242. Application of noninvasive ventilation in non-obstructive patients

P2042

Results of non invasive ventilation in patients with acute hypercapnic ventilatory failure and obesity hypoventilation syndrome (OHS)

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Background: The NIV is used in patients with OHS presenting with hypercapnic respiratory failure. Few studies examine the evolution and impact after starting this therapy in this patient group.
Objective: - Evaluate the result of NIV started in obese patients in acute hypercapnic respiratory failure and its prognosis consequences.
– Assess the impact of long-term NIV.
Material and methods: Observational study with consecutive inclusion of obese patients with acute hypercapnic respiratory failure treated with NIV from Feb 08 to Jun 11.
Results: See Tables 1 and 2.
At the moment of discharge no differences were observed in commorbidities, clinical data an blood gases between patients with or without NIV treatment. Patients discharged with NIV had tolerated better and had more total hours of use with BiPAP than those discharged without it.
Compliance measured at 3 months of onset and the last recorded was 4.51±3,30 hours and 5.12±3,42 hours daily.

Table 1

N=196/Gender	Age	IMC	FVC	FEV1	FEV1/FVC	Follow up
171 F/25 M	75+±11 years	39±7	69±22	65±20	78±11	1,32±0,94
pH	PCO2	PO2	Glasgow	Mean stay	Hospital mortality	Global mortality
7,28±0,7	76±17	60±26	13±3	11±7	17 (9%)	80 (40%)

Table 2

	Patients	Mortality outside Hospital p<0,005	Survival Days (95% CI) p<0,005	Readmissions
Discharged with BiPAP	122 (68,5%)	32 (26%)	1084 (992–1176)	55%
Discharged without BiPAP	56 (35,5%)	30 (54%)	562 (428–696)	48%

Conclusions: 1.- Non invasive ventilation is an effective tool for treating patients with obesity-hypoventilation syndrome and hypercapnic respiratory failure.
2.-Patients who received home treatment with NIV survived longer than those who didn't. This forces us to review NIV treatment at discharge.

P2043

Noninvasive ventilation during percutaneous endoscopic gastrostomy in amyotrophic lateral sclerosis patients with severe ventilatory impairment

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Introduction: Patients with amyotrophic lateral sclerosis(ALS) and severe bulbar muscle impairment may be at respiratory failure risk during percutaneous endoscopic gastrostomy(PEG).Noninvasive ventilation(NIV) might reduce the risk of respiratory complications in patients with severe ventilatory impairment(SVI).
Objective: To report the outcomes of PEG placement with NIV in ALS patients with SVI.
Methods: Retrospective study including ALS patients with severe bulbar muscle impairment and indication for PEG placement. Pre-PEG pulmonary data was analyzed. Procedure was performed under nasal NIV using patients home bi-level ventilator. Vital signs, estimated tidal volumes and air-leaks were monitored. Due to increases in mouth air-leaks during the procedure ventilator parameters were readjusted.Low flow oxygen was only for SpO2<95% despite NIV optimization. If SpO2≥92% could not be reached the procedure was cancelled. NIV was maintained for 3h after.
Results: Ten patients(mean age 68.2 years) were included. Six patients didn't require hospital admission. Patient's pre-PEG pulmonary assessment is in Table1.

Lung Function Parameters	Mean ± SD
VC (ml) (% predicted)	736.0±455.9 (25.0±14,9)
PCF (l/s)	64.0±69,9
SNIP (cmH2O)	33±4.8
SpO2 (%)	96.2±1,0
EtCO2 (mmHg)	38±3.9

All patients used home NIV for 5,9±10 months(mean daily use 14h:32)
Patients started the procedure with mean IPAP-19.2±3 and EPAP-6,7±1,5 mmH2O. All patients successfully underwent PEG placement with no complications, tolerated the ventilator adjustments maintaining SpO2>95%.1month survival was 100%
Conclusion: NIV allows successful PEG placement in ALS patients with severe ventilatory impairment.

