P1710 Home mechanical ventilation and respiratory rehabilitation: Influence in respiratory functional test and exercise capacity
Eduardo Marquez-Martín, Pilar Cejudo, Jose Luis Lopez-Campos, Ana Rodriguez, Borja Valencia, Emilia Barrot, Francisco Ortega.
Medical-Surgical Unit of Respiratory Diseases, Virgen del Rocio University Hospital, Seville, Spain

Our aim is to assess the impact on BODE index, quality of life and inflammatory parameters (IP) of a respiratory rehabilitation program (RR) compared with a program of home mechanical ventilation (HMV) and the summation of both interventions.

Methods: 45 COPD patients with severe functional impairment and in situations of hypercapnic respiratory failure were prospectively randomized to 3 groups: RR (12 weeks in 40-minute sessions that included strength training and resistance), HMV (12 weeks BiPAP mode) and RR-HMV (combination of the two interventions). The patients underwent different components of BODE index, quality of life (CRDQ) and IP: C Reactive Protein (CRP), Tumor Necrosis Factor-α (TNF-α), Interleukin-6 (IL-6), IL-8 and Surfactant D Protein (SPD).

Results: HMV group improved BODE index significantly by decreasing median point 2 points (p = 0.003). Also get statistically significant improvement in quality of life index CRDQ (in total and its four components). IP improved significantly by decreasing TNF-α and IL-8. RR group obtained the same results in BODE index, and CRDQ. IP significantly improved by lowering CRP. IL-8, SPD and C3. RR-HMV group improves BODE index significantly when going from 5 to 3.5 (p = 0.001). CRDQ in total and components of dyspnea, fatigue and disease control. Significantly improved IP by lowering CRP. TNF-α, SPD and prealbumin.

Conclusions: HMV and the RR produced improvement in the BODE index and quality of life as well as when the two interventions are given together without finding differences when applied independently. The combination of both intervention control more IP than each other separately.

P1712 Home non-invasive ventilation (HNIV) improves survival in hypercapnic patients with cystic fibrosis
Clinical Department, Pulmonology Research Institute, Moscow, Russian Federation

Background: The clinical benefits of home non-invasive positive pressure ventilation (HNIV) have not been well established in adult patients with cystic fibrosis (CF).

Objective: The purpose of this matched case-control study was to compare the effects of HNIV and long-term oxygen therapy (LTOT) on survival of adult CF patients with chronic hypercapnic respiratory failure (CHRF).

Methods: Twelve patients receiving HNIV were matched with 12 patients receiving LTOT regarding age, FEV1, PaCO2 and BMI.

Results: There were no differences between groups of patients in demographic, clinical and functional characteristics (HNIV patients: 29.4 ± 4.8 years, BMI 16.1 ± 3.3 kg/m², FEV1 15.3 ± 3.4%, PaCO2 59.8 ± 7.7 mmHg; and LTOT patients: 23.9 ± 6.0 years, BMI 15.8 ± 4.2 kg/m², FEV1 16.1 ± 4.4%, PaCO2 61.4 ± 7.9 mmHg). HNIV settings were: ST mode, IPAP 20 ± 4.4 cm H2O, EPAP 4.6 ± 0.7 cm H2O (nasal mask – 4, oronasal mask – 8). Compared with LTOT, HNIV significantly reduced breathing rate (p = 0.036), PaCO2 (p = 0.038) and number of exacerbations (p = 0.028). Survival was significantly better in HNIV group in comparison with LTOT group (survival time 12.5 [95%CI 9.6-16.4] months vs 6.0 [95%CI 0.7-7.3] months; log-rank test, p = 0.024).

Conclusions: The survival of adult CF patients receiving HNIV was better than that of patients treated with LTOT alone. We suggest HNIV is a first-line treatment for adult CF patients with CHRF.

P1713 Meta-analysis on nocturnal non-invasive positive pressure ventilation for stable COPD: an update
Fransien Struijk 1,2, Yves Lacasse 1, Huib Kerstjens 1,3, Peter Wijkstra 1,3
1Department of Pulmonary Diseases/Home Mechanical Ventilation, University of Groningen, University Medical Center Groningen, Netherlands; 2Centre de Pneumologie, Institute Universitaire de Cardiologie et de Pneumologie de Quebec (Hospital Laval), Quebec, Canada; 3GRIAC Research institute, University of Groningen, University Medical Center Groningen, Netherlands

Introduction: Nocturnal non-invasive positive pressure ventilation (NIPPV) might be beneficial in stable hypercapnic patients with COPD. However, evidence remains conflicting.

