Slow Ventilator Weaning After Cervical Spinal Cord Injury: Weaning Success After Transfer to a Specialist Centre

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Study Design: Cross sectional study
Setting: North West Regional Spinal Injuries Centre, UK.
Introduction: Many intensive care units have experienced difficult and slow weaning of a patient with neuromuscular weakness. A recent NAMDRC Consensus Conference noted that such patients contribute disproportionately to those undergoing prolonged mechanical ventilation. Though not so common in general intensive care, such patients tend to occupy a bed for a disproportionate length of time, mostly through delayed ventilator weaning.
Objective: To identify factors leading to successful ventilator weaning after acute spinal cord injury (ASCI).
Methods: Referrals over 12 years were reviewed for patients ventilated more than 21 days and deemed to have failed to wean before referral.
Results: 126 patients were referred, of whom 13 had already been ventilated for 102 days (mean). They were weaned in 56 days (mean) by progressive ventilator free breathing. The average vital capacity improved from 525ml to 1415 ml. Despite bacteriological colonisation, antibiotic therapy was required in only 4 cases after transfer.
Conclusion: Consistent factors underpinning successful weaning after ASCI were accurate neurological assessment; prevention of pulmonary atelectasis by physiotherapy; ventilator free breathing graduated according to vital capacity; rest periods with controlled ventilation; cuff deflation with translaryngeal air flow, and regular tracheostomy tube changes. Some of these factors could be invoked for the wider group of slow-to-wean patients in general intensive care.
Key Words: cervical spinal cord injury, weaning, mechanical ventilation

Stimulation Disorders of the Diaphragm

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Electrical stimulation disorders of the diaphragm are complex diagnostic dilemmas that require a clear understanding of the electrical pathways and neurophysiology of the diaphragm. Mechanism of injury and imaging studies are important in determining the level of nerve disruption and treatment options. While most patients can be managed with supportive care; including weight loss, pulmonary rehabilitation, bronchodilators, and bipap; severe cases require mechanical ventilation.

We will discuss the classification of these disorders and alternative treatment options; specifically the role of phrenic nerve pacing and diaphragmatic plication. The only FDA pacing system approved in the U.S. is made by Avery Biomedical Devices and consists of a radiofrequency generator and antenna worn externally and an implanted RF receiver and lead. More than 1500 patients have been implanted with this system worldwide, the youngest less than 2 months old and the oldest over 80 years old. The system provides ventilatory support for patients who have intact phrenic nerves and intact diaphragm muscle. These include patients with tetraplegia and Congenital Central Hypoventilation Syndrome (CCHS). The benefits of pacing compared to mechanical ventilation are physiological, psychological, and financial.

In patients who have phrenic nerve damage, options include phrenic nerve pacing of a grafted nerve to the phrenic nerve or diaphragm plication. Diaphragm plication improves pulmonary function by increasing the residual volume and improving the efficiency of chest wall mechanics. It is very useful in patients who cannot undergo phrenic nerve pacing.

Weaning Outcome of Ventilator Dependent Elderly Patients in a Geriatric Rehabilitation Department

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Purpose: Describe characteristics, weaning outcome and discharge destination data of elderly ventilator-dependent patients transferred from acute care hospitals to a regional weaning center (RWC).
Design: Retrospective record review
Setting: Regional weaning center (RWC) at a free standing 300 bed geriatric rehabilitation hospital.
Patients: 670 consecutive ventilator- dependent patients admitted for weaning over a 6-year period, from June 1st 2001 till December 31st 2007.
Measurement and results: Patients age: 76 (18-98) years. Pre hospitalization functional status: 82% were admitted from their home, 67% were ambulatory and 55% of them capable of self care. Co-morbidities: COPD 39%, CHF 32%, hypertension 51%, diabetes mellitus 29%, cerebrov-ascular accident 25%, cognitive decline 38%, Mean score on Mini Mental Test Examination was 7 (0-30), 12% of the patients received long term oxygen therapy, 41% had grade two or higher pressure sores, 15 % had multiple pressure sores, APACHE 11 was 13 (2-39). Median (range) time of mechanical ventilation prior to transfer to the RWC was 50 (7-305) days and declined from 56 days in 2002 to 47 ($p<0.03$) days in 2007. Weaning outcomes: 60 % were weaned, median time to successful weaning was 21 (0-477) days .Weaning rate increased from 33% in 2002 to 63 % in 2007. Discharge destination: 29 % died, 28 % were transferred to acute care hospitals, 13% went home' 28% were discharged to nursing home and 2% were still hospitalized. Overall survival at 1 year after discharge was 39%.
Conclusions: Elderly ventilator dependent patients have a high weaning rate in spite of multiple physical co morbidities, cognitive impairment and functional decline. This can be achieved even after 60 days of mechanical ventilation in the general hospital, in a specialized free standing geriatric rehabilitation ward, usually in a short time. (21 days)., Weaning reduces barotrauma and ventilator associated pneumonia and enables a better quality of life in this special group of elderly patients.

Support Group for Female Primary-care Givers of Chronically Ventilated Patients

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Background: In chronic ventilation units in Israel, some patients are ventilated for prolonged periods of time, sometimes until their death. Caring for chronically ventilated patients has emerged as an issue only in the last decade since the opening of the first unit in Israel. Primary care-givers of chronically ventilated patients are under enormous strain both physically and emotionally and with the need to deal with this new unfamiliar situation daily.
Intervention: A support group for 12 female primary care-givers of chronically ventilated patients was assembled in the chronic ventilation units in Herzog Hospital, in Jerusalem, Israel. The group was organized and coordinated by the two social workers in those units. The 12 care-givers were chosen based upon the following criteria: female, first-degree relatives of the patients, aged 50-60, and Hebrew- speaking. In addition suitability for participation in such a group and undergoing a process of identification and empowerment was evaluated based upon a personal interview. The participants differed in their socioeconomic status, degree of religiousness, ethnicity, and level of education. In addition the level of consciousness of the patients, their length of hospitalization and mechanical ventilation and prognosis also differed. Two relatives of patients who recently died in the unit were also included in the group.
Process: The group meets weekly during the morning hours for about 90 minutes with the two social workers, the group coordinators. This is a closed group for 10 meetings. Main themes arising during the meetings: continuous mourning on the new state of their relative, in some cases unconscious and somewhere between life and death; continuous frustration about the situation and feelings of helplessness and uncertainty about the situation and the future of their relatives, and, consequently themselves. In addition to the opportunity for the participants to share their feelings with the other members of the group, other tools used in the group meetings are group dynamics, use of therapeutic playing cards, bibliotherapy and art. The rationale for including only females was, firstly, because they are the main care-givers in most cases and, secondly, because we wanted to create an atmosphere of female empowerment. Although the reactions to the group differed among the participants we observed some processes which were common to the group members. Although we did not use structured questionnaires to assess these processes, nevertheless, our impression is that the self-esteem of the participants is increasing, they are more realistic with this situation regarding both the patient and themselves. From the grave point of total despair they found the power to rebuild themselves.
Conclusions: Support groups are an important tool in addition to individual support of the family care-givers. The feelings that each participant finds that other also cope with the same situation is very supportive. Careful choice of the group participants is crucial to the success of the group. Further research, using both qualitative and quantitative methods is needed in order to assess the short- and long-term effects of such groups.

The Effect of Bio-Psych-Social Activities on Quality of Life of Conscious Prolonged Mechanical Ventilated Patients, Hospitalized in a Specially Designed Department

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In our specially designed department for P.M.V patients we have studied the effect of interaction of bio-psycho-social model on the Q.O.L on conscious P.M.V patients.
The patients accepted for this program were relatively stable cllinically , managed by multidisciplinary team including physicians , nurses , physiotherapist , speech therapist , occupational therapist and social worker .
Each patient was evaluated for their capacity to be an active participant in every activity .
Many of the patients were stable enough to undergo a specialized weaning protocol for P.M.V patients.
The multidisciplinary activity consisted of various activities such as : bed- side gardening , various social games , cooking and music . This approach is new and unique.
In addition to that social worker assisted with the care givers and the family involvement with the patients.
Quality of life was evaluated by specialized short questionnaire given to patients and care givers.
The result of Q.O.L questionnaire were : patient and family feels safety and believes the multidisciplinary team in adition to nurses and physicians . 90% voted of comfort and peacefulness…..
Patients , care givrs and the medical and paramedical staff demonstrated a significant satisfaction and improved quality life .

End of Life “as it was” and Facing Life “as it is: Exploration of Meaning and Purpose for Ventilated Patients and their Families

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The purpose of this presentation is to present an overview of a meaning centered intervention adapted towards the needs of ventilated patients and their family members. The original intervention is based on Dignity therapy which was developed by Chochinov (2005) for patients at the end of life addressing among other things issues of meaning and purpose in life. This adapted intervention in the context of ventilated patients focuses on exploration of personal and social meaning and purpose and legacy, meaningful communication and relationships with dear ones, aspirations and accomplishments relating to life as they knew it before and in light of having to face their current situation. The intervention may offer patients and their families tools to establish new sense of meaning and purpose, enhance relationships, deepen their experience of spirituality, and appreciation of the moment. Previous studies will be presented along with a discussion on the adapted version of this intervention as it may apply for ventilated patients and their families.