P2044

Training and confidence in the use of NIV/BiPAP amongst front-line medical staff in a teaching hospital setting

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Background: Non-invasive ventilation is an evidence-based and validated treatment for patients with type II respiratory failure, and is widely used in acute and chronic settings. Poor training/preparedness have been linked with poor patient outcomes.
Aims and objectives: Staff confidence in managing patients on NIV is poorly described in the literature. Medical interns (with basic medical training) frequently care for patients on NIV during and outside normal working hours. We aimed to assess the preparedness and confidence of year 1 interns in managing patients on NIV within a teaching hospital in the UK. A structured questionnaire probed doctors' understanding, confidence and practical skills in administering NIV.
Methods: 30 interns completed the questionnaire at a weekly mandatory teaching session. Answers were collated and analysed.
Results: 43% of interns did not know what "BiPAP" stands for; 33% described their knowledge of NIV indications as inadequate; 87% had no formal teaching in the use of NIV; 87% described their practical knowledge of NIV as inadequate, and 70% felt their confidence in managing patients on NIV was inadequate. The overwhelming majority (90%) of respondents felt they needed formal training in the use of NIV to ensure patient safety.
Conclusion: Our study illustrates worrying shortfalls in the training and confidence of front-line medical staff in the use of a medical intervention frequently found on hospital wards. This suggests a role for formal training at either the undergraduate or early postgraduate stage.

P2045

Introduction of a non invasive ventilation (NIV) care bundle in a district general hospital

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Introduction: A care bundle is a group of evidence based actions needed to deliver optimal care in a clinical setting. It takes the form of a simple checklist, placed in the notes, which serves as a reminder to clinicians. It aims to ensure consistent delivery of care leading to safe and reliable care. Compliance with all elements is needed for optimum benefit.
Method: A 7 item bundle was created for acute NIV. It was introduced to coincide with the 2011 British Thoracic Society (BTS) NIV audit so that the impact could be assessed by comparison with the 2010 audit. The bundle was provided in the form of a sticker to be inserted in the case notes when NIV was commenced. Bundle elements not included in the table below were (1) NIV only to be delivered in areas where nursing staff are trained (2) arterial blood gases checked at 1 hour (3) and at 4 hours (4) review by a pulmonologist within 24 hours (Mon – Fri).
Results: 13 of 19 patients (67%) had a bundle in the notes. 11 of 13 (85%) had all 7 elements completed. The impact of the bundle on key measurements are summarised in the table (bundle items highlighted).

Audit point	2010 (n=20)	2011 (n=19)
Decision to apply NIV by registrar or above	100%	100%
Plan if NIV fails (on initiation)	55%	89%
IPAP by the end of 1st hour ≥20	49%	71%
EPAP by the end of 1st hour ≥5	68%	76%
NIV success	70%	74%
All cause mortality	40%	26%
Median length of stay	11 days	7 days
Mean length of stay	15 days	12 days

Conclusion: Implementation of an NIV bundle is possible in a DGH and coincided with improved audit outcomes, particularly documentation of escalation plans and increased pressures. Numbers are small but it may have contributed to reduced mortality and length of stay.

P2046

Efficacy and safety of continuous sedation for agitated patients under noninvasive ventilation

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Introduction: Sedation is often required for agitated patients under noninvasive ventilation (NIV). However, there have been few reports on use of continuous sedation in these patients.
Aims: To evaluate the efficacy and safety of continuous sedation for agitated patients under NIV.
Methods: We retrospectively reviewed 110 patients receiving NIV for acute respiratory failure from May 2007 to December 2011, who needed sedation for treatment of agitation. Difference in clinical outcomes was compared between continuous use group and intermittent use group, according to do-not-intubate (DNI) status (n=73) or non-DNI status (n=37).
Results: In non-DNI patients, the severity assessed by baseline P/F ratio and mortality were similar between continuous use group (n=10) and intermittent use group (n=27) (117±66 mmHg vs. 116±50 mmHg, p=0.95 and 10% vs. 22%, p=0.40). No patient in continuous use group required intubation due to agitation, while three patients in intermittent use group required intubation due to failure of sedation (0% vs. 11%, p=0.54). In DNI patients, baseline P/F ratio was lower and the mortality was higher in continuous use group (n=33) compared with intermittent use group (n=40) (113±51 mmHg vs. 151±82 mmHg, p=0.017, and 85% vs. 58%, p=0.011). Only one patient in continuous use group failed to continue NIV due to agitation. Patients with continuous sedation were safely managed under NIV with the level of sedation assessed by Richmond Agitation Sedation Scale, except only one adverse event of hypotension caused by midazolam.
Conclusions: Continuous sedation could be safely administered, and potentially prevent undesirable intubation due to persisting agitation under NIV.