Aim: To determine the effect of NIPPV in patients with stable hypercapnic COPD.

Methods: This meta-analysis gathered individual patient data from randomized controlled trials (RCTs) including NIPPV plus standard therapy with standard therapy alone. The current analyses are limited to gas exchange parameters.

Results: Our older Cochrane review and 3 new studies were identified, totaling

294s
P1714 The evolution of home mechanical ventilation in Poland between 2000 – 2010
Jacek Nasłonowski1, Marian Tuszyński1, Józef Trzaska2, Wanda Andrzewski1, Marek Migdała3, Beata Drzazga4, Andrzej Pytel1.

Background: From the last decades the indications for home mechanical ventilation (HMV) have changed significantly mainly due to technological development. The methods and indications for home mechanical ventilation (HMV) have changed significantly mainly due to technological development and an increasing number of patients with chronic pulmonary diseases. Data about HMV comes from developed countries. The aim of the study was to verify whether the same trends in HMV practice are observed in underprivileged European country. Questionnaire was sent to 10 centers providing more than 90% of HMV in Poland. Questions concerned number of patients, setting of initiation, indications for and the modes of ventilation during the last ten years. Data regarding 1032 patients was collected from 8 HMV centres. The number of treated patients increased from 8 in 2000 to 799 in 2010. Neuro muscular diseases still remain the main indication for HMV, however, their contribution gradually decreased from 88% to 51% of all patients treated in favor of pulmonary diseases (from 6 to 23%) and hyperventilation syndromes (from 3 to 12%). The number of patients treated via trachostomy was higher than treated with NIV in the period 2000-2008 and then the proportions equalized. The percentage of children treated has decreased from 88% in 2000 to 21% in 2010.

ICU is the principal location where HMV was initiated. However, its role diminished from 86% of all qualified patients in 2000, to 46% in 2010, while an increasing number of patients were required in respiratory departments: from 8% in 2000 to 35% in 2010. Indications for HMV in Poland moved from neuromuscular to respiratory diseases. However, the shift was not as marked as in more developed countries. Prevalence of indications for HMV in Poland: from 88% to 51% of all patients treated in favor of pulmonary diseases (from 6 to 23%) and hyperventilation syndromes (from 3 to 12%). The number of patients treated via trachostomy was higher than treated with NIV in the period 2000-2008 and then the proportions equalized. The percentage of children treated has decreased from 88% in 2000 to 21% in 2010.

ICU is the principal location where HMV was initiated. However, its role diminished from 86% of all qualified patients in 2000, to 46% in 2010, while an increasing number of patients were required in respiratory departments: from 8% in 2000 to 35% in 2010. Indications for HMV in Poland moved from neuromuscular to respiratory diseases. However, the shift was not as marked as in more developed countries. Prevalence of indications for HMV in Poland:

P1715 NIV (non invasive ventilation) improves Bode index in stable COPD with CHRF (chronic hypercapnic respiratory failure)
Andrzej Zabka1, Chardo Pastaka2, Vasos Tsiolaki1, Andrew Dimoulis1, Konstantinos Gourgoulis1, Maria Pinaka1, George Seitanides1.

Introduction: The BODE index, a simple multidimensional grading system, is used to predict the risk of death from any cause and from respiratory causes among patients with COPD. The use of NIV in exacerbation of COPD is suggested. On the other hand there are not any guidelines for the use of NIV in patients with stable COPD.

Purpose: To investigate any improvement in patients with COPD and CHRF using NIV at home, in relation with BOE index and the factors that predict the improvement.

Material and methods: Patients with COPD and CHRF (in stable condition) with LTO2 were included. Patients underwent a polysomnography study to exclude OSAS (AHI<10). The patients used NIV at home for a year. BODE index and its components (FEV1, MRC, BMI, 6MWT) were estimated at baseline (0 month) and 6 and 12 months after use. In addition, BODE index change on the 6th month was correlated with initial parameters (AHI, OD, min saturation, mean saturation at sleep, PO2, PCO2, BODE index (burnout), FVC, FEV1/FVC, age).