Non Invasive Biphasic Cuirass Ventilation in Neonates. Parameters that affects its Efficacy

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Background: The need, despite surfactant treatment, for prolonged respiratory support by positive pressure ventilation (IPPV) is a major risk factor for bronchopulmonary dysplasia. Biphasic Cuirass Ventilation (BCV), a non invasive form of respiratory support may be ab advantageous alternative. The optimal ventilatory parameters for BCV in neonates are unknown.

Objective: To study the role of the various components of BCV that will affect gas exchange and hemodynamic status.

Design / Methods: Anesthetized paralyzed neonatal piglets (weight: 2.2 ± .1 kg ; 3-10 days) were ventilated by BCV. For BCV, a loose fitting tightly sealed plastic cuirass attached to a programmable power unit (HAYEK RTX Respirator, Medivent), enclosed the chest and abdomen. In random order, positive expiratory cuirass pressure (PECP) was varied between +10, +5 and 0 cm H_2O. Likewise, Inspiratory: Expiratory ratio (I:E) varied between 1:2, 1:1 and 2:1. For all sequences, negative inspiratory cuirass pressure (NICP) was modified to keep the span (NICP + PECP) identical (mean : -28± .5 cm H_2O).For all, FiO_2, tracheal expiratory pressure (CPAP) and rate were 0.4, 4 cm H_2O and 40 / min respectively. Arterial and venous gases, cardiac output, systemic and pulmonary vascular pressures and carotid blood flow were measured after each 30 sequences.

Results: Results are shown in Table as mean ± S.E. All modes of BCV resulted in adequate gas exchange although with PECP of 0 cm H_2O ventilation was often less than optimal. Oxygenation was less effective with PECP of 10 cm H_2O and I:E ratios>1:2 were more effective in terms of ventilation.

PECP or I:E	**Tidal Volume** (ml/kg)	**$PaCO_2$** (mm Hg)	**PaO_2** (mm Hg)	**Cardiac Output** (ml/kg)	**Cariotid Blood Flow** (ml)
10 vs. 0	10.3 ±1 vs 8.2 ±1 *	45±5 vs 61 ±7 *	75 ± 12 vs 96±16	255±43 vs 268±44 *	25±3 vs 33±4 *
5 vs 0	11.6±1 vs 10.5±1 *	41±6 vs 49±3	98±9 vs 92±13	207±36 vs 191±35	16±2 vs 15±2.5
10 vs 5	10.8±.5 vs 11±.6	44±4 vs 41±3	84±6 vs 98±7 *	205±15 vs 199±15	19±2 vs 17±1.5
1:1 vs 1:2	11.1±.5 vs 10.7±.4	44±4 vs 47±3	92±5 vs 94±6	196±11 vs 207±12	19±1 vs 23±4
1:2 vs 2:1	11±4 vs 11.5±4 *	44.8±3 vs 38±2 *	92±5 vs 93±5	209±13 vs 188±11 *	23±4 vs 27±10
1:1 vs 2:1	16.1±.5 vs 11±.4	40±3 vs 40±3	93±5 vs 88±5 *	201±13 vs 195±12	18±1 vs 18±1

*: $p<0.05$

Tracheostomy Tube Choice for Long-term Ventilatory Support

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Study Design: Case Series
Setting: North West Regional Spinal Injuries Centre, UK
Introduction: The European prevalence of long-term ventilation through a tracheostomy is 2,800 cases whilst in the USA over 419 require tracheostomy ventilation following spinal cord injury. When ventilating using a plain tube, there is the potential for hypoventilation if excessive glottal insufflation leak occurs during sleep, while the natural morphological variations require that the tracheostomy tube curvature conforms to the patient's anatomy. Simple radiological assessment and blood gas monitoring readily address these points, but there is no guidance as to preferred tube or the expected size range.
Methods: A retrospective review of 64 adult patients discharged from the UK Centre, on home mechanical ventilation by tracheostomy tube between 1992 and 2005. With room air ventilation, 60 had plain tracheostomy tubes. Radiography in the coronal and sagittal views was usually used to aid in the selection of the tube. Measurements taken were corrected for magnification using a vernier scale.
Results: For males, the tracheostomy tube inside diameter median was 8.0 mm (range 6 – 11), and in females 7.5mm (range 6 – 8). The mean calibre reduction ratio between trachea and tube outside diameter was 0.58.
Conclusion: 8 different types of tracheostomy tubes were used in order to match the patients' anatomy and ventilation requirements. Good tracheostomy tube management can contribute to maximising the quality of life for such persons.

Key Words
Spinal cord injury, tracheostomy, long-term ventilation

Antimicrobial Resistance of Pseudomonas aeruginosa Isolated from Sputum of Chronically Ventilated Patients: Prevalence and Longitudinal Trends

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Background: In chronic ventilation units there is a high carriage and infection rates of antimicrobial-resistant bacteria. This causes morbidity, mortality and increases the cost of care due to the need to treat with broad-spectrum antibiotics**.** Some of the patients in the unit are ventilated for prolonged periods of time. This gives us a unique opportunity to examine trends in the prevalence of antimicrobial resistance with time. Our hypothesis was that the prevalence of antimicrobial resistance will increase with time due both to the use of antimicrobial agents for treatment of infections and cross-infection between patients.
Methods: In the chronic ventilation units in Herzog Hospital, sputum cultures are obtained routinely every 3-4 weeks and as needed for evaluation of fever. Since *Pseudomonas aeruginosa* is the most prevalent bacterium isolated, we analyzed its antimicrobial resistance pattern. In order to analyze trends with time, we included in the study only those patients with at least 7 separate isolations of pseudomonas. From the first positive culture of pseudomonas, the antimicrobial resistance status (susceptible, intermediate, or resistant) for each antibiotic was plotted against time for each patient. We calculated in each patient, and for each antimicrobial agent, the number of times the resistance status remained the same, increased, or decreased between two consecutive cultures, and the proportion of those events out of the total number of cultures per patient. For all patients, the mean of the proportions for either event (no change in resistance status, increase, or decrease between cultures) was calculated for each antibiotic. **Results:** During the study period, May 2005–August 2007, *Pseudomonas aeruginosa* was isolated from the sputum in 181 patients. In our analysis, we included 96 patients for whom there were 7 or more separate isolations of this bacterium. The average number of isolations per patient was 18 (range 7-60). The average time of follow up was 406.5 days (range 47-793). The prevalence of resistance to the various antimicrobial agents was: piperacillin-tazobactam 24.8%, amikacin 35.3%, piperacillin 37.2%, imipenem 44.5%, ceftazidime 55.1%, gentamicin 63.2%, and ciprofloxacin 75.9%. The pattern of resistance with time varied between patients; in some, the resistance status was stable over time, in some it decreased or increased, and in some decreased and increased many times. The mean prevalence of no change, increase, or decrease in the state of antimicrobial resistance between two consecutive cultures for the various antimicrobial agents was, respectively: piperacillin 70%, 15%, 15%; piperacillin-tazobactam 78%, 11%, 11%; ceftazidime 63%, 19%, 18%; imipenem 65%, 18%, 17%; gentamicin 70%, 16%, 14%; amikacin 65%, 18%, 17%; and ciprofloxacin 75%, 14%, 11%. **Conclusions:** Contrary to our hypothesis, the trends in antimicrobial resistance pattern with time are complex and unpredictable. On average, the proportion of events of increase in resistance are similar to the proportion of events of decrease in resistance. Interestingly, different antimicrobial agents with different resistance mechanisms show similar patterns of resistance. Further analysis is needed to clarify the factors that might influence that pattern, such as patient's characteristics and use of antimicrobial agents. In addition the correlations between resistance to various antibiotics should be investigated.

Factors Resulting in Unplanned Tracheostomy Ventilation: A 20 Year Observation of 118 ALS Patients

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Background: ALS/MND invariably results in respiratory failure, unless mechanical ventilation (MV) is used. Tracheostomy positive pressure ventilation (TPPV) often follows emergency hospitalization and uninformed decision-making. Noninvasive positive pressure ventilation (NPPV) has become the treatment of choice for ALS/MND. Immobile patients do not often return to clinics for pulmonary evaluation or optimal use of NPPV.

Objectives: The purpose of the study was to determine: [1] factors contributing to unexpected respiratory failure, emergency hospitalizations and commencement of TPPV [2] if use of NPPV prevented unplanned TPPV [3] respiratory status prior to TPPV [4] what patients believed about TPPV [5] the occurrence of severe immobility and locked-in state. [6] Burden of care factors [7] the causes of deaths of TPPV users [8] outcomes of MV users with ALS/MND.

Methods: Patients with ALS/MND were referred for nursing consultation on management of care. Data were collected from visits to homes or care facilities; periodic phone calls; questionnaires and interviews with caregivers.