P2047

Effects of a high-flow nasal cannula system (nHF) on ventilation in healthy volunteers and patients with IPF

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Introduction: Treatment with a nHF-system is able to improve symptoms of acute and chronic respiratory insufficiency. The method uses a warmed and humified high flow of air/oxygen with 10-50 liter per minute (lpm). By using these devices an increase of mean pressure, pressure amplitude and a decrease in pCO2 is observable.
Method: Healthy volunteers and patients with IPF were included in this study. For detection of volume changes, frequency variations and I/E-ratios we used impedance measure bands. The bands were placed 10 cm below jugulum and 10 cm below xiphoid. The signal was relayed to a polysomnography device. Flows from 10 lpm up to 50 lpm with small, medium and large nasal prongs were tested. To compare the results with a closed ventilation support system, the measurements were also performed with CPAP 6 and 10 mbar and BiPAP 14/6 mbar. We compared the results with values measured during spontaneous breathing.
Results: HFNC led to no changes in tidal volume in patients with IPF and a decrease in healthy volunteers. The breathing rates in healthy volunteers and patients with IPF in comparison with spontaneous breathing were decreased. The I/E-ratio results in no significant changes in healthy volunteers and patients with IPF. In both groups, the minute volume was decreased. In comparison with CPAP and BiPAP, the measuring results showed different effects like HFNC.
Discussion: HFNC resulted in significant effects on respiratory parameters of healthy volunteers and in patients with restrictive pulmonary diseases. The changes in healthy volunteers and IPF will support respiratory efforts and will finally results in a reduction of breathing-related work.

P2048

Acute repercussions of noninvasive ventilation in patient with severe heart failure

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Objective: To analyze the acute effects of noninvasive ventilation (NIV) on cardiac function in patients with severe heart failure (HF).
Method: The study intervention in 10 patients with HF functional class III and IV (NYHA), ejection fraction (EF) $\leq$ 40%. Shan CPAP was used and CPAP 10 cm H2O for 60 minutes with an interval of 20 minutes. We analyzed Simpson ejection fraction (EF SIMP), cardiac output (CO), pulmonary artery pressure (PAP), heart rate (HR) and mean arterial pressure (MAP) by echocardiography and oxygen saturation (SaO2) monitored every 30 minutes.
Results:

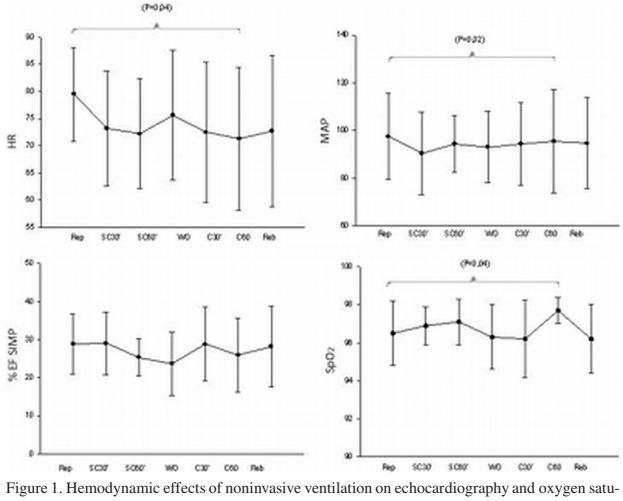

Figure 1. Hemodynamic effects of noninvasive ventilation on echocardiography and oxygen saturation. % EF SIMP: ejection fraction; HR: heart rate; MAP: mean arterial pressure; SaO2: oxygen saturation.

We observed a significant decrease in HR after CPAP 60' (71,13,17±13,17) compared to the initial rest (79,50±8,61, p=0,04) after using the PAM CPAP 30' (92,10±17,85) compared to the initial rest (97,50±18,04, p=0,01) and a significant increase in SaO2 after use CPAP 60' (97,70±0,67) compared to the initial rest (96,50±1,72, p= 0,04). And the variables FE SIMP, DC and PAP were not significantly different after administration of CPAP.
Conclusion: CPAP significantly alter HR, MAP and SaO2. The NIV were no significant changes on the FE SIMP, DC and PAP.