Results: There is a statistically significant change of BODE index after 6 months and after 12 months of using NIV. There is a correlation between BODE index change and oxygen desaturation (OD) [polysomnography study].

Conclusion: NIV improves bode index in stable COPD and CHRF. The change in BODE index is correlated with Oxygen Desaturation during sleep.

P1716 Co-morbidities and cardiovascular medications are the best predictors of mortality in patients with obesity-associated hyperventilation treated with long-term non-invasive ventilation
Jean-Christian Burel,1,2 Benoît Burel1, Renaud Tamisier1,2, Sonia Dias-Domingos1,2, Patrick Levy1,2, Jean-Louis Pepin1,2.

1HP2 Laboratory, Hypoxia: Pathophysiology, INSERM U1042, Joseph Fourier University, La Tronche, France; 2Locomotion, Rehabilitation and Physiology Department, Grenoble University Hospital, Grenoble Cedex 09, France; 3Research and Development Department, AGRISano, Meylan, France

Rationale: NIV is largely used to treat patients with obesity-associated hyperventilation (OH). The impact of comorbidities, their medications and NIV compliance on survival of these patients remain unexplored.

Methods: A Cohort of OH patients initiated on NIV between March 2003 and July 2008. Anthropometry, diurnal and nocturnal respiratory parameters, comorbidities, medications, conditions of NIV initiation and NIV compliance were used as co-variates. Survival curves were estimated by the Kaplan-Meier method. Univariate and multivariate Cox models allowed estimating predictive factors of mortality.

Results: In 107 patients (56% women, mean follow-up of 43±14 months) NIV was initiated in acute conditions in 36%. The 1, 2, 3-year survival rates were 99, 95, 82% respectively. In univariate analysis, death was associated with older age (>63 yrs), low FEV1 (<60% pred value), male gender, concomitant COPD, initiation of NIV in acute condition, use of diuretics, angiotensin-converting enzyme inhibitor and combination of cardiovascular agents (one diuretic and at least one other cardiovascular agent). In multivariate analysis, combination of cardiovascular agents was the only factor associated with a higher risk of death (HR: 5.3; 95% CI: 1.8-23.9). In contrast, female gender was associated with a lower risk.

Conclusion: Cardiovascular comorbidities represent the main factor predicting mortality in NIV-treated OH patients. In this population, NIV should be used among a combination of treatment modalities allowing a reduction in cardiovascular risk.

P1717 Predictors of readmission in patients on mechanical ventilation (HMV)
Lourdes Cañón Barroso1,2, Patrick Levy1,2, Jean-Louis Pepin1,2.

1HP2 Laboratory, Hypoxia: Pathophysiology, INSERM U1042, Joseph Fourier University, La Tronche, France; 2Locomotion, Rehabilitation and Physiology Department, Grenoble University Hospital, Grenoble Cedex 09, France

Objectives: There are few studies that examine which factors determine the readmission of patients on HMV. Our objective was to study the variables related to this fact to determine which aspects should be monitored more closely.

Methods: Prospective observational study over a period of 10 years. We collected clinical variables during hospitalization and data related to treatment adherence and the date of hospital readmission. Bivariate analysis and a Cox multivariate model were performed

Results: We included 214 patients (55.6% women, mean age 63.8 years: 13.3). 50% required hospital readmission and the median time to readmission was 170 weeks (144.1 to 195.8). Readmission was not related to the presence of comorbidities, morbidity, situation at the start of ventilation (chronic respiratory vs acute respiratory failure) or main diagnosis that led to the start of HMV. During follow-up readmission was associated with poor adherence to HMV (46.7% vs 29.9%, p = 0.017), previous admissions, previous respiratory failure and a poor quality of life. Predictors of readmission were also worse PaCO2 control and PaCO2 control, greater number of previous admissions and poorer lung function. The multivariate model identified as independent predictors of readmission: Poor adherence to HMV (OR 1.7, CI 95% 1.1 - 2.6), PaCO2 control (OR 1.03, 95% CI 1.0 to 1.06) and the level of dyspnea at follow up (OR 2.3, 95% CI 1.5-3.3).

