250. Noninvasive ventilation in the acute setting: education, organisation, H1N1, paediatrics, weaning, diagnostic procedures and special considerations

P2065

A five-year series on the use of noninvasive ventilation as a weaning tool from invasive ventilation

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Data from randomised-controlled trials suggest that use of noninvasive ventilation (NIV) as a weaning tool decreases mortality, length of stay (LOS) and duration of invasive ventilation. We aimed to evaluate if increased use of NIV after high-risk extubation over time was associated with improvement in outcomes in the clinical setting.

In this prospective cohort study of all invasively ventilated patients (n=2316) in our medical intensive care unit (ICU) between 2006-2010, we performed time-trend analyses using simple logistic and linear regression to determine temporal changes in post-extubation NIV use, ventilator days, ICU LOS, reintubation rates, and ICU mortality. During this time we had gradually implemented the use of NIV post-extubation in patients with risk factors for extubation failure.

The proportion of patients receiving NIV post-extubation increased from 2006-2010: 21.1%, 22.0%, 28.4%, 34.6% and 32.8% respectively (OR 1.20 with each passing year, 95% CI 1.12-1.29). The commonest indication for NIV was high-risk extubation despite a successful spontaneous breathing trial (79.1%). Increased NIV use was associated with temporal decreases in invasive ventilator days and ICU LOS but these were neither statistically nor clinically significant. There were significant associated decreases in overall reintubation rates (OR 0.87 per year, 95% CI 0.76-0.99) and ICU mortality (OR 0.82 per year, 95% CI 0.76-0.87).

Although greater use of NIV post-extubation did not reduce ventilator days and ICU LOS in a general medical ICU population, there were associated improvements in reintubation rates and mortality. Confounders included a heterogeneous population and sedation protocols.

P2066

Techniques of managing difficult to wean acute NIV: Comparison between prolongation of time off ventilator and pressure withdrawal

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Introduction: Recent guidelines suggested gradual reduction of the duration of NIV once clinical improvement is determined. However, a subgroup of patients become dependent on the machine, finding the hours off the machine stressful in the absence of signs of respiratory failure. In this particular group of patients, we compared between slowly prolonging the hours off ventilator as tolerated by the patient and slowly reducing the IPAP levels by 1-2 cm H2O every day.

Methods: Difficult to wean patients were identified as those unable to tolerate more than one hour off BiPAP on day 3 from the start of NIV. We excluded patients with persistent severe abnormal physiological parameters. All patients were fully alert with no clinical signs of persistent exacerbation. The failure of tolerating more than one hour off ventilator was due to the subjective feeling of tiredness and breathlessness in the absence of desaturation. Five patients (Group 1) were started from Day 4 on the gradual reduction of the IPAP levels at a rate of 1-2 cm H2O per day depending on the Day 3 IPAP level. The other five patients (Group 2) were treated in the conventional way of gradually prolonging time off ventilator as tolerated by the patient. Both groups received same medical management, physiotherapy and psychological support as needed.

Results: Both groups did not differ significantly in age, sex, physiological parameters or blood gas values. The length of NIV therapy and the length of stay in the hospital were significantly shorter in group 1

Conclusion: Gradual reduction of IPAP level can be used as an alternative method in a specific group of difficult to wean NIV patients.

P2067

A new weaning and long term ventilation service – One year on

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Introduction: In 2010 a purpose built 10 bed Ventilation Inpatient Centre (VIC) was opened. In its first year 230 patients received acute non invasive ventilation (NIV), and 164 electively established on domiciliary NIV. It now also manages weaning failure for tracheostomy ventilated ICU patients in a multidisciplinary, rehabilitation centred environment. The cost is less than half that of an ICU bed. A secondary role is assisting discharge of ventilator dependent patients to home or care facility. Well established in continental Europe and the USA, such units are rare in the United Kingdom. We reviewed our weaning cases to report our first years experience.

