consequences has far reaching implications for how we care for this vulnerable group especially when it comes to nursing them on ward areas rather than the HDU setting. The findings from this study have proved fascinating and set the scene for further exploration.

P155 NON-INVASIVE VENTILATION (NIV) IN ACUTE HYPERCAPNIC RESPIRATORY FAILURE IN RESTRICTIVE LUNG DISEASES (RLD)

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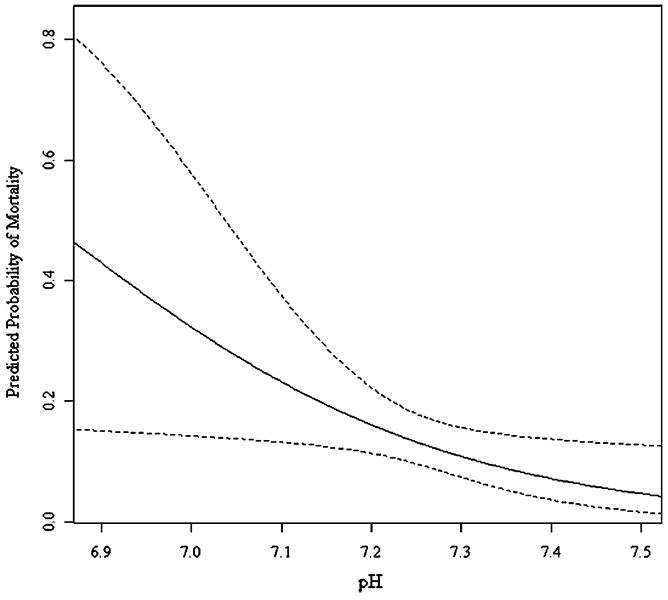
Introduction Successful NIV has been described in RLD (thoracic cage disease, obesity-hypoventilation and neuromuscular diseases) and given the success in chronic ventilatory failure, NIV should be considered as the treatment of choice in decompensated ventilatory failure due to RLD in an acute setting.

Methods Analysis of initial ABG in those admitted to a NIV unit on a respiratory ward with a diagnosis of RLD, requiring NIV for an acute episode of respiratory failure (pH <7.35 and pCO_2 >6.0 kPa) admitted between 01 August 2004 and 31 December 2009. Patients included were those with respiratory failure as a consequence of RLD. Those who were either admitted or managed in HDU were excluded from the analysis. The admission episodes were stratified by initial pH ranges (predictor variable) and in-hospital mortality was recorded (outcome variable).

Results In 270 admissions (221 unique patients) with RLD requiring NIV for acute respiratory failure, the overall mortality was 35 (13.0%). There was a significant increase in mortality in the group where ABG pH<7.15 (40.9%). The difference is significant when compared to the group with a pH between 7.15 and 7.26 (9.6%) (p=0.027). There was no significant difference in mortality in the group with pH 7.15 to 7.26 to the group with pH 7.26 to 7.35 (p=0.94): See Abstract P155 Figure 1. The plot of fitted logistic regression equation with initial pH (the dotted lines indicate 95% confidence band).



Abstract P155 Figure 1 The plot of fitted logistic regression equation with initial pH (the dotted lines indicate 95% confidence band).

Conclusion For those patients with RLD treated with NIV on a respiratory ward, the mortality increases with the severity of acidosis. As no current guidelines indicate a pH cut-off for the ward based management of RLD with NIV, from our results we propose that this could be an initial ABG pH of 7.15.

P156 DOES ANALYSIS OF PATIENT-VENTILATOR INTERACTION OFFER BENEFITS IN ADDITION TO OVERNIGHT PULSE OXIMETRY IN PATIENTS WITH MOTOR NEURONE DISEASE BEING FOLLOWED ON NON-INVASIVE VENTILATION?

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Introduction Non-invasiveventilation (NIV) is increasingly being offered to Motor Neurone Disease (MND) patients as studies report benefit insurvival and quality of life (QoL). Ventilator technology allows monitoring of patient–ventilator interaction. It is less clear whether such data yield useful additional information over pulse overnight oximetry. In a longitudinal study, MND patients were assessed both physiologically and psychologically prior to NIV initiation and 3monthly until death.