Conclusions: 1.-In our experience, a high percentage of patients on HMV required hospital readmission. 2.- Readmissions do not appear to be directly related to comorbidities neither the initial results of HMV and appear related to poor treatment adherence and severity of respiratory failure.

Poster Discussion Room A5 - 08:30 - 10:30
**P1718**

**Effect of an automatic triggering and cycling system on patient-ventilator synchrony during noninvasive ventilation in a mechanical lung model**

Luiz Melo, Renata Vasconcelos, Raquel Sales, Clarissa Magalhães, Mirzana Almeida, Juliana Silveira, Marcelo Holanda. Laboratório de Respiração - RespLab, Universidade Federal do Ceará, Fortaleza, CE, Brazil; Pós Graduação em Ciências Médicas, Universidade Federal do Ceará, Fortaleza, CE, Brazil.

Evaluate the effect of an automatic triggering and cycling system on patient-ventilator synchrony during NIV in a mechanical lung model. Bench study, one ICU ventilator (Esprit®) and one NIV ventilator (Trilogy®) were tested. The lung simulator ASL 5000(Ingram) was set with obstructive model: compliance 60cc/mL, resistance 20cmH2O/L/sec. and restrictive: compliance 30cc/mL, resistance 8cmH2O/L, both with respiratory rate 15 bpm and ventilatory demand of 60 L/min. A facial mask was adapted to a head manikin, with an air leak of 10L/min. The Esprit® was adjusted in the NIV mode and the Trilogy® in the ST mode. PAP 10cmH2O and EPAP 4cmH2O, triggering and cycling were set automatically (AutoTrak®) or flow triggering (3L/min) with expiratory cycling 25% (conventional) in both ventilators. Inspiratory and expiratory delay, inspiratory work and patient-ventilator asynchrony were analyzed. Auto-triggering was observed in the restrictive model in the Esprit® with conventional adjustments, but the phenomenon was abolished with the automatic settings. Little difference was observed between the systems, suggesting that both methods were equivalent with respect to inspiratory and expiratory delay and work.

**Table 1. Inspiratory and expiratory delay and work in the mechanical lung models**

<table>
<thead>
<tr>
<th></th>
<th>Obstructive</th>
<th>Restrictive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AT/ CV</td>
<td>AT/ CV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insp. delay (ms)</td>
<td>37/91</td>
<td>28/80</td>
</tr>
<tr>
<td>Expir. delay (ms)</td>
<td>18/28</td>
<td>14/42</td>
</tr>
<tr>
<td>Inspiratory work (J/L)</td>
<td>1.4/01.38</td>
<td>1.36/1.39</td>
</tr>
</tbody>
</table>

AT = AutoTrak®, CV = conventional; *persistent asynchrony.

The automatic system showed advantage with respect to synchrony in the restrictive model.

**P1719**

**Introduction:** The combined effects of postural changes and the use of noninvasive positive pressure ventilation (NIV) on the regional distribution of lung ventilation (RDLV) is still undersampled. The electrical impedance tomography (EIT) has emerged as a consistent technique for the dynamic evaluation of RDLV.

**Objectives:** To evaluate the RDLV in healthy subjects during spontaneous respiration (SR) and during NIV breathing in different body positions.

**Methodology:** The RDLV was assessed by EIT (32 electrodes) in 10 healthy subjects (5 men), during 10 minutes of SR, or with CPAP of 10cmH2O and with BiPAP of 15/5cmH2O in four body positions (dorsal (D), ventral (V), right lateral (RL), and left lateral (LL)).

**Results:** The figure below shows the % of RDLV in the four quadrants of the lungs.

During SR, the RDLV was higher in the gravity dependent quadrants, mainly in the lateral decubitus, except for the V position. NIV breathing (CPAP and BiPAP) did not alter the pattern of RDLV as compared to SR.

**Conclusions:** EIT can clearly demonstrate that, with the exception of prone positioning, the dependent regions of the lungs are better ventilated both during SR or CPAP and BiPAP breathing.

