening of the HAMU. Following establishment of the HAMU, success rates are also clearly better than national comparators for 2013. NIV delivery in a dedicated unit with highly trained nurses and dedicated respiratory medical input improves outcomes in acute Type 2 Respiratory failure.

P39 NONINVASIVE PH WITH TRANSCUTANEOUS PCO₂ MONITORING AS AN ALTERNATIVE TO ARTERIAL LINE SAMPLING: A NEW PATIENT FRIENDLY APPROACH TO MONITORING ACUTE NIV

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Arterial blood gas measurement is a standard way to initiate and monitor Noninvasive ventilation (NIV) in acute hypercapnic respiratory Failure. It is painful for patients and time and resource intensive for staff.

In a pilot study we have demonstrated that transcutaneous CO₂ monitoring provides reliable CO₂ measurements in patients with Acute Hypercapnic Respiratory Failure (AHRF). Moreover this is less painful and preferred by patients. van Oppen *et al.*, *Respir Care*. 2014 Nov 18. pii: respcare.03335.

PCO₂ time trends were concordant. Mean PCO₂ bias was -2.33 mm Hg (95%LOA -9.60 to 5.03) mmHg, $r = 0.89$ ($p < 0.001$). Initiation of transcutaneous monitoring was less painful than the arterial equivalent ($p = 0.008$).

Particularly in patients with AHRF due to COPD exacerbation pH plays an important role in initiating and guiding therapy. We explored whether TcCO₂ can be used to predict pH thereby minimising the need for repeated arterial blood gases in this patient group.

Based on Henderson Hasselbalch equation $pH = 6.1 + \log(HCO_3/CO_2)$.

In the pilot study mentioned above Non-invasive p_{Htc} was determined using p_{tcCO2} and predicted bicarbonate. Reference bicarbonate was recorded from ABG taken at NIV initiation. TcCO₂ was monitored continuously over 12 h using Radiometer TOSCA TCM4. PaCO₂ was obtained from arterial blood samples at 0, 4, 8 and 12 h. Mean pH bias was 0.012 (95%LOA -0.070 to 0.094), $r = 0.84$ ($p < 0.001$).

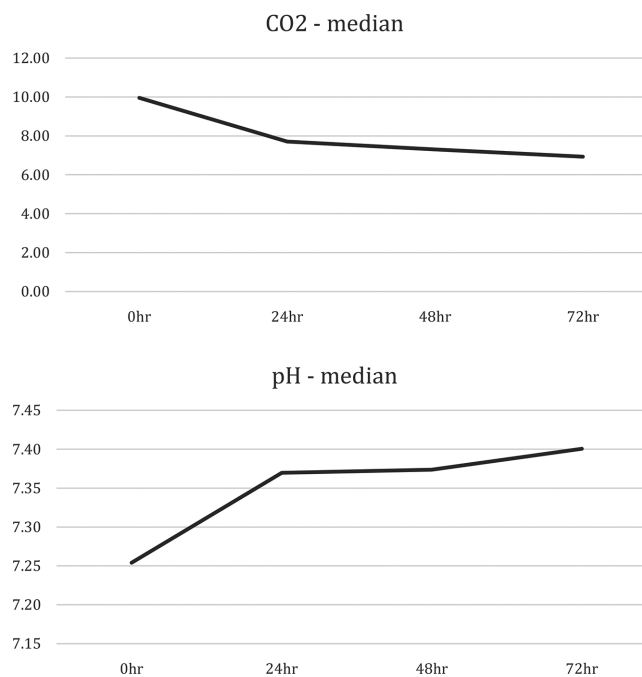
We have subsequently reviewed records for 38 patients who received Acute NIV for AHRF. We retrospectively looked at change in pH, bicarbonate and CO₂ over 24, 48 and 72 h.

Abstract P39 Table 1

Median absolute change	in 24 hr	in 48 hr	in 72hr
absolute increase in pH	0.11	0.12	0.15
absolute increase in HCO ₃	0.70	1.60	4.15
absolute reduction in CO ₂	1.85	2.21	2.47

Using these data and Henderson Hasselbach equation we can show that in the first 48 h change in pH is almost exclusively explained by change in CO₂ (Pearsons Correlation coefficient for change in CO₂ and pH = 0.84; $p < 0.05$).

Therefore in patients with pure Respiratory Acidosis transcutaneous CO₂ would provide trend for pH as well as CO₂, thereby minimising the need for arterial blood gas measurement and improve patient comfort.



Abstract P39 Figure 1 Change in pH and PaCO₂ in patients on NIV for AHRF

REFERENCE

- van Oppen JD, Daniel PS, Sovani MP. What is the potential role of transcutaneous carbon dioxide in guiding acute noninvasive ventilation? *Respir Care*. 2015;60:484–91

P40 SHOULD PROVISION OF ACUTE INPATIENT NON INVASIVE VENTILATION IN A DISTRICT GENERAL HOSPITAL BE EXCLUSIVELY A RESPIRATORY CONSULTANT-LED SERVICE?

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