P2049

Predictors of failure of non-invasive ventilation in patients with respiratory failure; a prospective study

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Introduction: In patients with respiratory failure, randomized studies have shown noninvasive ventilation (NIV) to be associated with lower rates of intubation. In these patients, predictors of NIV failure are not well characterized. We conducted this study to investigate variables predictive of NIV failure in patients with respiratory failure.
Materials and methods: This prospective study was conducted at a tertiary care hospital in India. Fifty patients were included in the study, and were then followed up to discharge/expiry.
Result: Patients matched on baseline characteristics. Most of the patients (68%) did not have any pre-existing lung disease while 8 out of 50 (16%) had COPD. 4 patients (8%) had bronchial asthma, 2 patients had malignancy and 2 patients(4%) had history of previous Tuberculosis. In associated co-morbidities, 17 patients(34%) had Diabetes and 24 patients(48%) had hypertension.
Oxygen saturation (SaO2) was noted at the time of presentation and was correlated with mortality. Patients with SaO2 less than 75% were noted to have highest mortality(66%) among all the groups. Similarly data based on pH was noted and it was found that maximum patients (100%) requiring intubation were in the group of pH <7.25. When outcome was correlated with the level of pCO2, it was found that mortality was highest (60%)in the group with pCO2 > 60 mm/Hg. Highest mortality was observed in Asthma group(50%), followed by those with Malignancy(40%).
Conclusion: With prudent case selection, NIV is successful in more than 60% of cases. Failure of NIV may be related to the primary diagnosis. Association of co-morbidities as independent predictor of NIV failure needs further study.

P2050

The use of non-invasive ventilation in paediatric lung transplantation

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Introduction: Progressive deterioration in paediatric patients (pts) with end-stage lung disease may result in diurnal hypoventilation. There are paucity of data describing polysomnography (PSG) & the benefits of Bilevel Positive Airway Pressure (BiPAP) therapy in these children.
Aim: To evaluate cardiorespiratory data & gas exchange using PSG in children awaiting lung transplantation (LTx) prior to & after BIPAP therapy.
Methods: Retrospective review of PSGs on these patients between 2005 & 2012 was performed. Change in cardiorespiratory parameters during PSG following BiPAP initiation was assessed & analysed using a paired t-test.
Results: Of the 31 pts identified, 24 underwent LTx & 7 were on a wait list (WL). 13 were male pts with mean age of 12 years (9 to 15). 9 LTX and 3 WL pts had PSGs & 10 pts were on supplemental oxygen. 9 pts had cystic fibrosis, 2 had interstitial lung disease & 1 had pulmonary venous occlusive disease (PVOD).
10 pts had evidence of nocturnal hypoventilation in the absence of obstructive or central apneas & were initiated on BIPAP. After titration of BiPAP to optimal settings, there was a significant increase in mean SaO2 [91% (SD 2.4) to 96% (SD 0.9),p=0.0001], decrease in heart rate [111 (SD 18.3) to 96 (SD 15) beats per minute, p=0.02], respiratory rate [35 (SD 5) to 28 (SD 6) breaths per minute, p=0.003] and transcutaneous carbon dioxide recordings [74 (SD17) to 67 (SD 14) mmHg, p=0.006] from baseline.
Conclusion: All pts had significant nocturnal hypoventilation with improved clinical parameters & gas exchange abnormalities following BiPAP. Further research is needed to assess the role of PSG & BIPAP therapy as a bridge to transplant in children with severe chronic lung disease.

P2051

Ventilatory management in patients after intestinal transplantation

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Intestinal transplantation (IT) is a life-saving therapy for the patients with intestinal failure. However, ventilatory management of intestinal transplant recipients in the immediate post-operative period is difficult and challenging. Therefore, our aim was to establish the criteria for postoperative extubation, identify risk factors for prolonged ventilator needs.
We conducted an observational, prospective clinical trial and performed retrospective chart reviews of 7 patients receiving IT between 2007 and 2012 at Far Eastern Memorial Hospital. The patients were divided into two groups; 3 patients were not successfully extubated within 72 hours of the IT operation (ventilated, V) and 4 were (extubated, E). The median age and weight in the V group were significantly lower than the E group, 9.67 yrs vs. 28.25 yrs and 23.33 kg vs. 36.75 kg respectively. When compared to the E group, congenital Hirschprung's disease as cause of intestinal failure, preexisting respiratory disease, severe acute rejection, immunosuppressive level and longer operation time were more common in the V group. The consequences of not being extubated within 72 hours were increased