Results: 118 patients with ALS/MND commenced TPPV during acute respiratory failure (ARF) and emergency hospitalization. 105 (89%) of 118 did not plan TPPV ahead. 13 (11%), who planned TPPV in advance, began TPPV during unexpected ARF. 21 (18%) of the 118 were previous NPPV users, including 4 who used NPPV a mean of 35 months. When they chose TPPV, 50 (42%) of the 118 were ambulatory, and indicated they were not ready to die. 30 (25%) engaged in strenuous activities when ARF occurred. 34 (29%) began TPPV within 3 months of the ALS/MND diagnosis. 38 (32%) had prior pneumonia. 10 had unexpected ARF after peg tube placement. 16 patients, who began emergency TPPV, were previously denied NPPV because their pulmonary tests "looked good," despite orthopnea and use of accessory muscles. 25 (21%) of 118 had no previous pulmonary evaluation. 12 (10%) began TPPV, after failed use of NPPV during ARF. 21 NPPV users had no pulmonary evaluation or NPPV management prior to emergency TPPV. Of the 21, 10 became intolerant of NPPV due to severe bulbar impairment. 5 had ARF, while off NPPV, and began TPPV. 78 (66%) of 118 believed TPPV would be short term and that progressive immobility predicted death. 30 (25%) of 118 were waiting for a cure and reversal of paralysis. 82 (69 %) of 118 became quadriplegic within five years. 18 became totally locked-in. Slow communication and immobility, not tracheostomy care, caused highest burden of care. 34 (29%) of 118 withdrew from TPPV. 23 (20%) died from cardiac arrest.

Conclusion: Unplanned TPPV occurred despite NPPV use. Factors triggering respiratory failure and unplanned TPPV: overexertion, unawareness of pending ARF, overlooking respiratory signs and test results; prior pneumonia, NPPV intolerance, failed or inadequate use, management of NPPV; and PEG tube placement. Ambulatory and respiratory onset patients are risks for unplanned TPPV. Everyone needs to know: TPPV is not short-term treatment, immobility will progress and is not a predictor of death, and treatment to reverse paralysis is unlikely. Patients have the right to withdraw treatment.

Characteristics of a Specialized Unit for the Treatment of Patients with Long-term Tracheostomy

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Long Term Disease, Long Term Tracheostomy, Long Term Disease, Term Tracheostomy, Nursing Administrator Office, Beit Rivka Hospital, Petah Tikva, Israel

'Beit Rivka' Geriatric Rehabilitation Center of 278 beds admits patients for orthopedic and neurologic rehabilitation, and patients with deconditioning after prolonged hospitalization. This geriatric center has in addition a specialized unit for chronic mechanically ventilated patients through a tracheostomy cannule. 56% of the ventilated patients undergo successful weaning from the ventilators, out of which only 33% undergo successful decanulation. Weaning from tracheostomy was unsuccessful due to inability to clear secretions or tracheal stenosis or malcia This led to an increase in the number of tracheostomy patients. A special unit was opened to care for their special needs, as well as to develop specific treatment protocols.

Aims: To describe the process of establishing a unique unit for the treatment of patients with tracheostomy following a successful ventilation weaning trial.

Patients: 46 patients with tracheostomy, mean age 81, admitted to the unit during 2006.

Methods: The multi-disciplinary team included doctors, nurses, social worker, dietitian, and physiotherapists. Prior to unit activation, observations were made on number of tracheostomy patients, nurse time was measured for each activity and a proposal for the expected manpower was made accordingly. A work protocol was set as well.

Guidance and training: Certified nurses were trained in a general hospital ward, in order to acquire the skills needed to treat a mechanically ventilated patient and those with tracheostomy. In addition, they developed a specialized patients' assessment and follow up paradigm , and methodical program both for current as well as future learning and training (single and in groups) .

Results: During the last 20 months 46 patients were admitted to the unit with the following characteristics: Mean age 81, 53% had pulmonary disease, and the rest had progressive neuromuscular disorders. All patients were cognitively impaired and bedridden. Their average Norton scale score on admission was 8.4. Staff satisfaction survey yielded significant improvement compared to previous years. Nurses with only basic knowledge in treating complicated patient became professional, highly skilled personnel.

Summary: A special unit nationally leading both professionally as well as academically was established. The ability to provide care to patients with tracheostomy in a specialized unit leads to higher standards of care and higher personal and collective self esteem.

Clinical Experience with Vibration Response Imaging Technology in Weaning of Chronically Ventilated Patients

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Background:
Weaning of chronically ventilated patients is prolong and difficult process with sometimes unpredictable level of success. Vibration Response Imaging (VRI) is a new computer-assisted lung sound imaging system that records and creates a dynamic image of breath sounds. There are correlations between changes in VRI images and changes in pressure support level during weaning process. These correlations can be potentially used for outcome predictions of weaning process for chronically ventilated patients.

Objective:
This is a pilot project implemented in chronic care facility in order to see possible correlations between changes in pressure support level and changes in VRI image during weaning process.

Method:
Mechanically ventilated patients initiated for weaning will be recorded in supine position with VRI-ICU device. Patients will be recorded following changes of pressure support level during weaning process. Received VRI images will be analyzed and compared as dynamic images and Maximal Energy Frames (MEFs). Quantitative data of the image will be analyzed using Quantitative Lung Data (QLD) tool. This information will be compared with corresponding conventional clinical data including clinical status, returned tidal volume, and arterial blood gas results. Quantitative data will be statistically analyzed.

Results:
Will be presented.

Can a Ventilator Float?

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The challenge of adapting traditional aquatic therapy to accommodate the special needs of the ventilated patient has led to some creative innovations. The aquatic therapy department an integral part of the physiotherapy department of the Alyn Children's and Adolescents Rehabilitation Hospital has been treating ventilated patients for the past fifteen years, whether the need for ventilation originates as part of a neuromuscular or a traumatic process, our population of acute and chronically ventilated children and adolescents enjoy aquatic therapy as part of there physical therapy program. The qualities of the water allow for respiratory muscle strengthening, mobility and flexibility of the thorax assists in secretion clearance as well as gives an opportunity to enjoy movement without the constraints of gravity. The need for a ventilator, emergency ambu and suction machine are always constant. This poster will present 15 years of experience treating ventilated patients including innovations allowing for ventilators to be used during therapy.

Spontaneous Breathing (either mouth or nasal) in and Tracheostomy Out

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Many patients with low level of consciousness have been hospitalized at the department A during the last few years. The patients, despite being stable hemodynamiclly and without pulmonary complications, continued to breathe via the tracheostomy. In this study we evaluated the possibility of weaning them from tracheostomy.
First evaluation consisted of general clinical evaluation, ability to cough spontaneously, while maintaining normal oxygenation.
All processes were monitored with a pulse oxymeter.
Fist stage was to perform respiratory muscle training 10 minutes x 3/ day. This was very important for the patients with suspected weak respiratory muscles. Thereafter, changing the tracheostomy tube to number 4 for a few days. When the patient was comfortable with the new tube closing the tube for 10 min trial was performed. A successful trial was followed by a protocol of closing the tube for 30 min, 1 hr, 2 hrs 4 hr, 8 hrs, 16 hrs and 24 hrs.
At this point patients suspected for laryngeal complications (vocal cords paralysis, or myopathy) was evaluated by ENT specialist with a fiberoptic device. A few days with the tracheostomy tube closed extubation was performed.
If infection was developed the process was stopped until the patient overcame the infection and the process was reinitiated again.
Conclusion: It is possible to successfully extubate patients with low level of consciousness who were tracheostomized. It is recommended to try this process in those patients despite that it seems not possible.

Swallowing Assessment in Ventilated Patients: The Comparison between Two Types of Swallowing Evaluations

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Ventilated patients are at high risk for aspiration pneumonia as they may suffer from Dysphagia. Among the variety of techniques for swallowing evaluation, there are subjective tools, such as the Bed-side evaluation, more objective tools such as Videoflouoroscopy, a dynamic X-ray technique and the Fiberendoscopic assessment (FEES). However, the latter techniques are not always available in all medical care centers. The Modified Blue Dye test (MBDT) is used as a part of the bed side evaluation for ventilated tracheostomied patients. This assessment includes introducing blue dyed food in various consistencies. In order to see whether or not aspiration occurred, the patient is suctioned after eating. However the reliability of this technique is controversial as there are frequent reports of false negative cases. One of the disadvantages of the MBDT is the lack of a unified protocol. That may explain the variety of results evinced in the different reports.

In the current study we re-examine the reliability of the MBDT comparing it to the FEES findings, both being done simultaneously. Furthermore we used a very strict and consistent protocol with regards to the amounts of food, the timing and the number of times the suction is conducted. Our preliminary results show that, using the improved protocol, a significant correlation between the two assessments emerges. We thus can conclude that the MBDT can be a relatively reliable tool for screening dysphagia in ventilated tracheostomied patients.

Issues in the Nutritional Care of the Chronic Mechanically Ventilated Patient-Raising Awareness

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The medical literature regarding nutrition in the chronic mechanically ventilated patient is very poor. Many issues in the nutritional care of these patients are not attended at all in the literature and some issues are reviewed briefly or in specific populations (such as ALS) only. The aim of this lecture is to raise awareness to problematic issues such as the correct weight to be used in equations, estimation of energy needs, protein-energy ratio in the feeding, target body weight, undesirable weight gain etc.

