P173 THE ROLE OF TRANSCUTANEOUS CARBON DIOXIDE MONITORING IN ACUTE NON-INVASIVE VENTILATION

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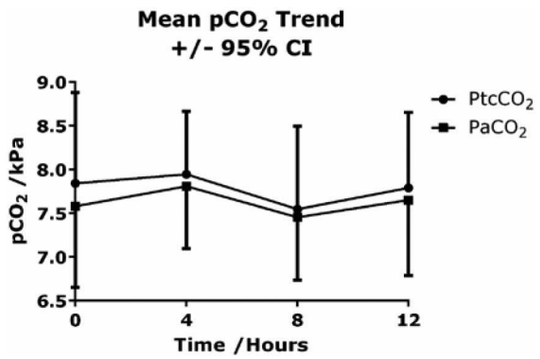
Background Transcutaneous carbon dioxide monitoring is rarely used in the acute hospital setting, where samples of arterial blood are used to measure pCO2. This is a pilot observational study to assess the role of transcutaneous ($p_{tc}CO_2$) versus arterial (p_aCO_2) monitoring during acute NIV, both to calculate pH and to guide therapy.

Methods Ten patients with acute hypercapnic respiratory failure were recruited. All had arterial lines placed for guiding acute NIV therapy. $p_{tc}CO_2$ was monitored for 12 hours (Radiometer TOSCA TCM4) and compared to measures of p_aCO_2 from samples taken from the arterial lines. Non-invasive pH_{tc} was calculated from $p_{tc}CO_2$. Agreements between pCO_2 and pH methods were assessed using Bland-Altman analysis and regression. The potential for guiding acute NIV therapy based on transcutaneous data was assessed and pain scores for each method were compared using the Wilcoxon signed rank test.

Results Mean bias between p_aCO_2 and $p_{tc}CO_2$ was -0.31 (95% CI 0.98) kPa, $R^2 = 0.79$ ($p < 0.0001$). $p_{tc}CO_2$ followed the same time trend as p_aCO_2. Mean pH bias was not statistically significant at 0.006 (95% CI 0.116), $R^2 = 0.64$ ($p < 0.0001$). If based on transcutaneous data only, clinical decisions would have been unchanged in nine out of ten patients. Transcutaneous readings were also less painful ($p < 0.001$) and preferred by patients.

Conclusion This pilot study demonstrates the potential for using transcutaneous pCO_2 monitoring to calculate pH and guide therapy, in the acute care setting. $p_{tc}CO_2$ shows promise in replacing arterial blood gases, in acute hypercapnic respiratory failure.



Abstract P173 Figure 1.

P174 REDUCTION IN HOSPITAL ADMISSIONS IN COPD PATIENTS FOLLOWING DOMICILIARY BIPAP

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Introduction COPD is a condition with multiple implications to the sufferer in terms of disability and high mortality, and one that often necessitates multiple hospital admissions, resulting in further distress to the patient as well as increased healthcare costs. Bi-level positive airway pressure (BIPAP) has long been used to treat patients with acute exacerbations of COPD in hospital settings. We aim to decipher if institution of BIPAP reduces the number of hospital admissions in patients with COPD.

Method We used a regional database to gather information on patients on domicilliary BIPAP in the region, and identified the number of patients with a primary diagnosis of COPD. We then used the electronic discharge notification software in hospitals in the region to identify the number of hospital admissions in these patients before and after the institution of BIPAP, within a one-year period. We used 2011 as the base year, i.e., we collected data from patients who were initiated on BIPAP in 2011, and determined the number of admissions the year prior to, and the year following, initiation of BIPAP.

Results On the database studied, 317 patients were on domiciliary BIPAP, 112 of which were secondary to COPD (35.33% of the total database). A total of 23 patients were commenced on BIPAP in 2011. The number of admissions per year prior to initiating BIPAP ranged from 0 to 4, with a total of 39 admissions among all patients, equating to a mean of 1.70 admissions per patient. This reduced to 14 in the year following BIPAP, with an average of 0.61 admissions per patient, reducing the number of admissions by almost two-thirds.

