Spoken sessions

Thirty-one patients were successfully decannulated and weaned from IMV, including the use of nocturnal NIV. Twelve required no ventilatory support, 19 were discharged using nocturnal NIV and 5 continued nocturnal IMV (one of own choice). Twenty-two were discharged directly home, 7 to rehabilitation or the referring hospital and 6 to long-term nursing care. Thirty-four patients were alive 6 months after hospital discharge.

Seven transfers had undergone neurosurgery, five having posterior fossa surgery. Compared with allcomers they were significantly more likely to have permanent bulbar dysfunction, require feeding gastrostomy, tracheostomy on discharge, have a longer LOS (106 vs 51 days) and were less likely to be discharged home. Long-term NIV was used in two neurosurgical patients compared with 17 allcomers.

Conclusions Patients with weaning failure can be effectively managed outside ICU. NIV enabled weaning in 50% of cases; consistent with published experience¹. Six month survival is good and most are discharged directly home. Patients after neurosurgery present a specific challenge. NIV may not be possible, and ongoing bulbar dysfunction may necessitate the retention of a tracheostomy for ventilation, airway protection and suction.

REFERENCES

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S86 CHANGE IN PATIENT DEMOGRAPHICS AND HOME MECHANICAL VENTILATION (HMV) SET UP FOR PATIENTS WITH CHRONIC RESPIRATORY FAILURE BETWEEN 2006 AND 2012

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10.1136/thoraxjnl-2013-204457.93

Introduction HMV is standard therapy for long term management of chronic respiratory failure in patients with neuromuscular disease (NMD), chest wall disease (CWD), chronic obstructive pulmonary disease (COPD) and obesity related respiratory failure (ORRF). This study investigated changing trends in patient demographics and HMV ventilator set up over a 7-year period.

Methods Data from a bespoke discharge summary system (Carevue, Philips Corporation, US) of patients established on HMV from 2006 to 2012 were analysed. Patient demographic and anthropometric data, including spirometry and arterial blood gas values were analysed. Difference in length of stay (LOS) for non-invasive ventilation (NIV) set up and trends in the ventilator pressures was performed. A p-value <0.05 was considered significant.

Results 952 patients (518 male) were reviewed with a mean age of 57 ± 16 years. HMV set ups rose by 32.1% over the 7 years. The largest increase was observed in the ORRF group from 44% to 53% of the cohort. In comparison with 2006, NMD/CWD patients were started on HMV with lower arterial partial pressure of carbon dioxide (P_aCO₂) in 2012, whilst COPD patients were initiated on HMV at a higher P_aCO₂ (Table 1). LOS for elective NIV set up fell between 2006 and 2012 (4 (2–7) vs 2 (1–3) days; <0.0001). An increase in inspiratory positive airway pressure (IPAP) was demonstrated across all groups with a decrease in expiratory positive airway pressure (EPAP) demonstrated in NMD/CWD and COPD groups (Table 1).

Conclusions This study demonstrated an increasing demand for HMV in the UK. This was most marked in the ORRF group in line with rising levels of obesity. In 2012, NMD/CWD patients were being initiated on HMV earlier in the course of chronic respiratory failure, whereas COPD patients were being initiated when chronic respiratory failure was well established. A significant increase was observed in the inspiratory pressures delivered across all groups with a reduction in the expiratory pressures in the NMD/CWD patients as well as the patients with COPD. Efficiency of HMV set up has improved, as reflected by the reduced LOS and this is the result of a more structured clinical pathway.

Abstract S86 Table 1. Changes in spirometric measurement, arterial blood gas measurements and ventilator settings of patients initiating HMV between 2006 and 2012.

Analysed parameters	2006		2012		p value
	mean	SD	mean	SD	
FEV1 (L/s)	0.9	0.5	1.1	0.4	0.2
NMD/CWD	0.7	0.3	0.6	0.2	0.8
COPD	1.6	0.7	1.9	1.2	0.1
ORRF	1.1	0.5	1.4	0.4	0.04*
FVC (L)	1.2	0.5	1.4	0.5	0.4
NMD/CWD	2.0	0.8	2.4	1.4	0.1
COPD	9.9	1.4	9.8	2.5	0.9
ORRF	8.0	1.2	8.5	1.9	0.3
PaO ₂ (kPa)	9.1	1.6	8.9	1.5	0.6
NMD/CWD	7.7	0.6	7.5	1.6	0.01*
COPD	7.5	1.1	8.6	1.2	<0.01*
ORRF	6.9	1.1	6.6	1.4	0.2
PaCO ₂ (kPa)	30	3	33	5	0.04*
NMD/CWD	33	4	37	5	<0.01*
COPD	31	4	29	4	0.03*
ORRF					
HCO ₃ (mmol/L)					
NMD/CWD					
COPD					
ORRF					
IPAP (cmH ₂ O)	Median	IQR	Median	IQR	
NMD/CWD	16	14-18	20	17-24	<0.01
COPD	24	20-25	26	24-28	<0.01
ORRF	22	18-25	24	19-28	<0.05
EPAP (cmH ₂ O)					
NMD/CWD	5	4-8	4	3-5	<0.01
COPD	6	5-10	4	3-5	<0.01
ORRF	12	10-16	12	10-19	0.1