**P1720**

**Observation cohort study of cause of death in patients with Duchenne muscular dystrophy (DMD).**

Emily Ballard, Natalie Grey 1, Heinz Junghubl 2, Elizabeth Wraige 3, Stam Kapetanakis 4, Craig Davidson 5, Nicholas Hart 1, 4. 1. Lane Fox Respiratory Unit, St. Thomas’ Hospital, London, United Kingdom; 2. Department of Paediatric Neurology, Evelina Children’s Hospital, London, United Kingdom; 3. Department of Cardiology, St. Thomas’ Hospital, London, United Kingdom; 4. NHIR Comprehensive Biomedical Research Centre, Guy’s & St Thomas’ NHS Foundation Trust & Kings College London, United Kingdom

Prior to the introduction of home mechanical ventilation (HMV), the major cause of death in patients with Duchenne muscular dystrophy (DMD) was respiratory failure. We performed an observational mortality cohort study of our DMD population over a 6 year period. As a large specialist centre we have a current population of 117 adult patients with DMD and 12.7% of our total patient population died in the 6 year period.

Table to show cause and location of death in patients with DMD over a 6 year period

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Respiratory Failure</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Other Cause</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Failure</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Other Cause</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Total Number of Deaths</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Total on Ventilators</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Total on Ventilators</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Total on Ventilators</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Total on Ventilators</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

**Conclusions:** The acute effects of postural change and non-invasive ventilation breathing on the regional distribution of lung ventilation: An electrical impedance tomography study.

Nathalia Parente de Sousa, 1 William Ferreira de Brito, 1 Mariana Carneiro do Amaral Beraldo 1, Marcelo do Amaral Beraldo 1, Marcelo Britto Passos Amato 2, Marcelo Alcantara Holanda 1. 1 Laboratório Respiration, Department of Medicine, Federal University of Ceará, Fortaleza, Brazil; 2 Laboratory of Medical Investigation, University of São Paulo, Brazil.
of physical impairment and respiratory failure. PPV may accelerate the delayed gastric emptying, possibly by esophago-gastric air inflation.

P1722 Unplanned respiratory crises requiring ventilation in Duchenne muscular dystrophy (DMD) patients can be reduced by timely respiratory review and care co-ordination at the age of transition

Emily Ballard1, Natalie Grey1, Heinz Jungbluth2, Elizabeth Wragge2, Stam Kapetanakis1, Craig Davidson1, Nicholas Hart1,4, The Lane Fox Respiratory Unit, St. Thomas’ Hospital, London, United Kingdom; 2Department of Paediatric Neurology, Evelina Children’s Hospital, London, United Kingdom;
3Department of Cardiology, St. Thomas’ Hospital, London, United Kingdom; 4NHR Comprehensive Biomedical Research Centre, Guy’s & St Thomas’ NHS Foundation Trust & Kings College London, United Kingdom

The introduction of home mechanical ventilation (HMV) in DMD is associated with increased life expectancy. In 2009, we introduced a transitional care co-ordinator role with the hypothesis that we would reduce the number of unplanned respiratory crises with early intervention. We have prospectively gathered data for all 75 patients with DMD under review in 2009.

Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of DMD patients receiving HMV</th>
<th>New elective HMV initiations</th>
<th>Mean age at initiation NIV (yrs)</th>
<th>Mean length of set up — elective (days)</th>
<th>Mean length of set up — emergency (days)</th>
<th>No. of new patients requiring invasive ventilatory support with emergency set up</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>34</td>
<td>2</td>
<td>19.3 (16-23)</td>
<td>5 (3-10)</td>
<td>67</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>46</td>
<td>7</td>
<td>20.3 (16-25)</td>
<td>4.14 (2-9)</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>2011</td>
<td>60</td>
<td>7</td>
<td>20.1 (16-25)</td>
<td>3.28 (2-4)</td>
<td>33</td>
<td>1*</td>
</tr>
</tbody>
</table>

*This patient did not require long term NIV; data expressed as absolute values.