Results:

Completed patient episodes 2010-2011

	n=11 (8 male : 3 female)
Median age (years)	45 (range 22–68)
Underlying diagnosis	6 neuromuscular
	2 no significant history
	1 obesity
	1 COPD
	1 neurological malignancy
ICU admission diagnosis	5 post surgery
	3 sepsis
	1 cardiac arrest
	1 ascending paraparesis
	1 acute ventilatory failure
ICU LoS (days)	106 (range 21–400)
VIC LoS (days)	56 (range 15–131)
VIC Outcome	2 no ventilatory support
	7 nocturnal NIV
	2 ventilator dependant
Hospital survival	11
Discharge destination	7 home
	1 rehabilitation
	3 nursing home

LoS, length of stay.

Conclusion: Activity has risen steadily, all weaning beds are currently used with a waiting list for transfer. Most patients had an underlying diagnosis likely to prevent complete liberation from ventilatory support. Success in weaning from invasive ventilation has been largely through the use of nocturnal NIV. The service has been well received by patients, families and referring ICUs. ICU beds can be used for acute care, it is cost effective and provides a template for other service development.

P2068

Noninvasive positive pressure ventilation in burn patients

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Introduction: Acute respiratory failure is a common complication of severely burn-injured patient. Noninvasive Positive Pressure Ventilation (NIPPV) has been used with success in hypercapnic and hypoxaemic acute respiratory failure. However, the outcome of NIPPV with burn patients is less well documented.

Objective: The purpose of this study is to report our experience with NIPPV in a series of burn-injured patients.

Method: The records of all burn patients from July 2008- January 2010, in whom NIPPV was used at the Intensive Burn Care Unit, were reviewed.

The criteria for selecting patients for NIPPV included a combination of the following factors; patients with acute respiratory failure, haemodynamically stable, conscious and cooperative with their treatment. There had to be no need for endotracheal intubation.

Results: Thirty five patients were treated with NIPPV. twenty were female. Mean age was 49.8 years, mean total body surface area (TBSA) was 37.63%. NIPPV was used to treat hypoxia in 24 patients, hypercapnia in 4 patients and both of them in 7 patients.

NIPPV was used to treat acute lung injury in 15 patients, pneumonia in 9 patients, atelectasis in 6 and cardiogenic oedema in 5 patients. Mean PaO2/FiO2 ratio

before NIPPV was 177 and after NIPPV was 304. Intubation was successfully avoided in 16 out of the 35 (45.7%) patients. All of these patients progressed to self-ventilation status following NIPPV.
Conclusion: The use of NIPPV with burn-injured patients is, as yet, unclear because of little work has been documented. In our experience, the use of NIPPV can lead to avoid the need for endotracheal intubation and mechanical ventilation.

P2069
Efficacy of noninvasive positive pressure ventilation during fiberoptic bronchoscopy: Bi-level *vs* CPAP valve
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Background: Fiberoptic bronchoscopy (FOB) in severe acute respiratory failure patients may have risks and sometimes is contraindicated. Noninvasive Positive Pressure Ventilation (NPPV) application to assist spontaneous breathing during FOB can be an alternative.
Objective: Compare the application of NPPV (Philips-Respironics BiPAP Vision and Airox Supportair) *vs* Continuous Positive Airway Pressure (CPAP) valve (Boussignac) (CV) during FOB, in hypoxemic and/or hypercapnic patients, with various etiologies.
Patients and methods: Fifteen (5 female) with severe hypoxemia defined by PaO2/FiO2<200 and PaCO2<60mmHg, submitted to FOB were eligible to the study. Seven patients were randomized to NPPV group (G1) and 8 to CV group (G2). At baseline 2 patients (G1) and 1 patient (G2) had PaCO2> 45mmHg.
Results [median (iqr)]: In G1 an IPAP of 23 (3)cmH2O, EPAP of 8 (2)cmH2O were applied and a FiO2 of 70 (50)% and in G2 a oxygen flow of 20 (8,6) L/min, generating a CPAP of 6 (4)cmH2O and a FiO2 of 60 (17,5)%. PaO2 improved after FOB in the whole group: 62,7 (16,1) *vs* 102,3 (97,1) mmHg post FBO, *p*=0,002, as well as PaO2/FiO2: 141,6 (57,2) and 203,9 (206) post FBO, *p*=0,002, and the PaCO2 remained within normal limits. Average SpO2 during FBO was not significantly different in both groups, 95,0 (5,9) in G1 *vs* 97,2 (0,9) in G2, (*p*=0,148). In G1 one patient was intubated.
Conclusion: These results suggest that noninvasive positive pressure has an important role as adjunctive technique during FOB in severe hypoxemic patients (PaO2/FiO2<200). In this preliminary study no advantage of NPPV *vs* CV.

