



NEW PERSPECTIVES IN PULMONOLOGY

Prolonged mechanical ventilation: New facilities and new models of care

Ventilação mecânica prolongada: novas instalações e novos modelos de atendimento

Advances in the management of critically ill patients admitted to intensive (ICU) or respiratory intermediate intensive care units (RIICU) have improved hospital mortality and morbidity. The consequence is a growing population of patients with partial or complete dependence on mechanical ventilation (MV) and other intensive therapies.¹

Who? The increasing ventilator assisted individuals (VAI) and patients needing prolonged weaning have poor outcomes, despite high medical resource consumption.² Available data suggest that the global prevalence of total or partial VAI in Europe ranges from 2 to 30 per 100,000 population according to different countries.³

Prolonged weaning patients have been variously defined. According to the European Respiratory Society Task Force, prolonged weaning patients are those requiring more than 7 days of weaning after the first spontaneous breathing trial.⁴ These patients may represent up to 14% of patients admitted to ICU for intubation and MV accounting for 37% of all ICU costs and are associated with a in-hospital mortality up to 32%.⁵

Where? It has been claimed that present ICUs are expensive, and at the end not aimed to take care of patients undergoing prolonged MV.⁴ The increasing financial burden of care of more and more patients receiving prolonged MV forces the acute care hospitals to transfer patients from the ICU to alternative sites for further weaning attempts and/or long-term treatment, when discharge to home is impossible.⁶ These alternative sites of care are usually geographically separate and have different medical, nursing, and ancillary staff from the acute care hospitals.

There is evidence that VAI may get significant advantages when transferred from the ICU to specialised facilities providing this kind of appropriate care. Compared to ICU these

facilities are relatively quiet, respect day/night cycles, supportive visitors are encouraged, mobility is increased, personal objects are permitted, time and devices increase communication, transition to oral feeding is possible, muscle training is prescribed. Furthermore there is more time and opportunity for counselling, time and space for patient/family palliative care, and finally the main aim is home discharge.⁶

Post-ICU ventilator facilities vary in purpose, organisation and financial structure. A commercial model, called a Long-term Acute Care Facility contrasts to a not for profit model such as a Ventilator Rehabilitation Unit or other dedicated weaning units where the primary goal and direction of resources is toward progression of the patient toward ventilator independence and discharge toward home.⁷

To take care of prolonged weaning patients recently the problem of appropriate ICUs utilisation has been faced by proposing two type of units⁸:

- (1) RIICU⁹ within acute care hospitals usually perform non-invasive ventilation in patients with acute or acute on chronic respiratory failure, with significant reduction in ICU admissions and need of invasive MV.¹⁰ These RIICUs, although less costly than ICUs, usually offer adequate level of assistance and may also provide multi-disciplinary rehabilitation.¹¹ Some of these RIICUs may work also as “step down” units for patients needing prolonged MV serving also as a bridge to home-care programs or long-term care facilities.¹²
- (2) Alternatively prolonged weaning patients may be transferred from acute care hospitals to specialised regional weaning centers, often located within Rehabilitation Hospitals. These dedicated weaning centers relieve pressure on ICU beds at a lower cost, with specialised teams (e.g. nurses, respiratory therapists, nutritionists, psychologists, speech and occupational therapists,

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etc.). Variable mortality and weaning success rate have been reported.^{13–15}

Recently we have proposed a new model of care for tracheostomised prolonged weaning patients consisting of sequential activity of a University Hospital RIICU and a dedicated regional weaning centre. The sequential activity of these units has been shown to have an additive weaning success rate in those patients with substantial cost savings compared with ICU.¹⁶

What? Physiotherapy is an important component of the weaning protocols and of long-term care programs, wherever these patients are admitted.¹⁷ Physiotherapy is probably the only treatment likely to increase in the short- and long-term care of the patients admitted to these units. Recovery of physical and respiratory functions, discontinuation of MV, prevention of immobility complications and improvement in health status are the clinical aims of a physiotherapy program in medical and surgical areas. To manage these patients, integrated programs dealing with both whole-body physical therapy and pulmonary care are needed.¹⁸

Discharge plan for the most seriously chronically ill patients like those requiring prolonged MV is a key issue and require careful identification of candidates.¹⁹

Home care is also a difficult task for informal caregivers. Findings suggest two patterns of depressive symptom response in caregivers of critically ill adults on MV from ICU admission to 2 months after discharge.²⁰

Tele health care in COPD appears to have a possible impact on the quality of life of patients and admissions to the emergency department and the hospital.²¹ Remote ICU coverage is associated with lower ICU mortality and length of stay (LOS), but not with lower in-hospital mortality or hospital LOS.^{22,23} Nevertheless the role of this tool in the care of "chronically critical" patients including those needing prolonged MV remains to be elucidated.²⁴

A randomised trial suggests that in chronic respiratory failure patients on oxygen or home MV, a nurse centred tele-assistance prevents hospitalisations while it is cost-effective. The COPD group seems to have a greater advantage from tele-assistance.²⁵

In a review of their activity Vitacca et al. have shown that Tele-assistance integrated care in patients with Amyotrophic lateral sclerosis (ALS) is a feasible tool to manage up to 25 ALS patients/month/nurse and costs about €105.00 per patient per month. Tele-assistance is proposed at 2/3 of time course of the disease.²⁶

Conclusion

Long-term care of patients needing prolonged MV is an important and complex area of medicine that requires appropriate attention and support from all stakeholders. A well-performed programme will result in a safe and appropriate environment of care for VAls.

European national health services, with wide differences among different countries are now beginning to recognise this problem. Despite the primary goal should be allowing the patients to remain at home with their families, there is the need to provide care for those unable to

receive this home care. Pilot programs to provide cost-saving home-based care vs institutionalised alternatives are underway.

Conflicts of interest

The author has no conflicts of interest to declare.

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