Methods 35 patients were enrolled; 28 offered NIV; 11 declined and 17 established on treatment. At initiation all had nocturnal hypoventilation by symptoms andoximetry criteria. Nine patients (8 male; median age 60 years) had ≥12 months follow-up on ventilation; none required oxygen with NIV. Patient–ventilator interaction was assessed by analysis of the 'memory card' from the ventilator at 4–6 months post initiation (Point A) and at 10–12 months (Point B); QoL assessed by validated questionnaires within 2 weeks of memory card analysis.

Results Median overnight oxygen saturation in the sample was 93% at point A and 94% at B; only 3 and 2 patients respectively exhibited 'sub-optimal' oximetry that is, >30 min below 90% saturation resulting in adjustment of ventilation. Minute Ventilation (MV) fell in the group from Point A to B (mean 6.97–6.34 l/min); a fall in MV (noted in five patients of which 1 exhibited "sub-optimal" oximetry) was associated with a fall in ALS FRS score denoting worsening health status (correlation coefficient 0.73; p=0.026). Ventilator triggering decreased overall in the group from Points A to B (mean 69.95–61.57% proportion of triggered breaths); a decrease in ventilator triggering (noted in six patients of which 1 exhibited "sub-optimal" oximetry) correlated with an increase in ALS AQ domain for emotion denoting worsening emotional functioning (correlation coefficient −0.89; p=0.002) with anon-significant trend noted between fall in triggered breaths and increase in Hospital Anxiety and Depression (HAD) score (correlation coefficient −0.68; p=0.055).

Conclusion In MND, monitoring of patient–ventilator interaction may serve as a useful adjunct to pulse oximetry and symptom assessment. Further studies are needed to ascertain whether adjustment of ventilation based on this approach allows patients to gain full benefit from NIV.

P157 STAFF EDUCATION IMPROVES NON-INVASIVE VENTILATION OUTCOMES IN COPD PATIENTS PRESENTING WITH ACUTE HYPERCAPNOEIC RESPIRATORY FAILURE.

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Introduction Non invasive ventilation (NIV) is safe and effective treatment for acute hypercapnoeic respiratory failure. National

guidelines[1] have been in existence since 2002 but despite widespread use of NIV, there is evidence to suggest that adherence is variable.[2] A recent update provides a specific focus for NIV use in COPD patients and recommends a protocol for weaning.[3] We sought to assess local adherence to British Thoracic Society (BTS) guidelines and outcomes in this group of patients before and after targeted education of staff involved in the provision of acute NIV.

Method In November 2008, 25 coded case notes were audited retrospectively using the BTS audit tool. The results were presented at the local Clinical Governance meeting followed by cyclical dedicated educational sessions comprising an overview of BTS guidelines and simulated clinical scenarios for Nursing and Medical staff involved in acute NIV services. A prospective audit was then conducted 6 months later to assess changes to NIV practice.

Results Analysis of the prospective study (n=25) compared to the retrospective study (n=25), demonstrated an improvement in all the assessed measures reflecting better adherence to the published guidelines .NIV was instituted within 60 min of admission in a higher proportion of patients (92% vs 80%) A similar trend was seen in documentation of initial NIV settings (84% vs 76%) and written management plans (88% vs 40%). A positive effect was also seen in the recording of blood gas analysis at 1–2 h (80% vs 56%) and at 4–6 h (72% vs 36%) Weaning as per the recommended protocol[3] was achieved in 40% patients.

Conclusion 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[3] may be difficult to achieve in a busy district general Hospital with a significant number of admissions with acute exacerbation of COPD.

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P158 THE STRENGTH OF ASSOCIATION BETWEEN THE RISK OF ENDOTRACHEAL INTUBATION AND INITIAL ARTERIAL BLOOD (ABG) PH IN PATIENTS PRESENTING WITH ACUTE HYPERCAPNIC RESPIRATORY FAILURE (AHRF) TREATED WITH NON-INVASIVE VENTILATION (NIV)

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Introduction The risk of failure of non-invasive ventilation (NIV) in AHRF patients is greater with higher degrees of acidosis. The BTS guidelines suggest that patients with pH <7.26 have a higher risk of NIV failure which implies a higher risk of endotracheal intubation.