The Relative Advantages of Group or Individual Physical Therapy Treatment for Long-term Respirated Patients

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Within the last decade, the healthcare system has been faced with an ever increasing number of patients requiring longterm respirator care. This increase stems from recent advances in medical care witch had led to decreased mortality rate and an increased life expectancy, along with an inability to cease respiration once initiated.

Long term respirated patients are generally hospitalized on specialized wards adapted to their needs, and stuffed by professional multidisciplinary teams. These patients are generally restricted to their bed most of the day, connected to respiratory and other medical apparatus. Resultantly, they are isolated from all interaction with the surroundings outside of their direct care giver. Additionally the respirator itself inhibits communication causing further psychological distress to the patient. Treatment groups serve both to stimulate generalized activity and respiratory exercise and to provide for supportive social interaction. We believe group treatment to these patients to be of great value in improving both physical and psychological status and quality of life.

Objectives: To assess the relative cost - benefit of individual as opposed to group physical therapy treatment among chronic respirated patients through a comparison of the advantage and disadvantages of each treatment method among chronic respirated patients.

Methods: The project was conducted on respirated patients at the respiratory ward of Bait Balev Hospital. Inclusion criteria where applied within the chronic respirated population in order to identify patients who were:

1. Medically stable.
2. Able to cooperate.
3. Free of conditions requiring medical isolation precautions.

The group was restricted to a maximum of eight patients per single physical therapist.

Eight long term respirated patient were included in a program of twice weekly group of physical therapy treatment, and twice weekly individual physical therapy treatments. Each patient then completed a multiple choice questionnaire with the aid of an assistance reflecting his opinion and feeling regarding his participation in each type of treatment.

Interim results: In addition to realizing a significant saving in physical therapy staffing time, participation in group therapy treatments were found to provide patient with a supportive social environment and to increase patient feelings of well-being. Assuming group physical therapy treatment to be of no less value than individual treatment this treatment option should be considered preferentially in a era of limited staffing resources.

Biofeedback Used to Enhance the Functional Capacity of ALS Patients

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An ALS patient who has been ventilated for prolonged period of time was successfully weaned from mechanical ventilation. The patient was discharged from the Intensive Care unit to a rehabilitation department. At the rehabilitation department the patient continued to use long term oxygen treatment. In order to enhance his recovery we evaluated the biofeedback technique as a part of his management and the success of the patient recovery.
The new method enables the patient and us to follow several parameters & enhance the patient quality of breathing. The parameters are: chest wall and abdominal expansion, HR, EMG of respiratory muscles, skin conductance, and peripheral body temperature. In addition t the bio feedback the patient is being treated with respiratory muscles trainer to strengthen the respiratory muscles.
The results, in the last few months, are optimistic and the final result will be presented.

Patients Managed with Long-term Noninvasive Positive Pressure Ventilation

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Recently, utilization of non-invasive positive pressure ventilation(NIPPV) for chronic respiratory failure has an increasing rate. We tried to determine beneficial results of our patients who have been managed with NIPPV at home. Clinical signs, total time of hospitalization before NIPPV treatment, measurements of arterial blood gase samplings and spirometric tests of 56 patients of 85, who were admitted between 2002 to 2006 and whose data could be found, were evaluated retrospectively. Mean length of NIPPV treatment at home was 18 months. 44 of patients had chronic respiratory failure with severe COPD whereas 22 were only COPD. Combination of COPD and OSAS, tuberculosis sequel or kyphoscoliosis were determined at rest. Indications for NIPPV were kyphoscoliosis and tuberculosis sequel for women while COPD or COPD-OSAS, kyphoscoliosis for men. Almost of the patients suffer from severe dyspnea. Mean hospitalization lenght was 42.3 days. 39 of patients were hypoxemic while 48 were hypercapnic before commencing NIPPV. 42 were also on long term oxygen therapy. Mean pulmonary arterial pressure evaluated by echocardiography was 56.4 mmHg. Serious airway obstruction was determined in COPD group. Discomfort with masks was the most common complication of NIPPV. It has been realised that, long term NIPPV has been a part of medical therapy of chronic respiratory failure as we follow up long term results of life quality scores.

Non Invasive Positive Pressure Ventilation (NIPPV) a Bridge from Acute Respiratory Insufficiency to Lung Transplantation Program

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Background: Up until today patients with acute respiratory insufficiency caused by exarcebation of a chronic end stage pulmonary disease were often subjected to mechanical ventilation.
Patients and methods: Four patients meeting inclusion criteria for Polish Lung Heart Transplantation program were admitted during chronic disease exacerbation.
On admission, all patients had complete respiratory insufficiency syndrome and all met criteria for mechanical ventilation in intensive care unit. All observed patients were initially treated with NIPPV (2-12 mbar).
After a trial period of NIPPV, patients could be separated into two groups:
1) Patients responding to NIPPV treatment - two COPD stage IV patients and one DIP patient with chronic heart failure;
2) Patients not responding to NIPPV treatment - one COPD stage IV patient.
We compare these groups and discuss the impact of NIPPV treatment on the possibility of a successful lung transplant program.
Results:
Group 1 subjects were admitted to heart lung transplantation program after effective NIPPV treatment.
Group 2 subject required mechanical ventilation in intensive care unit. Due to ventilator dependency it was impossible to proceed with successful extubation. The subject has required chronic mechanical ventilation through tracheal tube until now and was not initially accepted for lung transplantation.
Conclusions: NIPPV seems to be an efficient alternative way of ventilation in patients with complete respiratory insufficiency caused by end stage pulmonary disease exacerbation. It seems to have a good potential on prognosis and further treatment.

Difficult to Treat Asthma – an Uncontrolled Disease. Is There any Relation to Experience from Palliative Medicine?

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Difficult-to-treat asthma is characterized by uncontrolled symptoms occurring despite of intensive treatment (corticosteroids and long acting $ß_2$-agonists) and is associated with severe obturation. We challenged the idea, that patients with difficult-to-treat asthma might be candidates to palliation of persistent respiratory symptoms.

Aim

The aim of the study was to evaluate the occurrence of the refractory symptoms persisting despite the intensive treatment, factors exacerbating asthma and co-morbidities in patients with difficult-to-treat asthma.

Material and Methods

27 patients (21 women and 6 men, aged from 23 to 60) with diagnosed difficult-to-treat asthma were included into the study. All analyzed data were collected from the computed database of severe and difficult to-treat-asthma at the Department of Allergology.

Results

All patients suffered from chronic cough and dyspnoea despite of treatment administered according to GINA. These symptoms were refractory to the drug specific for asthma. The most important factor leading to exacerbation was long-term stress and rhinitis, r=. The most prevalent co-morbidities included obesity (….pts), hypertension (…pts) and GERD (…pts).

Conclusions

This study showed that patients with difficult-to-treat asthma have chronic cough and dyspnoea, which potentially may require benefit from palliation. Additional factors and co-morbidities are associated with difficult-to-treat asthma.

Need for Palliation in Patients with the Severe COPD – a Questionnaire Study

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Introduction: In Poland patients with COPD one not consulted by palliative care proffesional. The aim of this study was to assess the opinion of severe and very severe COPD patients on their most distressing chronic symptoms, social activity and the need for palliative support.

Material and methods: 26 patients (women–7, men-19, aged from 53 to 75) with advanced COPD (severe and very severe stage according to GOLD 2006) answered the short questionnaire concerning symptoms, social activities and the need for additional palliative care.

Results: None of the patients was professionally active (13 - disability pensions, 12 – retired), their social activity was limited. All patients were treated according to GOLD standards, 7 - had long-term oxygen therapy, 11 – pulmonary rehabilitation. All patients reported exacerbations in the last year (median number – 3, range from 1 to 10). 23 - patients required hospitalization due to exacerbation during last year (12 patients were hospitalized once, 10 – two or three times (equally) and one patients – seven times).

All patients were treated with antibiotics during the last year (median number – 3; range: from 1 to 10). They had regular visits in out-patients clinic and occasionally by were consulted pulmonologists. All patients declared need for addicional palliative care.

Conclusions: Polish pulmonologists and palliative medicine doctors should join the international discussion aiming on the definition of end-of-the life needs of patients with chronic, life-limiting diseases, respiratory disease like COPD and evaluate the potential benefits by addition of palliative care.

Echocardiographic Findings Among Steady-state Sickle Cell Anaemia Patients at The Lagos University Teaching Hospital

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Background

Few studies documenting the echocardiographic findings of patients with sickle cell anaemia have been reported from Africa despite the high prevalence of the disease on the continent.

Objectives

The present study aimed to determine echocardiographic cardiac dimensions and functional parameters of children with homozygous sickle cell anaemia (SCA), in steady state at the Lagos University Teaching Hospital (LUTH).

Material and method

Sixty children with sickle cell anaemia and sixty age and sex matched controls with ages ranging from one year to fifteen years were studied. Aspects of their cardiovascular function were determined by clinical examination and 2D guided M-mode echocardiography.