P2070
NIV for ventilatory support during percutaneous endoscopic gastrostomy (PEG) in ALS patients with respiratory failure
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Aim: The aim of the study is to evaluate safety and usefulness of PEG placement in ALS patients with respiratory failure supported with NIV during this procedure.
Material and methods: We analyzed the group of 17 ALS with respiratory failure admitted for PEG placement and starting NIV on period of two years (2007-2009). Mean period from the establishing diagnose was 2, 2±1, 2 years. Mean survival on home mechanical ventilation was 7, 1±4, 4 months. They were first accommodated to NIV with full face mask. Mean age was 55, 3±11, 06 (10 males and 7 females). Mean hospital staying was 8, 3±4, 52 days. Mean PaO2 was 9, 29±0,43kPa, PaCO2 7, 19±0,54kPa. Mean FVC was 38, 37±15, 01%. Bulbar symptoms had 48% of patients. NIV was used for ventilatory support during PEG. The team included very skilled surgeon for PEG placement and pulmonary physician for NIV. One patient had classical surgical gastrostomy and feeding tube placement on NIV. No respiratory complications occurred in any of these patients to be at high risk for PEG placement.
Conclusions: Placement of PEG in patients with respiratory failure and high risk for this procedure is safe if the team is skilled for PEG placement and NIV.

P2071
Safety of percutaneous endoscopic gastrotomy under sedation with propofol in patients with amyotrophic lateral sclerosis
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Percutaneous endoscopic gastrotomy (PEG) is believed to prolong life and increase quality of life in patients with amyotrophic lateral sclerosis (ALS). Since many ALS patients suffer from respiratory failure and the PEG procedure requires sedation, this intervention is believed to be hazardous.
Methods: We reviewed the charts of all ALS patients who underwent PEG placement in our institution between 2006 and 2010 and collected relevant data on the PEG placement procedure.
Results: 21 patients were identified. All patients had a restrictive pattern in lung function tests (VC 50±9% predicted). Sniff nasal inspiratory pressure was decreased (29±4 cmH2O), daytime blood gases showed hyperkapnia in the majority of patients (mean daytime PaCO2 6.5±0.6 KPa). PEG was performed by two experienced gastroenterologists using the "pull through method". Oxygen was delivered with a target saturation of 92%. Conscious sedation was reached by bolus administration of propofol. PEG placement could be performed successfully in all patients. Adverse events requiring noninvasive or invasive ventilation were not observed.
Compared to a control group of patients without ALS, ALS patients received lower doses of propofol (157±28 vs. 203±57 mg, p = 0.01) and oxygen (2.0±0.4 vs. 2.9±0.9 l/min, p = 0.02), and the nadir of oxygen saturation was higher in the ALS group (91±2 vs. 88±4%, p = 0.02).
Conclusions: PEG placement under propofol sedation in patients with ALS is safe and acute respiratory complications are rare. Compared with controls the decrease of oxygen saturation during the procedure is lower. This is probably due to a more cautious dosing of propofol.