Aims and objectives We set out to verify the strength of this known association of initial arterial pH (pre-commencement of NIV) and the risk of endotracheal intubation in a large dataset.

Methods A retrospective analysis of the initial ABG values on 1003 episodes of NIV at a dedicated respiratory NIV unit from 1 August 2004 to 31 December 2009. We predicted the probability of endotracheal intubation (T) using pH, pCO_2 and pO_2 variables, using a logistic regression model. The fitted equation was log $[T/(1-T)] = 53.0704 - 7.7064\ [pH] - 0.0752\ [CO_2] - 0.005[O_2]$ which was applied to find the strength of association and expressed as p-values.

Results In 1003 recorded episodes of acute NIV, the data entry was complete in 998 episodes on 712 unique patients. The p-values for the significance in predicting the risk of endotracheal intubation from the initial (pre-NIV) pH, CO_2 and O_2 are 0.0036, 0.3551, and 0.8929 respectively. The summary statistic for initial pH is stated in Abstract P158 Table 1.

Abstract P158 Table 1 Summary Statistic of episodes of endotracheal intubation (n=991)

Intubated	Yes=28	No=963
Mean initial pH	7.214	7.258
SD	0.0766	0.0760
Minimum	7.081	6.870
Maximum	7.340	7.522
Median	7.213	7.258

Conclusion Our survey confirms that out of initial pH, pCO_2 and pO_2, pH is the significant factor (p=0.0036) in predicting the risk of endotracheal intubation of acute hypercapnic respiratory failure patients treated with NIV.

P159 HOT HMV UK: SLEEP DISRUPTION FOLLOWING INITIATION OF DOMICILIARY NIV IN HYPERCAPNIC COPD

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Introduction The use of domiciliary NIV for the treatment of chronic hypercapnic respiratory failure (CHRF) in COPD remains controversial. Previous data from randomised controlled trials do not show a sustained clinical benefit, but to date there has been no RCT that has titrated NIV to nocturnal oximetry and capnometry. Although one randomised cross-over trial has shown that high intensity NIV produced greater improvements in health-related quality of life (HRQL) compared to low intensity set up (Dreher et al *Thorax* 2010) concern remains that this strategy may cause significant sleep disruption that would be expected to adversely effect the clinical benefits.

Method Patient who remained persistently hypercapnic ($PaCO_2$ >7 kPa) following acute exacerbations of COPD requiring NIV were offered participation in the home oxygen therapy versus home mechanical ventilation in COPD trial (HOT-HMV Trial). Baseline arterial blood gas analysis, HRQL and lung function parameters were performed prior to randomisation. Patients had nasal oxygen therapy or NIV established over a 3 day in-patient hospital stay. Sleep disruption and daytime activity was monitored for 7 days following HMV or HOT set up using a sleep diary and actigraphy (Actiwatch spectrum, Phillips-Respironics, Murrysville, PA, USA).

Results 7 patients were enrolled (4 HMV, 3 HOT). Mean ± SD age of 65 ± 11 years, BMI 25.5 ± 6.4 kg/m^2, FEV_1 30 ± 12%, FVC 58 ± 14%, FEV_1/FVC 39 ± 12%, $PaCO_2$ 8.22 ± 0.72 kPa, PaO_2 6.65 ± 0.58 kPa and MRC dyspnoea score of 4 ± 1. Actigraphy analysis showed HMV patients total sleep time (TST) was 241 ± 29 min with wake after sleep onset (WASO) time of 111 ± 41 min and a mobile time of 709 ± 119 min. Patients in the HOT arm had a TST of 373 ± 143 min with a WASO 116 ± 87 min and a mobile time 674 ± 132 min. No significant between group differences could be demonstrated in the sleep or activity variables. HMV settings Ipap 26 ± 3 cm H_2O, Epap 5 ± 1 cm H_2O, back up rate 15 ± 1 bpm.

Conclusion Although these data must be interpreted with caution, as the number of patients currently enrolled in this trial is small, there was no difference between the HOT and HMV groups. These data support the view that high pressure HMV does not cause significant sleep disruption when compared with HOT.