number of chest radiographs (median 40 for V and 9.5 for E), blood gas draws (median 120 for V and 10 for E,) and length of stay in the ICU (median 31 days for V and 9 days for E). IT has evolved into a therapeutic option, with an overall patient and graft survival rate of 100%.
Younger IT recipients were less likely to be extubated within 72 hours of IT operation. Hirschprung's disease, preexisting respiratory disease, severe acute rejection, immunosuppressive level and longer operation time appear to have an impact on ability to extubate.

P2052
Non-invasive ventilation failure predictor factors in acute respiratory infections in children
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Introduction: The use of noninvasive ventilation (NIV) has proved to be successful in acute respiratory failure (ARF) of children with chronic respiratory diseases; however, there is still no consensus as to its benefits in acute lower respiratory tract infections (LRTI).
Objective: Describe the use of NIV in ARF in acute LRTI, and seek for possible factors associated to the failure of this type of therapy.
Patients and method: Retrospective review of medical records of patients that received NIV for acute LRTI, during winter season 2010 at Hospital Josefina Martinez. Demographic and clinical variables were analyzed: heart rate (HR), respiratory rate (RR), oxygen arterial saturation and use of accessory musculature (UAM) at hours 0, 3, 12, 24 and 48 of use of NVI.
Results: Of a total of 71 patients, 51% boys, age median 13 months (2-124), the most frequent admittance diagnosis was viral pneumonia 48%, median length of stay 6 days (2-15) and median duration of NIV: 3 days (1-11). Five patients needed endotracheal intubation and transfer to intensive care unit (NIV failure group). Comparing with the rest of the patients (NIV success group), there was significant difference in age, HR, RR, and UAM, during the first 3 hours after NIV connection.
Conclusion: The use of NIV in respiratory failure in acute LRTI seems to be an effective ventilation strategy, appropriate for this population, with a high rate of success. The clinical parameters during the first 3 hours of NIV could be a useful tool at the time of redefining therapeutic options, as probable predictors of failure.

P2053
Incidence and risk factors for development of skin breakdown in patients undergoing prolonged noninvasive ventilation: A case-control study
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Among the adverse effects related to the mask, skin breakdown is a frequent complication and its occurrence may increase patient discomfort and failure of noninvasive ventilation (NIV). This study aimed to quantify the incidence and identify potential risk factors for the development of skin breakdown in patients undergoing prolonged NIV. A retrospective, observational study was conducted in the adult intensive care unit of a general hospital. It included 375 patients (between January and December 2011) receiving at least one application of NIV for a period longer than two hours. Cases were subjects who developed skin breakdown and controls were those who did not developed it. The risk factors evaluated were: age, gender, interface, number of applications carried out for more than 2 hours (N>2h), average time of use per application, total time of NIV use, inspiratory and expiratory pressure titrated, and delta pressure. Of the included patients, 49 (13.1%) developed skin breakdown Stage I and 5 patients (1.33%) developed skin breakdown Stage II. Case group presented a higher face mask use (92.6%) than control group (21.5%) ($p<0.001$). The use of total face mask was lower in case group (7.4%) when compared to control group (78.5%) ($p<0.001$). The N>2h in case group was 7.1±13.3 and in control group was 4.4±7.5 ($p=0.03$). Finally, the total time of NIV use was higher in case group (44.6±118.5 h) compared to control group (21.8±45.5 h) ($p=0.01$). We recommend the use of total face mask in patients expected to use NIV for a period longer than two hours in order to prevent the development of skin breakdown.