P2072
Noninvasive ventilation (NIV) after lung resection (LR) to prevent respiratory complications (RCs) in COPD patients (pts) (POPVNI trial)
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Background: RCs are common following LR in COPD pts. NIV decreases the rates of tracheal intubation and mortality in post-operative (PO) acute respiratory failure. The aim of our study is to prophylactic NIV for prevention of RCs in the immediate PO care of pts with COPD.
Patients and methods: This multicenter, prospective, randomised, parallel, open ended study planned to enrol 360 pts with moderate to severe COPD scheduled for LR. Patients were randomized to standard treatment without or with NIV during the 3 first PO days. The primary outcome is the incidence of acute respiratory events (AREs), defined as the occurrence of at least two of the following: RR >30/mn, PaO2/FiO2 ≤200 mmHg, >10 mmHg increase in PaCO2 or a new pulmonary infiltrate on chest X Ray. Secondary outcomes are the incidence of RCs, rescue NIV use, invasive ventilation requirements, mortality rate, duration of ICU and hospital stay. Univariate and multivariate analysis will identify subgroups who benefit more from NIV.
Results: 351 pts, 277 men (79%) and 74 women (21%) were effectively included in 6 centres between June 2008 and October 2010. Mean age (±SD) is 62±9 years. Mean pre-operative FEV1 is 62±11% predicted. Pts numbers in GOLD stage II, III and IV are 295 (83.4%), 44 (12.5%) and 4 (1.1%), respectively. There is no difference in baseline patients' characteristics at inclusion between the control group (n = 174) and NIV group (n = 177).
Conclusion: Comparability of the 2 groups at baseline will allow reliable comparisons of outcomes (which will be available at the ERS meeting) between PO NIV and standard care following LR in GOLD stage II-III COPD patients.

P2073
The provision of an acute paediatric NIV service at a district general hospital
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The experience of acute NIV in Paediatrics is limited. The experience outside a PICU is even more limited.
We looked at our acute NIV usage over a 3 year period (January 2007 to December 2009) in a Paediatric HDU at a District General Hospital with no PICU facilities. The indication for NIV was Type 2 respiratory failure as defined by pH <7.30, pC02 >6 (children <5 years) pH <7.35, pC02 >7.35 (children >5).
23 patients had 31 admissions over the study period. 11 previously stable children (Group 1) admitted with acute respiratory failure needed NIV; the largest diagnostic group was children with SMA followed by Duchenne muscular dystrophy. 10 children (Group 2) who were stable on NIV were admitted with a respiratory exacerbation and needed enhanced NIV support. The largest diagnostic group in this cohort was children with Duchenne Muscular Dystrophy. 11 of the 14 children in group 1 and all 10 of the children in Group 2 improved clinically and on blood gases measurements were discharged home.
NIV has been implemented successfully out with a PICU. There are significant benefits to the family and to the economy.

P2074

The use of non-invasive ventilation after liver transplantation in pediatric patients: Changes in the need for reintubation

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Introduction & aim: The role of non-invasive ventilation (NIV) in preventing reintubation after abdominal surgery in paediatric patients is uncertain and should be investigated.
Method: Our team has performed more than 700 liver transplantations (LT) for pediatric patients since 1990. Beginning in 2005 we began full introduction of NIV to these patients from 2005. We screened all medical records of pediatric patients less than 12 years old who underwent LT during two 4-year periods: 2001-2004 (pre full introduction of NIV) and 2006-2009 (post full introduction of NIV) and retrieved data on cases at high risk of respiratory failure. Data and clinical outcome for these cohorts were retrospectively analyzed and compared.
Results: Included in the analysis were 54 cases (53 patients) from the pre-NIV period and 29 cases (28 patients) from the post-NIV period. After full introduction of NIV, NIV was applied more frequently within one week after extubation in these patients (16/54 cases (29.6%) vs. 22/29 cases (75.9%), $p<0.01$) and the need for reintubation was significantly decreased (11/54 (22.5%) vs. 1/29 (3.7%) $p<0.05$) during that period. Sequential arterial blood gas analysis suggested that NIV use beginning immediately after extubation stabilized the respiratory condition in this cohort.
Conclusion: NIV is an acceptable method of respiratory management of pediatric patients undergoing LT. NIV may also stabilize their respiratory condition and decrease the need for reintubation after scheduled extubation.

