ANALYSIS OF EMERGENCY HELPLINE SUPPORT FOR HOME VENTILATOR DEPENDENT PATIENTS: RISK MANAGEMENT AND WORKLOAD

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WINNING ABSTRACT: From a total of 1211 adult & paediatric patients receiving home ventilation (HV) supervised by Royal Brompton Hospital between 1/1/06 and 30/6/06 the respiratory support team received an average of 528 daytime calls/month and 14/month out of hours calls to a telephone helpline.

Diagnoses included: neuromuscular disease, chest wall disease, COPD, obesity hypoventilation and non-COPD lung disease. 99% received non-invasive ventilation, 1% tracheostomy ventilation. 149 required 2 ventilators for near 24 hour ventilator dependency, the remainder were classified as 1 (17%) 2 (33%) & 3 (50%) night dependency as were able to breathe spontaneously for this period. 50% used bilevel positive pressure ventilators, 48% inspiratory pressure ventilators and 2% volume ventilators. In 188 calls a home visit was carried out because of ventilator or associated equipment-related problems. Despite regular equipment servicing programme, in 188 patients there was a technical problem with the equipment which was solved in the patient’s home in 64% or required replacement / parts in 22%. Of the 25 calls in which no fault was found, 13 patients were unwell at home or required hospital admission, 2 patients died within 1 month of identification of no fault. No patient was admitted as a result of technical failure of equipment.

Conclusion: There is a significant workload associated with supporting HV patients. Patients / carers all received standard competency training before discharge but other calls may be reduced by a more flexible problem-solving approach. Importantly, reports in which no technical fault is found may indicate deteriorating health in the patient and require close follow-up.

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MY JOB AND THE UNIT IN WHICH I WORK
I work as a Clinical Specialist Physiotherapist at the Clinical and Academic Dept of Sleep and Breathing at the Royal Brompton Hospital, London, UK. The Clinical and Academic Dept of Sleep and Breathing at the Brompton Hospital has provided a national service for the assessment of sleep and ventilation for >10 yrs under the leadership of Dr Anita Simonds.

STATEMENT OF INTEREST: M. Chatwin received an ERS travel grant in 2006 and received a reimbursement at the 2007 ERS Congress. Breas Medical (Sweden) contributes funds to pay 95% of M. Chatwin’s salary.
Patients with spinal muscular atrophy may be more prone to respiratory tract infection before the development of nocturnal hypoventilation. I have evaluated respiratory muscle strength in a group of spinal muscular atrophy patients and compared it with age-matched patients with Duchenne muscular dystrophy and healthy controls [2]. Spinal muscular atrophy patients had weaker expiratory muscles and often the muscle strength was below the threshold for an effective cough, while inspiratory muscle strength was above the threshold associated with nocturnal hypercapnia.

Mechanical insufflation/exsufflation is a technique that has been claimed to improve cough strength in neuromuscular patients; however, there are no published data prospectively evaluating this device. I have investigated the effect of mechanical insufflation/exsufflation plus other cough augmentation techniques on peak cough flow [3]. The results of this study established that mechanical insufflation/exsufflation had the greatest effect on peak cough flow: I assessed the usefulness of mechanical insufflation/exsufflation when compared with conventional physiotherapy in these NMD patients during an acute respiratory tract infection. It was found that mechanical insufflation/exsufflation decreased the amount of treatment time required to clear secretions compared with conventional treatment [4].

NIV has been shown to improve prognosis and quality of life in NMD patients [5]. I have evaluated the initiation of NIV provision both as an outpatient and as an inpatient. The results of this study suggest that initiation of NIV does not have to be carried out exclusively in the hospital environment, as comparable results are seen with in-patient and outpatient initiation of NIV [6]. A key area after the initiation of NIV is discharge information, risk management and workload. By evaluating the telephone calls to our service and ventilator failure reported to our service, it was found that there is a significant workload associated with the continued care and risk management of home-ventilation patients. Ventilator malfunction was more common in those patients who used their ventilators for >12 h/day. Patients/carers all received standard competency training before discharge, but other calls may be reduced by a more flexible problem-solving approach. Importantly, reports in which no technical fault is found with mechanical ventilation and secretions provide us with the knowledge that prescription of treatment should be titrated to the individual; it is therefore likely to be cheaper and better tolerated than more complex respiratory investigations. To assess this observation in more detail, we are starting a large study, funded by the British Heart Foundation, to establish the most efficient way to diagnose sleep apnoea in heart failure patients.

THE IMPACT OF MY WORK ON CLINICAL OR RESEARCH PRACTICE

In summary, my research has provided novel clinical information on where and how noninvasive ventilation can be initiated, along with the impact on workload and risk management. This has allowed our dept to improve and formalise education and discharge planning for patients requiring noninvasive ventilation. We are able to identify patients who may be at risk of an acute exacerbation if ventilator failure is reported and no fault is found. In children with spinal muscular atrophy, early provision of noninvasive ventilation may provide a tool for airway clearance, and the flexibility to be used as a method of supporting ventilation in more severe respiratory episodes, without increasing the strain of caring for a child with a severe physical disability [8]. Knowing that patients with spinal muscular atrophy have predominant expiratory muscle weakness, and patients with Duchenne muscular dystrophy experience inspiratory and expiratory muscle failure in parallel, provides us with the knowledge that prescription of treatment should be tailored to individual diagnosis. I have also evaluated noninvasive methods of secretion clearance; intrapulmonary percussive ventilation and mechanical insufflation/exsufflation have a role in the mobilisation and expectoration of secretions. Airway clearance techniques should be titrated to the individual depending on the amount of respiratory muscle weakness. Due to financial factors, treatments should start simply and then be modified as each technique becomes less effective, thus improving patient care. If secretions are not mobilised by increasing the individual’s tidal volume, intrapulmonary percussive ventilation can be considered. Mechanical insufflation/exsufflation and intrapulmonary percussive ventilation provide extra methods to assist this patient group when they become vulnerable to sputum retention. This provides neuromuscular disease patients with expert advice in airway clearance management.

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