P2054
Correspondence between clinical prediction and outcome in patients with acute hypercapnic respiratory failure (AHRF) due to restrictive lung disease
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Introduction: Non-invasive ventilation (NIV) is widely used for the treatment of patients in decompensated ventilatory failure due to Restrictive Lung disease (RLD: thoracic cage and neuromuscular diseases) with AHRF in acute hospitals in the United Kingdom. The information on the accuracy of clinical prediction of survival of patients presenting with AHRF secondary to RLD is scarce.
Aims: We set out to establish how well the clinical prediction of poor prognosis during admission leading to use of NIV as "ceiling of care" with AHRF from RLD correlates with the actual outcome.
Method: A scientific survey was undertaken of 331 admissions due to AHRF secondary to RLD over a 6-year period ending 31 October 2010, to our 11-bedded ward based NIV unit (catchment population = 450000 approx.). In-hospital mortality was established in patients who were clinically assigned ward-based NIV as "ceiling of care" and compared with that in those considered clinically suitable for further escalation to intubation and invasive ventilation on Critical Care Unit if needed.
Results: In the 331 episodes, the odds ratio of death in the "ceiling of care" group versus the escalation group was 4.41 and was highly significant ($p<0.000001$).
Conclusion: Our data suggest good correspondence between clinical prediction and outcome in patients with AHRF due to RLD - further prospective studies are needed to establish this in detail. As NIV is increasingly used acutely on critically ill patients beyond the originally supposed indication of AHRF in selected patients (and even in palliative care), the use of NIV as the "ceiling of care" needs consistent monitoring.

P2055
High flow nasal cannula oxygen in acute respiratory failure; effectiveness and predictors of failure
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Introduction: To determine the effectiveness of high flow nasal cannula (HFNC), and the factors predicting from failure of HFNC in acute respiratory failure.
Method: We retrospectively evaluated acute respiratory failure patients who required HFNC at Chuncheon Sacred Hospital, between August 2011 and January 2012.
Result: In all, 33 patients were included in the study. Their median age was 73.4 years (49-89). Majority of the patients were male(22 patients, 67%). The most common cause of acute respiratory failure was pneumonia followed by COPD acute exacerbation, acute pulmonary edema due to congestive heart failure, cancer progression, and lung fibrosis. The hospital mortality was 24%. In the unadjusted model, (P=0.03), APACHE II score (P=0.04), BNP (P=0.03) and higher respiratory rate (P= 0.04) were associated with HFNC failure. However, in the adjusted model, higher respiratory rate (P= 0.04) were associated with HFNC failure [P= 0.04, OR 3.36].
Conclusion: HFNC has beneficial effect on clinical sign and oxygenation in ICU patients with acute respiratory failure. Predictors of high flow nasal cannula failure might be used to guide decisions regarding intubation.

P2056
Treatment of preterm infants with high-flow nasal cannulae: A review of the evidence
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Background: High-flow nasal cannulae (HFNC) are gaining popularity as a form of non-invasive respiratory support for preterm infants, and are proposed as an alternative to nasal continuous positive airway pressure (NCPAP) in a variety of clinical situations.
Objectives: We critically examined the published evidence for the mechanism of action, efficacy and safety of HFNC as a treatment for preterm infants.
Methods: Internet-based literature search for relevant, original research articles on use of HFNC in preterm infants. PubMed, Medline, and the Cochrane Library were searched, search terms [high flow OR high-flow] AND nasal cannula(e), without language restriction.
Results: The search produced a total of 73 articles; 15 studies were included in the review. Distending pressure generation from HFNC increases with increasing flow rate and decreasing infant size, and varies according to the amount of leak around the prongs. HFNC may be as effective as NCPAP at improving respiratory parameters such as tidal volume and work of breathing in preterm infants, but perhaps only at flow rates above 2 Litres/minute. Only four published randomized controlled trials (RCTs) of HFNC use in preterm infants were found; only two of these compare HFNC to NCPAP, and all are small. Based on the current, limited evidence, HFNC appears to be inferior to NCPAP as post-extubation support, and ineffective when used to wean from NCPAP. There are no RCTs of HFNC as a treatment for early respiratory distress.
Conclusions: The efficacy and safety of HFNC in preterm infants remain to be determined, and further RCTs in the settings of primary support from birth, post-extubation support, and weaning from NCPAP are required.

P2057

Respiratory depressants among patients undergoing noninvasive ventilation for hypoxemic-hypercapnic acidosis: Prevalence and impact on prognosis

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Medical records show frequent psychoactive drug treatments among the elderly with respiratory depression as a potential side effect. We evaluate their impact in patients undergoing noninvasive ventilation (NIV) for acute hypercapnic respiratory failure (AHRF) with acidosis.