Results

The mean left atrial dimension (LA), mean left ventricular end diastolic diameter (LVEDD), mean left ventricular end systolic diameter (LVESD), mean left ventricular posterior wall thickness (LVPW), mean Intraventricuar diameter (IVS) and the mean left ventricular mass (LVM) in SCA was significantly larger than those of controls [$p < 0.001$]. The left ventricular Fractional shortening (FS) and ejection fraction were within acceptable normal limits although significantly lower in SCA patients [$p < 0.001$]. The direct echocardiographic parameters correlated significantly with age in both groups (LAD, AO, LVEDD, LVESD, IVS, LVPW), and LVM but not with ventricular functional parameters (FS and EF). In addition, chamber dimensions, and LVPW, as well as ventricular functional parameters were inversely correlated with haemoglobin concentration in the subjects.

Conclusion

Cardiomegaly is a common occurrence in patients with SCA and this is a result of the compensatory mechanism/haemodynamic consequence of the chronic anaemic state of these patients. It may not necessarily imply impaired myocardial function or cardiac disease.

Key words: Sickle cell anaemia, echocardiography, cardiac dimensions,functional parameters.

Typical Immune and Cytokine Patterns of Patients With Persistent Herpes Virus Infections

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Herpes virus infections are widely spread, but very little is known about the immune mechanisms that are involved in the process of the diseases caused by these viruses (Lacomba M.S., Martin C.M., 2000).

This study was designed with the aim to identify common typical changes in the immune system in such patients. 70 immunocompromised patients in total with often recurrent episodes of infections caused by Cytomegalovirus were included in this study. All patients had been infected with Epstein Barr virus - a probable cause of those recurrent Cytomegalovirus infections. Those patients were under constant control of the symptoms of infections caused by herpes viruses group (Herpes Simplex virus, Epstein Barr virus and Cytomegalovirus or their combinations) and were fully examined with all possible clinical and laboratory methods several times during the year.

We uses clinical, laboratory {(PCR (blood, saliva, vesicles fluid), ELISA (IgG, IgM, cytokines), flow cytometry (T-cells, B-cells and activation markers: $CD3^+$; $CD4^+$; $CD8^+$; $CD16^+$; $CD3^+$,$CD25^+$; $CD3^+$,$CD95^+$; $CD3^+$,HLA-DR^+, $CD20^+$)), assessment of phagocytoses, immunoglobulins IgA, IgM, IgG and circulating immune complexes} and statistic methods.

Patients complained to often, long lasting skin manifestations - more then 5 times per year (74%), headaches (96%), sub-fibril temperature (52%), fatigue and weakness (84.7%), no symptoms - only laboratory data (15.3%). Parameters and laboratory data of patients were compared to reference data of healthy persons. High IgG antibody's titers (HSV, CMV, EBV EBNA) were detected in all patients and very often IgM antibodies were detected too. The typical changes in immune system were: decrease of the amount of NK cells (4.1±1.2), increase of $CD3^+$;$CD95^+$ (15.5±2.3), decrease of $CD3^+$;$CD25^+$ (1.4±0.4), decrease of the amount of B cells (8.3±2.2), high quantity of CIC more then 86 units (87.3%). Significant changes were observed in cytokine levels: IL-1 (64.4±39.1 pg/ml), IL6 (38.6±7.2 pg/ml), IL4 (39.6±4.6 pg/ml), INF-gamma (14.0±6.2 pg/ml), INF-alfa (22.3±5.1 pg/ml), INF-beta (17.8±3.4 pg/ml).

In the conclusion we can suspect that those common changes have essential impact to the number of episodes of acute manifestations in immunocompromised patients with persistent herpes virus infections and could be monitored and used in prediction of the severity of acute cytomegalovirus infections. To achieve better results in treatment there is possibility to modify these parameters of cytokine pattern.

Elderly Respiratory Disorders

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Background The main causes of morbidity and mortality in the elderly have changed significantly since the beginning of the twentieth century, when five of the ten main causes of death in the elderly were infectious diseases. Since then, improvements in sanitation, nutrition and immunization as well as the introduction of antibiotics have led to a decline in the incidence of these diseases. Yet, pneumonia and infectious lung diseases in general are still among the five leading causes of death in the elderly and their occurrence keeps rising with age. Together with Chronic Obstructive Airway Disease and Congestive Heart Failure, respiratory disorders in the elderly present a diagnostic and therapeutic challenge to the medical staff in primary care services, emergency services and services for continuing and chronic long term care
. The decision was taken, therefore, to evaluate diagnostic and prognostic parameters in elderly patients in chronic long term care facilities who were hospitalized in internal or acute geriatric departments because of respiratory distress.
Methods. The patients' medical charts were reviewed during the six month study period. Of a total of 131 hospitalizations, 40 were due to respiratory distress. The main question to be answered was, what are the specific causes of the respiratory distress, while secondary questions related to differences in diagnosis, treatment and mortality between the specific diseases and between subjects hospitalized in the general or geriatric hospitals. In order to compare the different parameters, we propose here for the first time a new model for the determination and quantification of diagnostic accuracy based on a scale of 0-5.
Results A summation of the data indicates that of the forty hospitalizations for respiratory distress, seventeen patients were diagnosed with Congestive Heart Failure, thirteen with pneumonia and ten with Chronic Obstructive Airway Disease. The averages of diagnostic accuracy were 2.5, 2.2 and 1.8, respectively, in a total score of five. A comparison of the two hospitals showed the average diagnostic score to be 2.4 and 2.2, a statistically insignificant difference. There also was no significant difference in the diagnostic accuracy between discharged and deceased subjects: 2.2 and 2.5, respectively.
Conclusions The most prominent finding was the identification of respiratory distress in the elderly, such as aspiration, asthma and thromboembolic disease, as important missed causes, even if the sample was relatively small. Use of the proposed new tool can probably improve diagnostic accuracy and reduce the poor prognosis, enabling us to suggest more appropriate solutions and treatment for these subjects. The new tool can also improve diagnostic accuracy in other medical fields. Because of the pioneering nature of this work in a relatively small sample, it is recommended that the tool be used with larger populations in order to evaluate its reliability and validity.

The Use of Tracheal Stoma Stents in High Spinal Cord Injury

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Study Design: Case Series
Setting: North West Regional Spinal Injuries Unit, Southport and Formby District General Hospital, UK
Objectives: To identify a novel type of tracheal stents for use in patients with high spinal cord injury. Patients with high spinal cord injury (above C4) frequently have significant respiratory impairment and may require long-term access to the trachea for respiratory support. For the most part tracheostomy tubes are used for this purpose but a tracheal stoma stent can offer a suitable alternative in selected cases and deserves wider recognition.
Methods: The authors describe the use of stoma stents in nine patients, five of whom had full time diaphragm pacing. The stent in these cases is for retention of access for positive pressure ventilation, and for the prevention of obstructive sleep apnoea. This was also the indication in one self-ventilating patient with tetraplegia and sleep apnoea. Two patients with recurrent chest infections in whom chest physiotherapy was difficult, benefited from the stoma stents. One patient, after ventilator weaning, required a further 4 months of tracheal access on account of episodic hypoventilation and temporarily had a tracheal stent as an inpatient.
Conclusion: Patients who have had the benefit of tracheal stents report significant improvement in relation to local discomfort, tracheobronchial secretions and vocalisation. With suitable training, the stents can be changed and cleaned easily in the home setting.
Key Words
High spinal cord injury, Tracheal stoma stents, long-term ventilation

Quality of Life of Young Adults with Bronchial Asthma

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The objective of the study was to assess the quality of life of young adults suffering from bronchial asthma. In view of previous findings about the interpersonal conflicts of asthma patients, the hypothesis was that the individuals with asthma would suffer from lower quality of life as depicted by inter-personal relation scale. Group 1 (experimental) consisted of 34 patients suffering from bronchial asthma (20 men, 14 women) who were followed at the Chest and Allergy Institute of the Tel Aviv Sourasky Medical Center. The mean disease duration was 7.25 ±2.35 yrs. Group 2 (control) included 43 healthy individuals (16 men, 27 women) who were matched to the asthma group in terms of the major demographic characteristics and who denied any respiratory or allergy symptoms in the past. Both groups were in the same age range of 18 to 32 years (mean age for group 1 =22.30 yrs, mean age of group 2 = 23.00). A Multidimensional Quality of Life questionnaire (51 items providing scores on 10 scales) was administered to all participants. A comparison of results of the two groups demonstrated that the individuals with asthma scored significantly lower than the controls on the overall summative score of quality of life and on the separate scales of family relations, sex, sense of health, security and positive feelings. However, they did not differ from the controls in the scales of pain, body image, self control and negative feelings.

These findings support the hypothesis that asthma patients suffer from lower quality of life compared with control and may benefit from targeted psychosocial support.