Conclusion These findings suggest that the use of domiciliary BIPAP reduces hospital admissions in patients with COPD, thereby improving, at least partially, their quality of life. It also highlights the importance of a dedicated centre for managing patients on domiciliary BIPAP, as this database reflected the work of a single respiratory centre within the region specialising in managing patients requiring domiciliary BIPAP, thereby providing standardised care.

P175 HOME MECHANICAL VENTILATION (HMV): AN EXPANDING SERVICE IN ACUTE HOSPITALS

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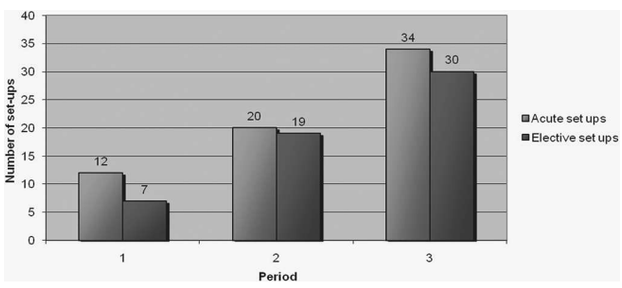
Background HMV/domiciliary non-invasive ventilation (NIV) is being increasingly used to treat chronic ventilatory failure, particularly due to obesity and neuromuscular conditions. In patients attending an acute hospital, most domiciliary NIVs are set up at the end of an acute episode of admission with hypercapnic acidotic respiratory failure but over time, as more at-risk patients come under surveillance for respiratory failure, we hypothesised that a unit supervising domiciliary NIV/HMV is expected to do more elective set-ups.



Abstract P175 Figure 1. HMV set-ups: Elective vs Acute.

Methods Comparison of the volume of new domiciliary NIV set-ups and the elective NIV set-up rate over three 12-month periods: Apr 2005-Mar 2006 (period 1), Apr 2011-Mar 2012 (period 2) and Apr 2012-Mar 2013 (period 3) in a dedicated 11-bedded ward-based NIV unit (established: Aug 2004) in a 1000-bedded central England teaching hospital trust, providing domiciliary NIV support to over 260 patients with over 392 under surveillance for respiratory failure.
Results The volume more than doubled from 19 new domiciliary NIV set-ups in period 1 to 39 new domiciliary NIV set-ups in period 2; to 64 set- ups in period 3. The elective domiciliary NIV set-up rate increased from 7/19 (36.8%) to 19/39 (48.7%) to 30/64 (46.9%) for periods 1, 2 and 3 respectively [Figure 1].
Discussion We have previously shown that the elective set-up rate for new HMV has gone up in our unit. In this survey we have shown that this increase in 'elective set-up rate' is associated with a consistent increase in volume of HMV set-ups. This is most likely to be due to an increased number of people at risk of respiratory failure coming under the unit's surveillance. HMV is well known to improve quality of life and reduce unscheduled care utilisation when started at the appropriate timepoint in chronic ventilatory failure through surveillance. Comparison of data between centres supervising domiciliary NIV/HMV, e.g 'elective set-up rates', is warranted in this rapidly evolving field.

REFERENCES

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P176 INDICATIONS AND DEMOGRAPHICS OF DOMICILIARY NIV SET-UPS IN AN ACUTE HOSPITAL