P2075

Non-invasive-ventilation in H1N1 acute respiratory failure in emergency department: A case series

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Background: The recent ERS/ESICM guidelines do not recommend the use of non-invasive ventilation (NIV) in patients with severe pneumonia caused by H1N1 infection.
Methods: We retrospectively reviewed the clinical data of 9 consecutive patients with acute respiratory failure due to H1N1 virus, admitted to the Emergency Department of Fondazione IRCCS Ca' Granda Policlinico (Milan, Italy), between January 1 and February 20, 2011.
Results: Patients were predominantly male (66%), mean age was 55 years (range 34-79).7/9 patients had one or more risk factors for severe H1N1 infection: obesity, chronic pulmonary disease, onco-haematologic disease, age $\geq$65 years. All patients presented with high fever (>38°C), cough, dyspnea and multifocal bilateral consolidations on chest X ray. 6/9 patients developed ALI, 2/9 patients presented with ARDS. All patients received oseltamivir and empirical antibiotic therapy. 7/9 patients were immediately treated with NIV (6 CPAP, 1 BiLevel). 5/7 patients developed severe sepsis; no patients showed signs of septic shock or needed inotropic support. One patient needed endotracheal intubation. Only one patient died for acute respiratory failure due to nosocomial infection, all the others were discharged after a mean of 17 days (range 4-34).
Conclusions: NIV was successfully applied in the majority of patients (6/7), and only one patient needed endotracheal intubation. Our data suggest that in particular settings with staff experienced with NIV, high monitoring level and rapid access to intubation and ICU, early NIV could be an option to improve oxygenation in acute respiratory failure due to Influenza A H1N1 infection.

P2076

The application of bi-level positive airway pressure in patients with severe pneumonia and acute respiratory failure caused by influenza A (H1N1) virus

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Objective: To evaluate the effect of noninvasive Bi-level Positive Airway Pressure (BiPAP) ventilation on the severe influenza A virus associated with pneumonia and acute respiratory failure (ARF).
Methods: Based on conventional therapy via face mask using BiPAP ventilator positive airway pressure ventilation in the treatment of severe pneumonia caused by influenza A (H1N1) virus with acute respiratory failure (ARF) in 18 cases, we observed and evaluated the therapeutic effects.
Results: PaO_2 and SaO_2 before and after treatment were (48.85±12.15)mmHg, (68.56±16.25) mmHg and (80±6)%, (92±5)%, respectively. The results were significantly different ($P<0.05$) before and after treatment. Endotracheal intubation rate was 25% (6/24) and case-fatality rate was 8.3% (2/24).
Conclusion: BiPAP ventilator airway pressure by face mask ventilation can reduce the rate of endotracheal intubation in the treatment of severe pneumonia caused by influenza A (H1N1) virus in acute respiratory failure. It could be an effective approach in the emergency treatment with clinical value.

P2077

Effect of adherence to hospital NIV guidelines on the outcomes of type II respiratory failure patients

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Background: BiPAP is used on 3 different areas providing acute therapy at Newham University Hospital: A&E, ACU and ITU. Trust's BiPAP guidelines were introduced and loaded on the hospital intranet in December 2008. We compared adherence to guidelines during two three month periods in January to March 2009 (Period 1) and September to November 2009 (Period 2) and compared those two time frames outcomes.
Method: A proforma was developed and data acquired from the patients' notes and laboratory results. We compared the Trust's BiPAP guidelines with the data acquired for both periods.
Results: During Period 1, 70% of patients started on BiPAP (n=19) were correctly indicated for treatment, compared with 83% (n=23) during Period 2. 48% were started on BiPAP in ACU, 43% in A&E during Period 1, whilst 40% were started in ACU and 35% in A&E during Period 2. BiPAP initial settings were correct for no patients in period 1 and 14% of patients in period 2. 35% of patients in Period 1 had decisions fo ceiling of treatment documented, compared with 65% in Period 2. Oxygen was prescribed for 30% of patients during Period 1 and 17% of patients during Period 2. Outcomes showed that 45% patients made a full recovery in Period 1 and 75% during Period 2.
Conclusion: At Newham, introduction of local BiPAP guidelines helped in improving outcomes. There is poor evidence of documenting decisions on ceiling of care if BiPAP fails. Oxygen prescribing was very poor through both periods.
Recommendations: We need to encourage and educate all doctors and nursing staff using BiPAP to refer to the guidelines. A proforma has been developed to aid this and encourage early decision making and good documentation.