Methods: Prospective study in 103 consecutive admissions (71 M, age 74,9±9 yrs) starting NIV for AHRF with acidosis in a Monitoring Unit (Oct.08-Jan.12) Two groups based on previous therapy with psychoactive drugs and significant sedative effect. *Variables:* pH, pO_2, pCO_2, pO_2/FiO_2 at admission(1), 2h of NIV(2) and 24h of NIV(3); in-hospital mortality and combined in-hospital and 30-day post-discharge mortality, length of stay (LOS) and intubation %. We recorded main diagnosis and thoracic comorbidities.*Stat. analysis:* χ^2/MWW.

Results: 39 pts (37,9%) received sedatives: M 22,5%,F 71,8%; BZDs 89,7%. Main diagnosis (% sedatives): COPD 48 (25%), OHS 20 (55%),Acute heart failure 16 (56,2%), Pneumonia 7 (28,6%), Acute pulmonary edema 6 (66,7%), Chest wall deformities 4 (25%).Comorbidity 55,3%. Group analysis (sedatives vs no sedatives): Sex (M) 41% vs 85,9% ($p<0,001$); age 77,4±8,1 vs 73,5±9,3 ($p<0,05$) In-hospital mortality 17,9% vs 10,9% (NS); in-hospital+30d mortality 23,1% vs 14,1% (NS); COPD prevalence 30,8% vs 56,2% ($p<0,05$). NS differences in LOS, intubation %, pH and pCO_2 evolution between groups: pH1 7,27±0,08 vs 7,26±0,59; pH2 7,30±0,09 vs 7,32±0,07; pH3 ≥7,35 (both groups)

Conclusions: We found a high prevalence of respiratory depressants in patients with AHRF. Sedatives may worsen prognosis and early response to NIV, especially in elderly female patients without COPD.

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Effect of non-invasive ventilation on pH, carbon dioxide and bicarbonate, in acute, hypercapnic, respiratory failure

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Acute type II respiratory failure is defined by the presence of PaCO2 >6.6 kPa and pH <7.35. Non-invasive ventilation is an established treatment for this condition. The improvement in alveolar ventilation leads to a lowering of the PaCO2 with normalisation of the pH. The role of renal buffering in the treatment of acute respiratory failure using NIV has not been reported in the literature.

We undertook an audit of patients admitted to a high dependency unit in a large teaching hospital setting. The patients were in acute type II respiratory failure as defined by above. They had an arterial blood gas (ABG) recorded before initiation of NIV, after 1-2 hours, after a further 4 hours and at discharge from NIV. We have shown the data for pre NIV and at the end of NIV treatment. The data is therefore for patients who successfully completed NIV therapy. The study was carried out over a twelve month period. The data was entered into the database by the ward junior doctor at the time of the patient's admission and subsequent discharge.

Changes in Arterial Blood Gases

	pre NIV	Discharge	P value
pH	7.26	7.39	<0.05
PaCO2 (kPa)	10.13	7.21	<0.05
PaO2 (kPa)	11.26	9.2	0.23
HCO3- (mmol/L)	32.11	32.02	0.94

We had complete data for 44 patients. The p value was derived from the t-test for paired data

This study confirms the findings of previous studies that the successful use of NIV in acute, hypercapnic, respiratory failure leads to significant improvements in both the pH and $PaCO_2$. This improvement appears to be directly due to improved alveolar ventilation leading to a reduction in $PaCO_2$; from this data there does not appear to be a significant contribution from renal buffering.

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Noninvasive ventilation in acute cardiogenic pulmonary edema with haemodynamic instability

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Background: Although noninvasive ventilation (NIV) in acute cardiogenic pulmonary edema (ACPE) is widely used, its use in patients with unstable hemodynamics is contradictory.

Aims: To evaluate NIV use in ACPE with low systolic blood pressure (SBP) and search for the correlates of it's success.