Analysis of these data was focused on the primary respiratory crisis admission requiring ventilatory support. Within 3 years we identified 19 patients who required initiation of HMV, all known to the respiratory team prior to initiation and only (15.8%) were a result of an emergency admission. Of the 19 patients initiated on HMV, 16 were elective with a mean length of stay of 4.7 days (2-9) days. 1 patient was admitted directly from clinic as an emergency, requiring invasive ventilation but without tracheostomy formation. Of the two patients who required tracheostomy formation, one did not require NIV post discharge from hospital. The data supports that with timely intervention and coordination you can reduce the need for emergency intititation of ventilation through respiratory crisis.

P1723 Introduction of domiciliary mechanical insufflation-exsufflation can reduce the incidence of crisis admissions in patients with Duchenne muscular dystrophy (DMD)

Emily Ballard1, Natalie Grey1, Heinz Jungbluth2, Elizabeth Wragge2, Stam Kapetanakis1, Craig Davidson1, Nicholas Hart1,4, The Lane Fox Respiratory Unit, St. Thomas’ Hospital, London, United Kingdom; 2Department of Paediatric Neurology, Evelina Children’s Hospital, London, United Kingdom; 3Department of Cardiology, St. Thomas’ Hospital, London, United Kingdom; 4NHR Comprehensive Biomedical Research Centre, Guy’s & St Thomas’ NHS Foundation Trust & Kings College London, United Kingdom

Although trials are ongoing, there is limited evidence to support the use of mechanical insufflations-exsufflation as a method of secretion clearance to prevent chest infections in patients with DMD. However our local unit practice is to provide a machine to DMD patients that are established on non invasive ventilation with a peak expiratory cough flow < than 160 litres per min despite maximal physiotherapy adjuncts with either: (1) > 2 episodes of chest sepsis per year requiring antibiotics and hospital admission (2) 1 episode of severe chest sepsis requiring invasive ventilation. The aim of the use of the cough assist machine is to reduce the frequency of hospital admissions and length of stay (LOS). We reviewed the prospective data from our DMD patient cohort over a 7 year period in which 32 patients had been issued with a machine. We reviewed the data for 12 months pre and post issue in order to establish the effect on admission frequency and LOS.

Table 1

<table>
<thead>
<tr>
<th>n=32</th>
<th>Pre home issue</th>
<th>Post home issue</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean frequency of respiratory admissions a 12 month period</td>
<td>3 (1-6)</td>
<td>0.3 (0.1)</td>
<td>p&lt;0.001*</td>
</tr>
<tr>
<td>Mean LOS of respiratory admissions in a 12 month period</td>
<td>12.9 (20.67)</td>
<td>11.4 (5.51)</td>
<td>p&lt;0.001*</td>
</tr>
</tbody>
</table>

Data are expressed as absolute value (range). *Significant using Wilcoxon signed ranks test.

These data have showed a significant reduction in both hospital admission frequency and LOS for those patients using a domiciliary cough assist machine. These are the first data to add support to the use of domiciliary cough assist machines in DMD patients with an ineffective cough and previous episodes of chest sepsis already established on NIV.

P1724 Neuropsychological functioning after CPAP treatment in obstructive sleep apnea: A meta-analysis

Justine Aurenmore1, Wynne Kylstra1, Winni Hofman2, Ben Schmand2, 1Research & Development, Helsomare, Wijk aan Zee, Netherlands; 2Psychology, University of Amsterdam, Netherlands

Introduction: The generally held clinical view is that treatment with continuous positive airway pressure (CPAP) substantially improves cognition in patients with obstructive sleep apnea (OSA). The cognitive domains in which recovery is found as well as the extent of recovery differs widely between studies, however.

Objective: A meta-analysis was conducted to quantify the magnitude of the overall effect of CPAP treatment in OSA on neuropsychological functioning.

Methods: A comprehensive literature search of clinical trials published from January 1990 to June 2011 was performed. The inclusion criteria were: randomized controlled trial, diagnosis OSA by polysomnography, apnea-hypopnea index, duration and compliance of CPAP treatment, one or more standardized neuropsychological tests. Mean-weighted effect sizes of CPAP treatment for 7 cognitive domains were calculated.

Results: 12 studies encompassing 516 OSA patients were included. A small significant effect on attention was observed in favour of CPAP treatment (d=.20). For the other cognitive domains the effect sizes did not reach significance. Improvement on measures of sleepiness was modest (d=.30-40) and comparable to a prior meta-analysis.