Interventions to Decrease Prevalence of Antimicrobial-Resistant Gram Negative Bacteria Among Patients in a Chronic Ventilation Unit

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Background: In chronic ventilation units there is a high rate of carrying and being infected with antimicrobial-resistant bacteria. This causes morbidity, mortality and increases the cost of care due to the need to treat with broad-spectrum antibiotics. The aim of the study was to assess the effectiveness of periodic culture surveillance and staff education in decreasing the rate of antimicrobial resistance.

Methods: The study was conducted in the 3 chronic ventilation units in Herzog Hospital, Jerusalem, Israel. In all patients hospitalized in the chronic ventilation unit, weekly cultures were obtained from sputum and urine. We defined an antimicrobial- resistant Gram negative bacteria as those resistant to either amikacin, cephalosporins (ESBL), carbapenems or piperacillin-tazobactam. In patients who were carriers of those bacteria, in addition to standard precautions (hand washing, gloves), other precautions were taken, such as disposable gowns for the staff and additional measures according to source of infection. Infection prevention was the main issue in in-service training of all medical staff, with on-site monitoring and feedback. Administration of broad-spectrum antibiotics required the approval of an infectious diseases consultant.

Results: At the time of the study there were 49 patients in the 3 units. Before the intervention, 22 patients were carriers of antimicrobial-resistant *Pseudomonas* and 3 patients, with resistant *Serratia*. After 2 months of intervention there were only 11 cases with resistant *Pseudomonas* and one with resistant *Serratia*. This was achieved without transferring patients from unit to unit or from room to room and without significant interference in the daily life of patients and family. In the same period, 2 patients with resistant *Acinetobacter* and one with vancomycin resistant *Enterococci* (VRE) were admitted.

Conclusions: The combination of simple interventions such as antimicrobial- resistance surveillance, continuous education and monitoring decreased significantly the prevalence of antimicrobial resistance. This was achieved with the same staff number and without significant interference with the usual routine of the unit. Due to the success of the intervention, since then we have continued the same measures. The attitude and management of patients with antimicrobial-resistant bacteria has become part of the organization culture. Unfortunately, the ongoing admission of patients with highly resistant bacteria, such as carbapenem-resistant klebsiella (CRK) imposes a continuous challenge for infection control.

Modified Pulmonary FunctionTest in the Very Old

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Geriatric population world wide has increased dramatically in numbers and percentage during the last century. This population is characterized by multiorgan pathology, expressed by several chronic diseases, consumption of many medications and low reserve of general functional capacity. The very old (90 years and older) is a special group within the geriatric population. Despite a significant increase in numbers, few studies were conducted on their organ function in health and disease.

Pulmonary function test consists of several parameters representing the respiratory capacity and reserve.

We propose to study the pulmonary function in the very old population without known respiratory diseases.

We studied 5 patients age 90-102 in order to detect the most representing parameter of their respiratory capacity.

We found that all patients had a reduced value of Maximum Voluntary Ventilation, (21-53 % of predicted value). In addition, we found that their expiratory capacity is significantly reduced (20-54% of predicted value). This is a surprising finding due to the fact that the FVC, a parameter representing the maximum respiratory volume was found almost normal.

We suggest that the very old population demonstrate a decreased respiratory capacity and reserve due to reduced respiratory muscle function and a decreased in general body functional capacity.

Efficacy of Non Invasive Biphasic Cuirass Ventilation in Neonates. Comparison with Invasive Positive Pressure Ventilation.

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Background: In spite of surfactant therapy, bronchopulmonary dysplasia (BPD) remains frequent. A major contributor to this complication is the persistent need, notwithstanding normalized lung mechanics, for respiratory support by invasive positive pressure ventilation (IPPV). Biphasic Cuirass Ventilation (BCV), a non invasive form of respiratory support could thus be an advantageous alternative.

Objective: To compare efficacy of BCV to IPPV in terms of gas exchange, stability of pulmonary mechanics and hemodynamic status.

Design / Methods: Anesthetized paralyzed neonatal piglets (age: 2-17 days) were randomized to 5 hours ventilation by IPPV or BCV. For IPPV, a pressure and time cycled ventilator delivered a tidal volume of 11±.4 ml/kg at 16 ±5 cm H_2O of peak inspiratory pressure. For BCV, a loose fitting tightly sealed plastic cuirass attached to a programmable power unit (HAYEK RTX Respirator, Medivent), enclosed the chest and abdomen. Inspiratory and expiratory cuirass pressures were - 19 ± 2 and + 5 cm H_2O respectively. For both ventilation modes, FiO_2, tracheal expiratory pressure (PEEP/CPAP) and rate were 0.4, 5 cm H_2O and 40-60 breaths/min respectively. Arterial and venous gases, cardiac output, systemic and pulmonary vascular pressures and carotid blood flow were measured hourly. From the above were derived systemic and cerebral oxygen extraction. Lung volumes were measured by Helium dilution.

Results: Gas exchange and pulmonary mechanics at baseline and after 5 hours (end) of ventilation are shown in Table 1. Indices of systemic and cerebral blood flow remained similar at the end of each mode of ventilation.

Table 1. Measurements at the start and after 5 hours (end) of ventilation

	$PaCO_2$ (nm Hg)	**PaO_2 (nm Hg)**	**Dynamic Lung Compliance (ml/cm H_2O/kg)**	**End Expiratory Lung Volume (ml/kg)**	**Functional Residual Capacity (FRC) (ml/kg)**	**Cardiac Output (ml/kg)**
BASELINE	37±.9	181±5	1.26±.2	30.7±2.5	24.5±2.1	126±10
IPPV end	41±3.4	138±13 *	1.08±.2 *	28.6 ±2.5 *		141 ±20
BASELINE	39±.3	169±11	1.21±.1	29.5 ±3.2	22±2.9	106±3
BCV end	39.5 ±7	118±22*	.91±1 *	25.2 ±1.7 *		98 ±13

* end<BASELINE;$p<0.05$

Conclusions: Hemodynamic status and gas exchange were similar for IPPV and BCV. The mild decline in lung volume associated with prolonged ventilation in paralyzed animals was accentuated during BCV. However, the combination of CPAP and BCV maintained expiratory lung volume above initial preventilatory FRC.

Acustic Monitoring of Breath Sounds for Online Detection of One Lung Intubation

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Inadvertent one lung intubation (OLI) a major risk, mainly in pediatric anasthesia and laparoscopic surgery, but also in a ICU setting. OLI can lead to serious complications such as atelectasis, hypoxemia, pneumothorax, cardiac arrythmias and hypotension. The monitoring methods used today such as bilateral lung auscultation, pulse oxymetry and capnography have all been found to be non specific and controversial regarding to OLI detection (references) and no reliable monitoring technique has been deviced to solve this problem yet.

A previous successful experimental study led us to perform **a first clinical study**, on patients intubated for general anesthesia with a double lumen tube for thoracic surgery. Its aim was to verify the accuracy of data obtained from an acustic sensor device in order to detect OLI during anesthesia, when separate lung ventilation was part of the anesthesia protocol.

The separate lung breath sounds sampling was performed by three piezoelectric microphones placed in three different positions. Breathing sounds of only right, only left and both lungs ventilation were obtained prior to the beginning of surgery and were harmless for the patients..

The results of this clincal study showed that recognition of left OLI was determined correctly in all our patients without any system mistakes. Recognition of right OLI was recognized in all patients but one. Bilateral venitlation was correctly recognized in all cases.

The second clinical trial was performed on 24 patients, anesthetized for various surgical procedures and from whom an informed consent was obtained. In this study we positioned the tube initially as far down as possible in the trachea in order to achieve, on purpose, OLI and drawn back step by step, using a stethoscope until bilateral sounds appeared. A fiberoptic bronchoscope verified the final position of the distal tip of the tube. The results of this second study show similar results as in the first one : a correct diagnosis of the tube positioning in 23 out of 24 cases, e.g. a 95% probability of correct detection

In conclusion, inadvertent endobronchial intubation or one lung intubation is known to be a significant incident of during general anesthesia or in patients intubated for mechanical ventilation., especially in pediatric patients and during laparoscopic surgery, but also in the intensive care setup.

The results of our studies show that the proposed method is achievable and can be used for online detrection of OLI during anesthesia.

In-Line Inexsufflation: A New Method For Noninvasive Secretion Clearance in Ventilated Patients

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In-line mechanical inexsufflation (MIE) is a new, non-invasive, method for clearing airway secretions from intubated ventilated patients. The method has significant potential advantages over the current gold standard - catheter suction - because it is non-traumatic, does not cause Ventilator Associated Pneumonia, and achieves more effective secretion removal. It is also superior to an existing MIE device – the Respironics CoughAssist – because it is fully automatic and does not interrupt patient ventilation at all. An animal study on an excised pig lung model has demonstrated that the method is capable of noninvasively clearing secretions that were missed by catheter suction. The design of an in-line MIE device developed at Alyn Hospital will be presented, along with the rationale for the technique and animal data demonstrating its efficacy.