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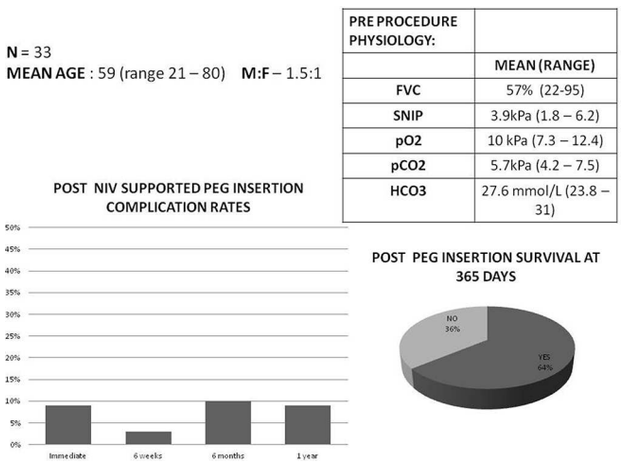
Background Domiciliary NIV is being increasingly used to treat chronic ventilatory failure but there is little site-level data available describing the demographics of patients on domiciliary NIV under centres which have developed over the last decade. At our central England teaching hospital, domiciliary NIV is either set up following an acute admission with hypercapnic acidotic respiratory failure through the dedicated 11-bedded ward-based unit or electively, through the surveillance of patients at risk of ventilatory failure. Currently we have 262 patients on domiciliary NIV. We aimed to analyse the primary diagnosis and demographics of patients started on domiciliary NIV in the last 18 months.
Method A retrospective analysis of all patients started on domiciliary NIV at a 1000-bedded central England teaching hospital from 01 Jan 2012 to 30 June 2013.
Results A total of 90 patients were analysed and there was a slight male predominance (55.5%). The mean age at initiation of domiciliary NIV was 56.3 years (SD 18.9, median 52.5 years). Primary diagnoses (reason for domiciliary NIV) were 1.neuromuscular disorders (35.5%); 2. obesity-related disorders (33.3%); 3. COPD (13.3%); 4. thoracic cage disease other than obesity (15.6%) and 5. central pathology (2.3%). Of the COPD patients, 7/12 (58.33%) were GOLD class 4, 4/12 (33.33%) were GOLD class 3 and 1/12 (8.33%) were GOLD class 2. The mean domiciliary NIV set-up per month was 4.68 (SD 3.16). There was no clear relationship between number of set-ups per month and corresponding calendar month; 22.2% patients (20/90) had long term oxygen therapy prescribed with their NIV.
Discussion The role of domiciliary NIV is expanding with greater numbers of people living with chronic ventilatory failure, and this is set to increase with the rising problem of (a) obesity-related respiratory disorders and (b) improved survival of children with neuromuscular weakness. This study highlights the need for a domiciliary NIV registry for improved resource and workforce planning.



Abstract P177 Figure 1.

P177 ARE NIV SUPPORTED PEG INSERTIONS (NSPI) IN PATIENTS WITH NEUROMUSCULAR DEGENERATIVE DISORDERS (NMD) SAFE AND EFFECTIVE?

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Introduction Patients with NMD's suffer from feeding difficulties and respiratory failure which worsens prognosis. A survival advantage with PEG feeding has been suggested in case reports but there are concerns regarding safety and complications in this high risk group in or at risk of ventilatory failure. We have therefore reviewed the outcomes of NSPIs in our tertiary teaching hospital.
Methods 33 NSPIs were identified upto 2012. Disease background, baseline lung physiology, NIV use, peri-procedure details, complications and survival at 365 days were analysed. A subset analysis examining bulbar vs. non bulbar MND, baseline FVC and NIV use against survival at 365 days was also carried out.
Results 33 patients with NMD (MND 79%, DMD 9%, Myotonic Dystrophy 6%, others 6%) were included. Mean age was 59 (range 21–80). Mean pre-procedure FVC was 57% (22–95), SNIP was 3.9kPa (1.8–6.2kPa). Mean pre-procedure pO_2 was 10kPa (7.3–12.4), pCO_2 5.7kPa (4.2–7.5) and HCO_3 27.6mmol/L (23.8–31). 52% were previously on NIV. Mean pre-procedure NIV settings were IPAP 18cmH20, EPAP 3cmH20. Mean post procedure settings were 19 and 3cmH20 respectively. 11% needed supplemental oxygen for a short period post procedure. Sedation was used in 95% and no medical reversals were needed. Complication rates were 9%, 3%, 10% and 9% (immediate, 6 weeks, 6 months, 1yr) respectively. Of those who were