*Significant difference (p value <0.05) between 2006 and 2012

S87 THE EFFECT OF ON PATIENT COMFORT AND NEURAL RESPIRATORY DRIVE (NRD) OF VENTILATOR TRIGGER DELAY DURING NON-INVASIVE VENTILATION (NIV)

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10.1136/thoraxjnl-2013-204457.94

Introduction Optimising patient-ventilator interaction (PVI) has been shown to enhance patient comfort and respiratory muscle unloading. A major cause of poor PVI is ventilator trigger delay,

defined as an extended response time in the delivery of airway pressure following initiation of inspiratory effort by the patient. Although bench tests of ventilators have demonstrated variation in trigger response times (120–500ms), there are limited data reporting the effect of trigger delay on a subject's NRD and comfort. We therefore investigated the relationship between ventilator trigger delay, NRD and comfort perception.

Methods A custom-made NIPPY3 + ventilator (B&D Electro-medical, Stratford-upon-Avon, UK) with modifiable trigger delay was used. A standardised protocol of 10cm H₂O inspiratory positive airway pressure, 4cm H₂O expiratory positive airway pressure and back up rate of 6 breaths per minute was utilised in healthy subjects familiarised with NIV. Subjects were blinded to the settings and asked to assess perceived comfort using a visual analogue score (VAS) at 20 randomised trigger delay timings ranging from 10ms to 1000ms following a 2 minute assessment period. Second intercostal space electromyography (EMGpara% max), as a marker of NRD, mask pressure and flow were used to assess PVI. Transcutaneous carbon dioxide and oxygen saturations were controlled within limits of 0.5 kPa and 4% respectively of the subject's baseline values to minimise changes in the biochemical drive to breathe.

Results 5 subjects (1 male) were enrolled to date with a mean age of 34 ± 8 years, BMI 22 ± 3 kgm², FEV₁ $105 \pm 11\%$ predicted and FVC $114 \pm 13\%$ predicted. 500 breaths were analysed. The EMGpara%max was lowest at a trigger delay setting of 400ms 5.9%(4.8–8.0) and largest at a trigger delay of 800ms 10.1%(6.0–16.5). (Figure 1). There was a corresponding decrease in the VAS score from 78cm (63.5–92.5) at 400ms

Abstract S87 Figure 1. Graph representing the changes in comfort and neural respiratory drive with increasing trigger delay

trigger delay to 47cm (30–66) at 1000ms trigger delay. The highest comfort score was 89cm (52–92) observed at 170ms trigger delay.

Conclusion This is the first study to comprehensively investigate NIV trigger delay in healthy subjects. Based on NRD, these data suggest that the optimal NIV trigger response time was up to 400ms. This challenges previous bench studies that reported ventilators with response times over 100–150ms have limited clinical utility.

S88

1 YEAR UK SURVIVAL READMISSION RATE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) SURVIVORS FOLLOWING ACUTE NON-INVASIVE VENTILATION (NIV)

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10.1136/thoraxjnl-2013-204457.95

Background Previous data has shown that premorbid MRC-dyspnoea (MRCD) score predicts outcomes following acute exacerbation of COPD (Steer, Thorax 2012). There are limited data on the clinical utility of the MRCD in predicting outcomes in patients requiring NIV to treat hypercapnic respiratory failure complicating an acute exacerbation.

Methods A single centre observational cohort study was undertaken from 1st April 2009 to 31st March 2012. We prospectively followed a cohort of patients admitted with acute exacerbation requiring NIV according to standard BTS criteria. Pre-admission MRCD were calculated from a prospective database obtained from the electronic patient record system as were hospital readmissions and mortality data.

Results 119 patients (69 male) with a mean age of 71 ± 12 years were admitted requiring NIV. Mean pH was 7.26 ± 0.07 with a PaCO₂ 9.47 ± 2.26 kPa and HCO₃⁻ of 30.6 ± 6.3 mmols/l. 102 patients (86%) survived the index hospital admission. 16 (16%) patients had previous admissions requiring acute NIV prior to April 2009. 63 (62%) survivors were readmitted or died within 1 year with 26 (25%) survivors having >1 readmission episode and 33 (32%) patients required NIV on readmission within a year. Median 1 year re-admission rate per patient was 1 (1–9) with median time to readmission 228 days for all patients and 373 days, 216 days, 105 days for MRC-dyspnoea score 2–3, 4 and 5, respectively. Median length of stay of the index admission was 9 days (1–48) with median length of readmission, or readmissions of 13 days (1–111). Hospital readmission accounted for 1251 bed days. There was significantly poorer 1 year survival in the most severely dyspnoeic patients (MRC 5)

Kaplan-Meier plot: 1 year survival stratified by MRC dyspnoea score

Abstract S88 Figure 1.