Mobility as the Driving Force for Building Quality of Life among Ventilated Young Adults

O Ababa, M Bloch, J Smerling-Kerem

The Alyn Hospital has an independent living unit for ventilator dependent adults, who are independently mobile with electric wheelchairs. The slightest voluntary movement of a finger, toe or chin can be used to operate an electric wheelchair, which is vital to quality of life for the person dependent upon a wheelchair and ventilator.
Ventilator dependent people are usually dependent on others for even their most basic daily needs. People with the abilities to manage their lives need the space for independence where they can fulfill their needs without an interceder. To illustrate the continuum of conflict of 'dependence-independence' that these people face, O, age 24, a resident of the independent living unit will present her story with an emphasis on the advantages of independent mobility, as well as the specific difficulties a ventilator dependent person faces to live as a regular member of the community.

O, who has an advanced neuromuscular disease, has used many mobility strategies as her physical condition changed. At the age of eight when the need for ventilation began she was ambulatory with the help of a walker. After that she was independent in an electric wheelchair and with the help of an aide, attended school and completed her matriculation exams. For more than a year O has been independent in driving an adapted van. The ability to drive is crucial to O's ability to leave the independent living unit and live independently in the community.

Community Critical Care

Debbie Field

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The concept of community critical care within the UK is fairly new. Pockets of this type of care and management exist across the country but it is often carried out on an informal or limited basis even though there are over 3000 patients who are registered as receiving home mechanical ventilation (excluding continuous positive airway pressure) invasively and non invasively.[1] These patients are a heterogeneous group and include those with neuromuscular disease, rib cage deformity, spinal injury, COPD and obesity. Their numbers have increased exponentially over the past few years and this trend is set to continue for many reasons such as technical advances, increased understanding of such disease processes and survival from prolonged critical illness. These patients therefore will require input at home or in an intermediate care facility from a critical care team to support and manage symptoms, psychological support, changing ventilatory requirements, exacerbations and palliative care issues.

Sending patients home from acute care who require invasive ventilation is fraught with obstacles, anxiety, lack of understanding and prejudice from all areas of the healthcare system with the largest driving force being how cost effective is HMV? However, this nilhistic approach to HMV is no longer acceptable and a change in attitude from healthcare professionals and society as a whole needs to be realised.

Developing community critical care as a model of care for the 21st century in order to meet the needs of this patient group is paramount and requires a partnership between primary and secondary care trusts, the independent sector and industry. At all times it must aim to maintain quality in terms of process, patient quality of life and life satisfaction and equality across disability.

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Obstacles to Discharge of Ventilator-Assisted Children from the Hospital to Home

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Background: There is a growing demand for respiratory rehabilitation services for children dependent on tracheostomy and/or chronic mechanical ventilation. Discharge home of these patients following their rehabilitation, however, can be an arduous process. **Objectives:** To identify factors that contributed to a delay in hospital discharge from the time medical stability was achieved and to describe from the social worker descriptive, as the key discharge coordinator, how to deal with those obstacles**. Methods:** A retrospective chart review of patients admitted to the Respiratory Rehabilitation Unit at Alyn Hospital, Jerusalem, over a four year period, and social worker reports regarding those patients. **Results:** A total of 48 patients were identified. The median length of hospitalization was 10 months: Specific family characteristics – an unemployed father and an additional family member with a disability– as well as ongoing mechanical ventilation at the time of discharge were found to positively correlate with a prolonged or failed discharge process. **Conclusions:** Hospitalization in a pediatric Respiratory Rehabilitation Unit may be prolonged for both medical and non-medical reasons, with the process of discharge home being particularly difficult in certain subsets of patients. A proactive discharge policy by hospitals, improved community support services, and legislation defining the rights of home ventilated children may facilitate more efficient discharge home of these patients.

Predicting Tolerance of Noninvasive Positive Pressure Ventilation Using a Salivary Dysphagia Score in Patients with ALS

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Objectives: The purpose of this study was to determine tolerance of noninvasive positive pressure ventilation (NPPV) using a simple salivary dysphagia scoring system in ALS patients and evaluate the score's ability to (1) predict survival (2) anticipate intolerance of NPPV and the end-of-life (3) identify the need for hospice, or when to start invasive ventilation, and (4) identify appropriate care interventions to promote tolerance and safe use of NPPV.

Methods: ALS patients were referred for nursing consultation on management of care in community-based settings of Ohio. Data were collected on 157 patients. Twenty-two tried NPPV, but failed. The remaining 135 used NPPV and were closely observed through ongoing periodic home visits. Impaired ability to swallow saliva was quantified using an ordinal salivary dysphagia scoring system. Score of 4 = no impaired ability to swallow saliva; 3 = infrequent, intermittent small accumulations of saliva; 2 = occasional drooling/pooling; 1= frequent pooling/drooling; 0 = constant pooling/drooling and inability to swallow of saliva.

Results: Median survival differed significantly between those with a score of one (8 months), compared to those with a score of four (27 months, $p = 0.002$). There were no other significant differences in survival times when using pairwise comparisons between scores. In the subset of 49 patients who stopped NPPV, the swallow score at the start of NPPV (median = 2) was significantly higher ($p < 0.05$) than the swallow score when NPPV was no longer tolerated (median = 1), or when NPPV was stopped due to death, or transition to TPPV (median = 1). Of those patients who could no longer tolerate NPPV, more than 80% had scores of 0 or 1.

Conclusions: The salivary dysphagia score was useful in predicting tolerance of NPPV. Patients with a score of 4 remain on NPPV more than 3 times longer than patients with a score of 1; a score of 1 signaled the intolerance of NPPV, the need for hospice or planned tracheostomy. The majority were treated less than 15 months using NPPV. Patients who tolerate NPPV for 20 to 24 hours a day live longer than those who tolerate NPPV for fewer hours. The Score can be simply applied in the home setting by minimally trained caregivers. This may help to avoid inappropriate therapy, emergency hospitalizations, early mortality, dying with distress and unwanted outcomes of ALS patients using NPPV.

Thriving, Not Just Surviving: A Ventilator User's Experience!

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Introduction: What a difference a day makes! Or, so it seemed. One day I was flying around the country; the next day I was in a ventilator step-down unit in cor pulmonale, right heart failure due to pulmonary hypertension (60 mmHg) and ventilatory failure, as well as hypoxemia, corrected with O2 (PaCO2=95 mmHg).

Transition to Home and Noncompliance: Introduced to Dr. Norma Braun and noninvasive ventilation, I was put on a pneumosuit and for the first time in my adult life was able to take in a breath that was fully satisfying! However, when discharged from the hospital it sat unused for over a year. My CO_2 was still in the low 60s and I was oxygen dependent and restricted in what I was able to do. I never thought I would see my 17 year old son grow up and saw no future.

Shock Therapy: When another noncompliant patient of Dr. Braun's died, she told me I was next and handed me a release form for my body for research – stating that I could use the vent and live – or continue to not use it and die! Although angry with her, I was frightened enough to start using the ventilator.

Compliance and Positive Outcomes: After 18 years of nocturnal NPPV, I am mostly oxygen free, enjoy my 4 granddaughters and travel around the world as a patient advocate. NPPV gave me my life back and the independence I thought gone for good thanks to a caring doctor who did not give up one me!

Conclusion: Despite emergency initiation of noninvasive ventilation, respiratory care practitioners need to know the potential for ventilator users to achieve a happy, long life through a strong desire to live, willingness to wear interfaces, optimal use of NPPV and ongoing encouragement by their healthcare professionals. Social interaction and achieving personal goals greatly enhance the quality of living.

Oral Care and Prevention of Ventilator-associated Pneumonia

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Background: Oral care has been increasingly recognized as a key factor in the prevention of VAP, with dental plaque colonization in the respiratory tract recognized as a risk factor. Ventilated patients have 6-21 times the risk of developing VAP, with mortality rates ranging from 20-41%. Studies of overall oral health status during the period of endotracheal intubation have been few. Even fewer are the studies investigating an interdisciplinary approach to oral care. Oral care may decrease the risk of this deadly disease. Nursing, Speech, and Respiratory therapists come from varied educational backgrounds, yet all working in conjunction with a Registered Dental Hygienist can provide the best approach to patient oral care.

Objectives: The objective of this presentation is to discuss current evidence-based research on the oral health connection to VAP. The oral changes that occur with intubations and the increased risk of VAP will be addressed. The immediate steps that can be taken to decrease the rate of VAP will be presented. Oral assessment guidelines, protocols, and products will all be described. The CDC and AACN guidelines for oral decontamination will be provided.

Conclusion: It is important to promote oral care on ventilated patients as a life saving measure. The interdisciplinary approach to oral care is one that warrants further investigation. Having a Registered Dental Hygienist assisting in the team approach holds multiple benefits for ventilated patients. It also holds promise as a cost saving measure for the health care industry.

Do Unto Others… Conflicts in End of Life Decision-making by Relatives of Chronic Ventilated Patients

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Objectives: Ethnic, social and religious restraints may influence end of life decisions in ventilator dependant patients. This study aims to evaluate attitudes of first degree relatives of chronically ventilated patients in Israel towards end-of-life decisions regarding their loved ones, themselves, and unrelated others.