Conclusion: This meta-analysis shows that effect of CPAP treatment on cognition is small and limited to the attention domain. These findings indicate that, contrary to the general assumption, only slight improvement of cognitive functioning after CPAP treatment can be expected.

P1725 Inaccuracy of built-in ventilator softwares (BIVS) in monitoring apnea-hypopnea index (AHI) in patients treated by home non invasive ventilation (NIV)

Julie Teulade1, Frédéric Damagnes2, Ha Tram1, 1Pediatric Sleep Center, Center for Reference of CCHS, Robert Debré Hospital, Paris, France; 2ADEP Assistance, Suères, France; 3Univ Paris Diderot, Paris, France

Home ventilators are often equipped with BIVS able of recording various parameters over many months. AHI is one of the parameter most frequently used by clinicians to monitor efficiency of ventilation applied to patients with Obstructive Sleep Apneas (OSA). However, the reliability of algorithms used by BIVS to detect apnea (A) or hypopnea (H) has yet to be determined.

Patients & methods: We studied 5 patients with severe OSA (4M, 1F, 10.5 years, range 2.5-15 years) and treated by NIV (4 CPAP1,1 BiPAP). An overnight respiratory polygraphy (RP) was performed while the patient was on NIV at home. All RP were analyzed as usually recommended by one of us (JT) blinded to BIVS data. We compared A and H detected by BIVS versus those detected by RP.

Results: BIVS detected 169 A-H that were related to movements in 56% and no visible event using RP in 25% of cases.

Table 1

<table>
<thead>
<tr>
<th>Nb of events (%)</th>
<th>Movements-RP</th>
<th>No event-RP</th>
<th>A-RP</th>
<th>H-RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-VS</td>
<td>28 (100%)</td>
<td>21 (75%)</td>
<td>4 (14%)</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>H-VS</td>
<td>141 (100%)</td>
<td>74 (52%)</td>
<td>39 (28%)</td>
<td>9 (6%)</td>
</tr>
<tr>
<td>A-H-VS</td>
<td>169 (100%)</td>
<td>95 (56%)</td>
<td>43 (25%)</td>
<td>31 (18%)</td>
</tr>
</tbody>
</table>

Among the 88 A-H detected by RP, only 35% were recognized by BIVS.

Table 2

<table>
<thead>
<tr>
<th>Nb of events (%)</th>
<th>No event-VS</th>
<th>A-VS</th>
<th>H-VS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-RP</td>
<td>19 (100%)</td>
<td>8 (42%)</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>H-RP</td>
<td>69 (100%)</td>
<td>49 (71%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>A-H-RP</td>
<td>88 (100%)</td>
<td>57 (65%)</td>
<td>31 (35%)</td>
</tr>
</tbody>
</table>

Conclusion: The majority of A-H detected by BIVS was related to patient movements, whereas BIVS was unable to detect A-H seen in RP. These preliminary data support that AHI provided by BIVS is largely inaccurate in patients during NIV and should not be used to adjust NIV. Polysomnographies are required to monitor efficiency of NIV.
The inter-observer reliability of using a new non-invasive technique to identify patient ventilator asynchrony (PVA) during non-invasive ventilation (NIV)

Michelle Ramsay1,2, Swapna Mandal1,2, Joerg Steier1, Anita Simonds3, Nicholas Hart1,2, Lane Fox Respiratory Research Unit, Guy’s & St Thomas’ NHS Foundation Trust, London, United Kingdom; 2Division of Asthma, Allergy and Lung Biology, King’s College London, United Kingdom; 3NIHR Respiratory Biomedical Research Unit, Royal Brompton Hospital, London, United Kingdom; 4Guy’s and St Thomas’ NHS Foundation Trust and King’s College London, National Institute of Health Research Comprehensive Biomedical Research Centre, London, United Kingdom

Introduction: Poor patient-ventilator interaction reduces respiratory muscle unloading resulting in patient discomfort and reduced adherence. We hypothesised that non-invasive measurements with pre-defined PVA criteria would be reliably correlated between 2 independent observers.

