



Revista Portuguesa de Pneumologia

ISSN: 0873-2159

sppneumologia@mail.telepac.pt

Sociedade Portuguesa de Pneumologia  
Portugal

Ambrosino, N.

Prolonged mechanical ventilation: New facilities and new models of care

Revista Portuguesa de Pneumologia, vol. 18, núm. 5, septiembre-octubre, 2012, pp. 211-213

Sociedade Portuguesa de Pneumologia

Lisboa, Portugal

Available in: <http://www.redalyc.org/articulo.oa?id=169724490003>

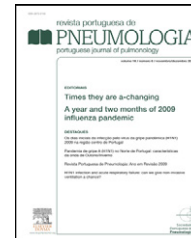
- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative



## 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.<sup>1</sup>

**Who?** The increasing ventilator assisted individuals (VAI) and patients needing prolonged weaning have poor outcomes, despite high medical resource consumption.<sup>2</sup> 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.<sup>3</sup>

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.<sup>4</sup> 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%.<sup>5</sup>

**Where?** It has been claimed that present ICUs are expensive, and at the end not aimed to take care of patients undergoing prolonged MV.<sup>4</sup> 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.<sup>6</sup> 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.<sup>6</sup>

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.<sup>7</sup>

To take care of prolonged weaning patients recently the problem of appropriate ICUs utilisation has been faced by proposing two type of units<sup>8</sup>:

- (1) RIICU<sup>9</sup> 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.<sup>10</sup> These RIICUs, although less costly than ICUs, usually offer adequate level of assistance and may also provide multidisciplinary rehabilitation.<sup>11</sup> 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.<sup>12</sup>
- (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,

DOI of refers to article:

<http://dx.doi.org/10.1016/j.rppneu.2012.04.004>

etc.). Variable mortality and weaning success rate have been reported.<sup>13–15</sup>

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.<sup>16</sup>

**What?** Physiotherapy is an important component of the weaning protocols and of long-term care programs, wherever these patients are admitted.<sup>17</sup> 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.<sup>18</sup>

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

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.<sup>20</sup>

**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.<sup>21</sup> Remote ICU coverage is associated with lower ICU mortality and length of stay (LOS), but not with lower in-hospital mortality or hospital LOS.<sup>22,23</sup> Nevertheless the role of this tool in the care of “chronically critical” patients including those needing prolonged MV remains to be elucidated.<sup>24</sup>

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.<sup>25</sup>

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.<sup>26</sup>

## 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.

## References

1. Epstein SK. Size of the problem, what constitutes prolonged mechanical ventilation, natural history, epidemiology. In: Ambrosino N, Goldstein RS, editors. Ventilatory support in chronic respiratory failure. NY, USA: Informa Publisher; 2008. p. 39–57.
2. Cox CE, Carson SS, Govert A, Chelluri L, Sanders GD. An economic evaluation of prolonged mechanical ventilation. *Crit Care Med*. 2007;35:1918–27.
3. Lloyd-Owen SJ, Donaldson GC, Ambrosino N, Escarabill J, Farre R, Fauroux B, et al. Patterns of home mechanical ventilation use in Europe—results from the EUROVENT survey. *Eur Respir J*. 2005;25:1025–31.
4. Boles JM, Bion J, Connors A, Herridge M, Marsh B, Melot C, et al. Weaning from mechanical ventilation. *Eur Respir J*. 2007;29:1033–56.
5. Funk GC, Anders S, Breyer MK, Burghuber OC, Edelmann G, Heindl W, et al. Incidence and outcome of weaning from mechanical ventilation according to new categories. *Eur Respir J*. 2010;35:88–94.
6. Vianello A, Ambrosino N. Clinical settings for ventilator-assisted individuals – when and why – LTAC-SNF-CAVC. In: Ambrosino N, Goldstein RS, editors. Ventilatory support in chronic respiratory failure. NY, USA: Informa Publisher; 2008. p. 181–8.
7. Mamary AJ, Kondapaneni S, Vance GB, Gaughan JP, Martin UJ, Criner GJ. Survival in patients receiving prolonged ventilation: factors that influence outcome. *Clin Med Insights: Circ Respir Pulm Med*. 2011;5:17–26.
8. Simonds AK. Streamlining weaning: protocols and weaning units. *Thorax*. 2005;60:175–82.
9. Corrado A, Roussos C, Ambrosino N, Confalonieri M, Cuvelier A, Elliott M, et al. Respiratory intermediate care units: a European survey. *Eur Respir J*. 2002;20:1343–50.
10. Ambrosino N, Vaghegini G. Noninvasive positive pressure ventilation in the acute care setting: where are we? *Eur Respir J*. 2008;31:874–86.
11. Thomsen GE, Snow GL, Rodriguez LAS, Hopkins RO. Patients with respiratory failure increase ambulation after transfer to an intensive care unit where early activity is a priority. *Crit Care Med*. 2008;36:1119–24.
12. Scala R, Corrado A, Confalonieri M, Marchese S, Ambrosino N. Increased number and expertise of Italian respiratory high-dependency care units: the second national survey. *Respir Care*. 2011;56:1100–7.
13. Vitacca M, Vianello A, Colombo D, Clini E, Porta R, Bianchi L, et al. Comparison of two methods for weaning patients with chronic obstructive pulmonary disease requiring mechanical ventilation for more than 15 days. *Am J Respir Crit Care Med*. 2001;164:225–30.
14. Lone NI, Walsh TS. Prolonged mechanical ventilation in critically ill patients: epidemiology, outcomes and modelling the potential cost consequences of establishing a regional weaning unit. *Crit Care*. 2011;15:R102.
15. Polverino E, Nava S, Ferrer M, Ceriana P, Clini E, Spada E, et al. Patients’ characterization, hospital course and clinical outcomes in five Italian respiratory intensive care units. *Intensive Care Med*. 2010;36:137–42.