Methods: The study was conducted in a chronic ventilation unit in Jerusalem. First degree relatives of chronically ventilated patients were interviewed about possible treatment escalation for patients with end stage diseases. Distinctions were made between attitudes in the case of their hospitalized relatives, themselves and unrelated others; between conscious and unconscious patients; and between a variety of interventions. Interviewee demographics and patient profiles, medical data and cognitive function were collected.

Results: Thirty one family members of 25 patients were interviewed. 57% were offspring, 23% partners, 10% parents, and 10% siblings. Patients' median age was 78 years (range 32-90), median length of ventilation at the time of the interview was 13.4 months (range 2.9-99). Major diagnoses: degenerative neurological disease or CVA 40%, anoxic brain damage 24% and end stage pulmonary or cardiac disease 36%. 36% of patients were in persistent vegetative state, 36% had cognitive impairment and only 28% were fully conscious. Most interviewees wanted further interventions for their ventilated relatives, yet for themselves, only 21% and 18% wanted chronic ventilation and resuscitation respectively and 48% would want to be disconnected from the ventilator. Interventions were more likely to be endorsed for others (versus self), for the conscious self (versus unconscious self) and for artificial feeding (more than chronic ventilation and resuscitation). Interviewees were reluctant to disconnect patients from a ventilator.

Conclusions: Family members often want escalation of treatment for their ventilated relatives, however most would NOT wish to be chronically ventilated or resuscitated under similar circumstances. Advance directives may reconcile people's wishes for treatment strategies at the end of their own lives with their reticence to make decisions regarding others.

Nutritional Status and Outcome of Ventilator Dependent Elderly Patients

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Objective: To study the nutritional status in ventilator dependent elderly patients and to investigate the predictive value of these nutritional parameters at admission for weaning and outcome.

Design: Retrospective record review.

Setting: Regional weaning center (RWC) at a free standing 300 bed geriatric rehabilitation hospital.

Patients: Six hundred seventy consecutive ventilator dependent elderly patients admitted for weaning over a 6-year period. Demographics, functional and nutritional status, ventilatory parameters and body composition obtained by bioimpedence were collected.

Measurement and results: Patients age was 76 (range 18-98) years and 19.4% were undernourished, 31% overweight while 33% were obese.
The prevalence of low BMI and low FFMI was not significantly different in female than in male (10.5% vs. 11.3%). Prevalence of normal BMI and low FFMI was 38.4%. Predictive parameters for successful weaning using the one way ANOVA analysis were as follow: AIDL ($p< 0.006$), BADL ($p< 0.005$), home oxygen therapy ($p<0.02$), MMSE($p< 0.0001$), FIM at admission ($p< 0.006$) and on discharge ($p< 0.0001$) , compliance value ($p< 0.001$), nutritional laboratory parameters (total protein ($p< 0034$), albumin ($p< 0.0001$), transferin ($p< 0.0026$), cholesterol ($p< 0.021$), quantity of calories per day ($p< 0.017$) and per ideal weight ($p< 0.017$), presence of decubitus ulcer ($p<0.0001$), length of ventilation previous to admission ($p< 0.006$), and severity APACHE 2 score at admission ($p< 0.0001$). Decrease in extracellular water content was an excellent predictor for successful weaning ($p<0.005$).

Conclusion: In addition to general status and previous length ventilation, nutritional parameters and variation in ECW appear to be excellent predictors of weaning success in chronically ventilated patients.

Artificially Respirated, Unconscious Infants, Growing with Third of the Calories Recommendation – 3 Case Report

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Introduction: little is known about hospitalized artificially respirated infants, not in pediatric intensive care units (PICU). Since these infants lack any physical activity or stress, it is expected that their energy expenditure will decrease. It is also agreed that clinical monitoring is an inseparable part of the treatment.

Aims: To present the energy expenditure of 3 artificially respirated, unconscious infants, after anoxic brain damage (ABD).

Methods: one-year follow-up. Three infants at the age of fourteen months at admission, after ABD; artificially respirated, gastrostomy fed. 2 were healthy prior to the onset of their condition; one was after TOF repair. All three were status post prolonged cardiac-pulmonary resuscitation in vegetative state. Feeding followed prescriptions given at PICU, and set to about 61% of the amount recommended by the EER equation.

Results: the two healthy infants were admitted with less than 5th percentile weight and the third with over 90th percentile weight. In 5 month all three presented significant weight gain, breaking 3 curves upwards, on the weight-to-age chart. Such dramatic change wasn't present on the height-to-age chart. At this point, skinfolds wounds appeared, requiring a gradual decrease in caloric intake, down to a level of 34% of the children's caloric needs, averaging 27kcal/kg. These needs were examined on a monthly basis.

The drop in caloric intake took approximately 3.3 months. Since the beginning of the process, weight gain slowed and the weights returned to the normal range.

Conclusions: it is possible that in chronic, artificially respirated, unconscious infants, energy expenditure decreases to low levels, even to 33% of the predicted.

How Special is Special Education for Ventilated Children?

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"Shachar" Rehabilitation Education Medical Day Care Center located within the Alyn Hospital in Jerusalem is unique in the opportunities it offers for chronically ventilated children in Israel. Shachar is an educational framework for children aged six months upwards, whose medical needs prevent their integration into any other educational setting. Doctors and nursing staff attend to medical needs, enabling the children to participate in the rehabilitation and educational programs.

Of the 59 children currently enrolled, eight are ventilator dependent and another eleven are ventilated part-time or have tracheostomies without regular mechanical ventilatory support. The children participate in an all-encompassing rehabilitation and education program with the aim of maximizing ability and participation thereby allowing the children to experience as many age-appropriate activities as possible. In addition to the usual para-medical therapies, they enjoy a variety of other activities including hydrotherapy, yoga, gardening, bicycle riding and group outings. These will be presented as a reflection of our credo that every child has the right to discover and to fulfill his developmental potential and to maximize his abilities to function within society – regardless of religion, race, gender or medical condition.

Views and Conflicts Expressed by First-degree Relatives of Chronically Ventilated Patients

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Background: In Israel, religious, social and legal constraints influence end-of life decision-making. It is illegal to discontinue continuous life support such as mechanical ventilation, and, as a consequence, some patients are ventilated for prolonged periods of time. Families of these patients are under enormous strain both physically and emotionally due to the burden of supporting their ventilated relatives and the decision making processes required.
Methods: The study was conducted in a chronic ventilation unit in Jerusalem. First- degree relatives of chronically-ventilated patients were interviewed using a questionnaire. They were asked about their views on prolongation of their relatives' lives, the sacrifices that they made and any possible discrepancies between their relatives' presumed wishes and the decisions made.
Results: Thirty-one family members of 25 patients were interviewed. Median length of ventilation at the time of the interview was 13.4 months. Major diagnoses: degenerative neurological disease or CVA 40%, anoxic brain damage 24% and end- stage pulmonary or cardiac disease 36%. Of the patients 36% were in a persistent vegetative state, 36% had various degrees of cognitive impairment and 28% were fully conscious. Major themes included willingness for sacrifices such as quitting the workplace, regular and prolonged visits and other burdens. Example: "although my husband is the principle decision maker, I have taken over the responsibility of looking after my son". Conflicts between wishes to prolong their relatives' lives despite the fact that they may not have wished to be in such a situation: "he would commit suicide if he would require a nappy", " my brain says to let go but my heart cannot, I need her to put her hand on my face…", difficulties in decision-making for others: "it's not in our hands to decide, it's in the hands of God" and discrepancies between their wishes for their relatives and for themselves: "I want everything to be done for my relative but nothing for myself, because others will not do for us what we do for them".
Conclusion: Family members are often willing to make major sacrifices for their ventilated relatives and mostly want to prolong their lives, despite their presumed wishes. Interviewees often wish less to be done for themselves, but find it hard to make decisions for others.

Training Nurses to Wean Patients of Prolonged Mechanical Ventilation

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Background
In the last few years, in Israel, there has been a continuous grouth in the number of patients who needed prolonged mechanical ventilation (P.M.V.), at a time that in Reuth Medical Center, there was a continuous decrease in the number of patients weaned from mechanical ventilation in the P.M.V. units.This decrease was due to medical and other reasons. The Israeli ministry of health developed proffesional standards to treat those patients, and also allowed nurses to adjust ventilators, in order to help weaning patients from P.M.V. This policy enables nurses to be actively involved in weaning programs.

Purpose
To increase the percentage of patients weaned from mechanical ventilation in a long-term care facility, by involving well trained nurses. This might lead to the improvement of quality of care and increase the retention of nurses in the P.M.V. units.

Method
A focus group of senior nurses was built. This group wrote a guideline and a procedure for withdrawal from mechanical ventilation and choose a training program for the nurses working in the P.M.V. units.
The written program was planed, approved and fully implemented. A group of 17 senior nurses were taught and trained to work by a written guideline, during a course ran by I.C.U. physicians and nurses and based on proffesional literature.

Results
The nurses successfully finished the theoretical training and started the practical one, in January 2008.
The first patients started their weaning program by the same time.

Conclusion
In such a short period of time, we can point out that, comparing to the same period last year, more patients were weaned from mechanical ventilation.
We expect an increase in the percentage of patients weaned from mechanical ventilation, by the nurses, by may 2008.