Methods: 5 patients initiated on NIV were assessed for PVA using respiratory inductance plethysmography (RIP), 2nd intercostal space parasternal electromyography (EMG para) and mask pressures (P_mask). Two independent observers each recorded PVA from the overnight traces examining each breath from a 2 minute period for each 10 minute epoch over an hour.

![Figure 1. Representative trace showing an “Ineffective Effort” asynchronous event with EMGpara activity and chest wall movement without pressurisation of the ventilator (arrowed).](image)

Results: A total of 1347 breaths were analysed by each observer.

<table>
<thead>
<tr>
<th>Type of Asynchrony</th>
<th>Observer 1</th>
<th>Observer 2</th>
<th>Intraclass correlation coefficient (ICC), 95% CI</th>
<th>Bland-Altman coefficient (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineffective efforts</td>
<td>255 (19%)</td>
<td>219 (16%)</td>
<td>0.90 (0.39–0.99)</td>
<td>7.2 (–45.3, 59.7)</td>
</tr>
<tr>
<td>Premature cycling</td>
<td>63 (5%)</td>
<td>49 (4%)</td>
<td>0.75 (–0.19–0.97)</td>
<td>2.8 (–19.9, 25.5)</td>
</tr>
<tr>
<td>Extended cycling</td>
<td>4 (&lt;1%)</td>
<td>10 (&lt;1%)</td>
<td>0.36 (–0.58–0.90)</td>
<td>–1.2 (–6.5, 4.1)</td>
</tr>
<tr>
<td>Auto-triggering</td>
<td>103 (8%)</td>
<td>22 (2%)</td>
<td>0.086 (–0.29–0.76)</td>
<td>16.2 (–15.1, 47.5)</td>
</tr>
<tr>
<td>All asynchronies</td>
<td>429 (32%)</td>
<td>312 (23%)</td>
<td>0.87 (0.75–0.94)</td>
<td>2.6 (–33.5, 40.7)</td>
</tr>
</tbody>
</table>

Conclusion: PVA can be reliably identified using the above technique. The predominant PVA was ineffective effort. This analysis could be automated to provide a simple approach to assessing PVA.

How well do questionnaires capture symptomatic relief and well-being over time with NIV in motor neurone disease?

Hikari Ando1, Biswajit Chakrabarti2, Carolyn Young1, Rosanna Cousins1, Everard Thornton1, Robert Angus3, 1Health Sciences, Liverpool Hope University, Liverpool, United Kingdom; 2Chest Centre, Aintree University Hospitals NHS Foundation Trust, Liverpool, United Kingdom; 3Neurology and Neurosurgery, The Walton Centre NHS Foundation Trust, Liverpool, United Kingdom; 4School of Psychology, University of Liverpool, United Kingdom

Benefits of non-invasive ventilation (NIV) in motor neurone disease (MND/ALS) have been explored using quantitative health measurements with little examination of subjective experience. This study explored whether current quantitative tools commonly used in MND adequately capture the effects of NIV. 6 patients (all male, mean age= 67) from an original cohort of 35 were available for the present study having survived a year on NIV. Both questionnaires and semi-structured interviews were completed at 3 occasions: pre-NIV (Point A), 4-6months (Point B) and 10-12months post-NIV (Point C). The scales used were ALSFRS–R (physical functioning), ALSAQ-40 (ALS specific health status), MNDRS (dysphagia), BDI (depression), BHS (hopelessness), HADS (depression and anxiety), and ESS (sleepiness). During the interviews, experience of NIV, physical changes and their impact on daily life were explored. All interviews were assessed using thematic analysis. Quantitative scores were compared using analysis of variance. Changes were seen from points A to C in ALSFRS-R 33 v 27 (p=0.021), ALSAQ subscale for communication 46 v 29 (p=0.018), BHS 3.67 v 1.80 (p=0.03) and ESS 9.50 v 2.8 (p=0.046). The scores of ALSFRS-R denote worsening functional status, while the other scales indicate improvement. Qualitatively, 4 symptoms were discerned as problematic and were improved by NIV: energy level, quality of night sleep, daytime sleepiness and breathlessness. The results show the multidimensional range of symptoms that relate to hypoventilation in MND and how the routinely employed scales may fail to capture significant symptomatology or the impact of NIV on such symptoms.