P2078

An audit of NIV in COPD patients in a respiratory and coronary care unit

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Introduction: While non-invasive ventilation (NIV) is established in the management of acute type 2 respiratory failure (T2RF) in COPD, the ideal location for its delivery is debatable. Recommended target inspiratory pressure (IPAP) is 20cmsH_20, or until patient response or tolerance is reached (BTS guideline 2008). There is little data on optimum duration for NIV. It is generally agreed that weaning can commence once respiratory rate and acidosis have normalised and acute cause for decompensation resolved. Nocturnal NIV should be continued in the weaning period. We aimed to assess if patients with acidotic T2RF on NIV met target IPAP and were weaned following local and national guidelines.
Method: Records for all 39 patients on acute NIV from Jan-Sept 2010 were reviewed. Data collected: time NIV started, maximum IPAP achieved, duration of NIV, compliance with weaning criteria, use of nocturnal NIV on weaning, rate of recommencing NIV and failure rate.
Results: 82.1% of patients (n=32) were started on NIV out-with normal working hours (1700-0900), due to bed pressures the majority were managed in the coronary care unit (n=24, 61.5%). Data is summarised below.

	Overall (n=39)	Respiratory unit (n=15)	Coronary care unit (n=24)
Respiratory input	51.3% (n=20)	100% (n=15)	20.8% (n=5)
Mean maximum IPAP	15	17	14
Mean maximum EPAP	4.6	4	5
Weaning criteria met	48.7% (n=21)	86.7% (n=13)	25% (n=6)
Mean duration of NIV	35.8hours	68.5hours	15.4hours
Nocturnal NIV continued	43.6% (n=17)	86.7% (n=13)	16.7% (n=4)
Emergency restart rate	12.8% (n=5)	0	20.8% (n=5)
Failure rate	20.5% (n=8)	6.7% (n=1)	29.2% (n=7)
Failure due to patient intolerance	50% (n=4)	0	57% (n=4)
Failure due to patient deterioration on NIV	50% (n=4)	100% (n=1)	43% (n=3)

Local weaning criteria	
Clinically stable	>6hours
Respiratory rate	<24bpm
Heart rate	<110bpm
H^+	<45

Conclusion: This audit indicates that acute NIV can be done well in a general respiratory ward, where teams are experienced in its use. It also highlights the importance of ongoing audit, training and support to all areas where NIV is undertaken. A local training programme is in development.

P2079

Can repeated educational interaction improve doctors' knowledge of NIV management?

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Introduction: Exacerbations of chronic obstructive pulmonary disease (COPD) requiring non-invasive ventilation (NIV) are common and often poorly managed [1]. Amongst other aspects, doctors on call in Southport may be asked for advice in adjusting settings appropriately.
Methods: On the background of a 6-12 monthly rolling teaching program a new educational intervention on NIV was established. Doctors of all grades completed a questionnaire containing 3 questions prior to receiving a presentation about NIV. The teaching was then repeated 3 months later and the same questionnaire completed afterwards. 3 clinical vignettes asked for the best change in settings in response to common scenarios (involving intensive care, low PaO2, persistent acidaemia).
Results: 21 questionnaires were collected before the first teaching session and 16 after the second. The table below shows the number of correct responses for each question.

Questionnaire responses

Question	1st Questionnaire	2nd questionnaire	P value
1.	9 / 21 = 42.9%	11 / 16 = 68.75	0.1845
2.	6 / 21 = 28.6%	11 / 16 = 68.75	0.0220*
3.	7 / 21 = 33.3%	6 / 16 = 37.5%	1.0

*Statistically significant (Fisher's test).

Conclusion: The survey shows that there is a lack of knowledge in important aspects of NIV. After an educational intervention some improvement was observed. We therefore conclude that an educational intervention such as ours combined with ward-based practical sessions are likely to be the best ways to improve standards of care. Frequency and intensity need further exploration.
References:

[1] Roberts CM, et al. Acidosis, non-invasive ventilation and mortality in hospitalised COPD exacerbations. Thorax. 2011 Jan;66(1):43-8.