Methods: Prospective interventional trial of all 22 patients with ACPE with SBP 75-90 mm Hg, with no acute arrhythmia, SaO2 90% on spontaneous breathing with 10 l per minute oxygen, cooperative, not hypercapneic, with low cardiac output due to acute myocardial infarction, mitral regurgitation or congestive heart failure, was done from July 1, 2010 through December 31, 2011. All patients were immediately started on conventional therapy (dobutamine and/or dopamine, morphine, furosemide, nitroglycerine) and NIV through a face mask with FiO2=1.0, initial PEEP 5 cm H2O and pressure support (PS) 5 cm H2O. Hemodynamic parameters, SaO2, central venous saturation (ScvO2), respiratory rate (RR) and tidal volume (Vt) were documented every 3 minutes. If no relief in 3 minutes, PEEP was enhanced to 7 cm H2O and after next 3 minutes PS added to 7 cm H2O.

Results: All patients had SaO2 90% and SBP≥90 mm Hg after 10 minutes. If at this moment RR was 30 and Vt 5 ml/kg of body weight, or more than low doses of cardiotonics were needed, the patient was intubated (4 patients).After 30 minutes, those who needed FiO2 60% on NIV, were oluguric and failed to rise ScvO2 above initial, were intubated (2 patients). No intubation was needed in 16 patients (73%). No factors correlated with NIV failure.

Conclusion: In selected hemodynamically unstable patients with ACPE NIV helps avoid intubation.

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Effects of use of Boussignac CPAP on development of post-operative atelectasis

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Background: Boussignac CPAP system is a method to apply CPAP through a special valve system.

Aim: Patients who had a high likelyhood of postoperative atelectasis undergoing abdominal surgery were included in the study. It was aimed to evaluate the development of atelectasis and its effects on PFT parameters through utilisation of Boussignac CPAP system.

Patients and method: A total of 28 patients were included in our study and were randomized into two groups. Conventional methods (incentive spirometry, respiratory physiotherapy) were scheduled for the first group and Boussignac CPAP treatment in addition to conventional methods was scheduled for the second group. Boussignac CPAP system was applied to patients with spontaneous respiration for 3 days as 6 times and 15 minutes on each session. Pre and post application pulmonary function tests(PFT) parameters, chest X-Ray findings and radiological atelectasis scores were evaluated.

Findings: Mean age was 65.4 years and 57.1% were male. There was not any significant differences in the Boussignac CPAP group and control group between location of incision, operation time and presence of pulmonary disease. Preoperative chest X-Ray findings were similar($p>0.05$). In the Boussignac CPAP group, postoperative radiological atelectasis score was significantly lower than control group($p<0.05$). In CPAP group, no decline in oxygen saturation and oxygen partial pressure was observed unlike control group. Significant decrease was observed in FVC that is one of PFT parameters in postoperative period.

Conclusion: Our findings suggest that development of post-operative atelectasis might be decreased, thus oxygenation might be improved by use of Boussignac CPAP.

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Noninvasive ventilation in the emergency department: Early predictors of outcome in acute cardiogenic pulmonary oedema

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Introduction: The application of early continuous noninvasive ventilation (NIV) is well established in the Emergency Department (ED) for the treatment of acute respiratory failure (ARF) due to Acute Cardiogenic Pulmonary Oedema (ACPO).

Aims and methods: To critically analyse the impact of NIV in ACPO, about ARF presentation and the treatment efficacy or failure (defined as hospital mortality or need for invasive mechanical ventilation). Observational clinical study in the real life practice of the ED of a University teaching Hospital, during 5 months, including every patient emergently admitted and treated for ACPO according to inclusion criteria referring to an institutional protocol.

Results: 214 patients (media 1.42/day). Failure rate 15,5%. Failure versus success groups were similar in many characteristics and parameters. They were mainly different in: comorbid diseases, neurologic status, arterial blood pressure, rates of palliative or "ceiling" NIV, leukocytes, AST, CPKMB, troponinT, LDH, PCR, changes in blood gas analysis parameters after 120 minutes.

Conclusions: We identified early predictors of outcome in the ED: clinical parameters, biomarkers and arterial blood gas analysis data to recognize severe conditions and the response to treatment. Unnecessary delaying tracheal intubation remains

the major hazard of NIV in ARF; the overutilization of NIV is also a concern. A pivotal unresolved question is about selection criteria and early choices for patients having preset therapeutic and prognostic limits and acutely reversible processes. RCTs in the ED are necessary to define the subgroups of patients who are most likely to benefit for the early application of NIV.