16. Carpenè N, Vaghegini G, Panait E, Gabbrielli L, Ambrosino N. A proposal of a new model for long-term weaning: respiratory intensive care unit and weaning center. *Respir Med.* 2010;104:1505–11.
17. Ambrosino N, Janah N, Vaghegini G. Physiotherapy in critically ill patients. *Rev Port Pneumol.* 2011;17:283–8.
18. Ambrosino N, Venturelli E, Vaghegini G, Clini E. Rehabilitation, weaning and physical therapy strategies in chronic critically ill patients. *Eur Respir J.* 2012;39:487–92.
19. Escarabill J. Discharge planning and home care for endstage COPD patients. *Eur Respir J.* 2009;34:507–12.
20. Choi J, Sherwood PR, Schulz R, Ren D, Donahoe MP, Given B, et al. Patterns of depressive symptoms in caregivers of mechanically ventilated critically ill adults from intensive care unit admission to 2 months postintensive care unit discharge: a pilot study. *Crit Care Med.* 2012;40:1546–53.
21. McLean S, Nurmatov U, Liu JL, Pagliari C, Car J, Sheikh A. Telehealthcare for chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2011;6:CD007718.
22. Young LB, Chan PS, Lu X, Nallamothu BK, Sasson C, Cram PM. Impact of telemedicine intensive care unit coverage on patient outcomes. A systematic review and meta-analysis. *Arch Intern Med.* 2011;171:498–506.
23. Willmitch B, Golembeski S, Kim SS, Nelson LD, Gidel L. Clinical outcomes after telemedicine intensive care unit implementation. *Crit Care Med.* 2012;40:450–4.
24. Sarwat IC, Mattera JA, Curtis JP, Spertus JA, Herrin J, Lin Z, et al. Telemonitoring in patients with heart failure. *N Engl J Med.* 2010;363:2301–9.
25. Vitacca M, Bianchi L, Guerra A, Fracchia C, Spanevello A, Balbi B, et al. Tele-assistance in chronic respiratory failure patients: a randomised clinical trial. *Eur Respir J.* 2009;33:411–8.
26. Vitacca M, Comini L, Assoni G, Fiorenza D, Gilè S, Bernocchi P, et al. Tele-assistance in patients with amyotrophic lateral sclerosis: long term activity and costs. *Disabil Rehabil Assist Technol.* 2012. Feb 7 [Epub ahead of print].

N. Ambrosino<sup>a,b</sup>

<sup>a</sup> *Weaning and Rehabilitation Unit, Auxilium Vitae Rehabilitation Centre, Volterra, Italy*

<sup>b</sup> *Cardio-Thoraco-Vascular Department, Pulmonary Division, University Hospital, Pisa, Italy*  
E-mail address: [nico.ambrosino@gmail.it](mailto:nico.ambrosino@gmail.it)