P2080

Effect of a structured education programme on the documentation of "ceiling of care" for patients with acute hypercapnic respiratory failure (AHRF) requiring non invasive ventilation (NIV)

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Introduction: With greater use of ward-based NIV, early documentation of decisions regarding ceiling of care of these patients is assuming greater importance. Nava et al. [1] showed that ceiling of care documentation was low in this group of patients. We conducted a survey of documentation of "ceiling of care" at our 11-bedded ward-based NIV unit in Birmingham, UK, providing acute medical services to a population of over 450000 to assess the effect of a targeted rolling education programme for the caregivers and the use of a standardised protocol.
Methods: Retrospective case note analysis of all patients commenced on acute NIV for AHRF between 1st January 2009 and 31st January 2010. Data relating to documentation of ceiling of care for patients, NIV outcome and mortality were collected after the educational intervention to improve practice.
Results: Over the 13 month period of data collection there were 264 NIV episodes for AHRF. Ceiling of care was documented in 165 patients (62.5%). NIV treatment failure occurred in 59/264 (22%). Eleven of 264 patients (4%) were admitted to ITU during this admission episode. The overall in-hospital mortality for the entire group was 12.8%.
Conclusions: Documentation of ceiling of care in NIV patients can significantly improve with the increase in awareness among caregivers following the introduction of a rolling education programme and the use of a standard protocol.
Reference:

[1] End of Life decision making in Respiratory Intermediate care units: a European Survey. Nava S, Sturani C, Hartl S, Magni G, Ciontu M, Corrado A, Simonds A. *Eur Respir J*. 2007 Jul;30(1):156-64.

P2081

Non-invasive ventilation (NIV) practices in Swiss adult ICUs

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Purpose: The real scenario of the practical modalities for NIV in adult Swiss ICUs has never been reported.
Methods: Using the survey methodology, we developed a questionnaire addressed by e-mail to all directors of the 79 certified adult Swiss ICUs. Responses were analyzed using descriptive and standard statistics.
Results: We obtained replies from 49 of the 79 ICUs (62%). The overall Swiss utilization rate for NIV was 26% of all mechanical ventilations, but we found significant differences in the perceived utilization rates among different linguistic areas, from 20% in the German part to 48% in the French part ($p < 0.01$). NIV was mainly indicated for the acute exacerbations of COPD (AeCOPD), acute cardiogenic pulmonary edema (ACPE), acute respiratory failure (ARF) in selected *do-not-intubate* patients and post-operative states, post-extubation failure in high risk patients and pneumonia in the immunocompromised host. CPAP use in ACPE was much less used than bi-level ventilation and was still applied in AeCOPD.The most important arguments reported by doctors perceiving low degree of satisfaction in the NIV application, were lack of medical technical knowledge and inadequate staff training.
Conclusions: This survey demonstrates that the perceived NIV practice is high in Switzerland, with significant regional variations. The indications of the perceived NIV use are in accordance with the international guidelines, but a high percentage of units considers selected *do-not-intubate* conditions an important indication for NIV. The variability of NIV application and some erroneous applications suggest that education and training of physicians, nurses and therapists are warranted.

P2082

Non-invasive ventilation as ceiling of ventilatory care (NIVc) in a respiratory intermediate care unit (RICU)

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Aims: In European RICUs an end-of-life decision is taken for ±20% of the patients admitted. One of the most common practices is the use of NIVc. We aimed to characterize this group of patients under NIVc practice.
Methods: A systematic retrospective review of the patients admitted in our RICU for NIV, in whom an end-of-life decision was made, was carried between February 1 and July 31, 2010.
Results: Of the 126 admissions, 23 had an end-of-life decision (18%), in 10 decision was made pre-admission and in 13 during hospitalization. NIVc was instituted in 18 patients (78%), with a mean age of 74 yrs. (52-93) and 72% males. Patients were referred mainly from the Emergency Department (39%), Respiratory wards (22%) and other hospital wards (11%). All patients had chronic diseases, a quarter had neoplastic disease and diabetes, 77% pulmonary chronic disease, mostly severe, 89% cardiovascular disease, 17% neurologic disease, 50% renal insufficiency, 72% were high dependent on daily activities and 61% had previous hospitalizations in the last year. The majority had decompensated chronic diseases (83%) at admission (mainly pulmonary and cardiovascular). Nosocomial pneumonia was the main cause for admission (56%). RICU mean stay was 9 days (2-23) and mean hospital stay was 19 days (2-71). At RICU admission, blood gases showed respiratory acidosis in 61%, hypoxemia in 22% and mixed acidosis in 17%. NIVc had success in 1 patient and 17 died (94%).
Conclusions: NIVc is used as an effective alternative to intubation in patients whom invasive approach is questioned or as palliative approach. The high mortality found in our group of patients was related to NIVc on the end stage disease.

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Respiratory intermediate care unit (RICU) – What are we doing?

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Aim: RICUs are designed to treat invasive mechanical ventilated (IMV) stable patients for weaning and chronic care, hemodinamically stable patients with compromised gas exchange for frequent observation and/or non-invasive ventilation (NIV) and patients who require frequent vital signs monitoring or aggressive pulmonary physiotherapy. We aimed to evaluate the work developed in our RICU.
Methods: A systematic retrospective review was made from February 1 to July 31, 2010, in an 8 beds RICU.
Results: In the studied period, 105 patients were responsible for 126 admissions, 73% were male, mean age was 68 yrs. (16-96). Patients were referred mainly from the Emergency Department (44%), Intensive Care Unit (ICU) (21%) and Respiratory wards (11%). The reasons for admission were in 21% to step-down ICU, 52% for NIV, 24% for cardiorespiratory monitoring and 3% for other reasons. In 98% respiratory insufficiency was present, mainly hypercapnia, mostly caused by infectious respiratory exacerbations. All but 1 had chronic disease, 76% cardiac and 60% pulmonary (mostly severe). The average stay at RICU was 22 days (1-76). RICU has enabled to liberate 536 days of ICU. Eleven patients were transferred to ICU and 20 died. One of two was weaned from chronic IMV. Tracheotomy was closed in 3 of 5 patients. In respiratory failure patients, NIV succeeded in 46 (70%), 4 were transferred to ICU and 16 patients under palliative NIV died.
Conclusions: Despite the diversity of work developed in our RICU, primarily it allowed free days in ICU and NIV practice. Although the advanced stage of chronic diseases and a high number of do not intubate patients, the possibility of close monitoring and observation is greatly responsible for NIV's success.

P2084

The introduction of a respiratory high care unit in a district general hospital

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Introduction: Non invasive ventilation (NIV) has a well documented place in the management of the type two respiratory failure of COPD. Ward based NIV is cost effective when compared to administering the treatment in an Intensive Care Unit (ICU) setting.

Prior to March 2010, type 2 respiratory failure requiring NIV at the Lister Hospital was managed in ICU, under anaesthetic care. In March 2010, a 4 bedded Respiratory High Care Unit (RHCU) was created to deliver NIV in a ward environment.

Aims: To look at usage of the RHCU in the management of type 2 respiratory failure and the outcomes of those receiving NIV.

Methods: Bed occupancy records were kept from the introduction of the RHCU. These were analysed from May 2010 to January 2011 in conjunction with medical records to establish diagnosis, length of stay and discharge destination.

Results: 40 patients received NIV over the nine months. 31 (77%) had underlying COPD, 4 (10%) sleep apnoea and the remainder; heart failure, pneumonia, interstitial lung disease and motor neurone disease. Length of stay varied from 1-46 days (mean 11.3, standard deviation 9.7).

In the 31 patients with COPD, 6 already had home NIV, 6 were referred for consideration of home NIV, and 14 (45%) discharged with no need for ongoing ventilation. 5 COPD patients did not survive the admission.

Conclusion: COPD was the predominant diagnosis in the 40 patients treated with NIV. The introduction of the RHCU allowed savings through the avoidance of an ICU admission and meant a trial of NIV could be used more readily as a ceiling of treatment in end stage COPD. Of note, no COPD patients were transferred from the RHCU to ICU, indicating appropriate selection of patients for ward based NIV.