



SPECIAL ARTICLE

Multidisciplinary rehabilitation in ventilator-dependent patients: Call for action in specialized inpatient facilities



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Abstract The numbers of patients needing prolonged mechanical ventilation are growing. The rehabilitation programs to be implemented in specialized inpatient facilities are ill defined. There is a clear need to establish guidelines to define the optimal rehabilitation program in this setting. In this article we review the current evidence and propose some guidance.

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Introduction

According to the NAMDRC consensus conference, prolonged mechanical ventilation (PMV) defines patients who require at least 6 h of mechanical ventilation for >21 consecutive days.¹ Recent estimates indicate that in the US the numbers of PMV are expected to double by the year 2020, reaching more than 600,000 patients.²

The reasons for this are heterogeneous: a greater capacity of ICUs to assist severe respiratory failure; modulate systemic inflammatory response syndrome and severe sepsis in patients with a high prevalence of secondary neuromuscular dysfunction and severe physical deconditioning, all these at increasingly advanced ages. Another large group

of patients is represented by those suffering from severe injuries to the central nervous system or incurable and progressive neuromuscular diseases.

Currently we only have partial information about the functional outcomes and quality of life of these patients, who are now described as chronic critically ill patients.³ Their life trajectories, during their stay at long-term acute care hospitals, or LTACs or after a successful ventilatory weaning, are yet to be described. Many will have severe, permanent cognitive and physical impairments and serious limitations due to their disability, which will obviously involve high psychosocial costs.⁴

Treating these patients in specific venues with strong rehabilitative focus is normally recommended, with the cost savings and higher ventilator weaning rates.⁵

PMV patients (also referred to as Chronically Critically Ill patients) are very demanding due to multiple systems

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and organs dysfunctions. Beyond prolonged dependence on mechanical ventilation, muscle, neuro-endocrine, skin and brain dysfunctions give way to a distinct and complex syndrome.³

Although liberation from the ventilator will be one of the most important interventions in this setting, there is more than one type of weaning.

Psychological factors

Psychological factors (like depression or delirium) may hinder ventilator weaning.⁶ Sleep deprivation or unrecognized sleep disorders may also interfere with weaning.⁷ So measures to improve sleep and psychological disorders can impact other outcomes.⁸ In fact educational interventions, counseling and stress management can decrease the risk of developing psychological disorders. Moreover, effective pharmacological treatment of anxiety and depression is also mandatory.

Swallowing dysfunction

Oropharyngeal dysphagia (OPD) has been described in patients with PVM for three decades, and yet, has not received much attention in research addressing different subgroups of this diverse population.^{9,10} Swallowing dysfunction is a common complication in chronic critically ill patients, which affects nearly half of the non-neurologic patients requiring percutaneous dilatational tracheostomy and almost all of those with neurologic involvement; it is well known to deteriorate outcomes, and delay the weaning and tracheostomy decannulation process.¹¹ A number of possible specific swallowing dysfunctional conditions arise in PMV patients; to mention a few, sarcopenic dysphagia, presbyphagia, neuromuscular dysfunction related dysphagia and even with some structural swallowing disorders.¹² Overall evaluation measures and treatment are based on experiments with different methodologies^{13,14} but not on controlled studies which consider the unique pathophysiology of chronic critically ill patients.¹⁵ It is worth mentioning the potential role of fiberoptic endoscopic evaluation of swallowing (FEES) as an objective tool to precisely classify and guide therapeutic interventions after prolonged intubation and in tracheostomy patients. In fact, FEES with sensory testing is improving the rehabilitation designs and protocols.¹⁶

The main components of a dysphagia rehabilitation program include oral health care, swallowing rehabilitative techniques, and food consistency modification. To the best of our knowledge there are no detailed studies or any evidence about the most effective strategies to improve the swallowing process in different non-invasive and invasive PMV scenarios. This role which has been suggested for FEES as an objective tool to precisely classify and guide therapeutic interventions after prolonged intubation and in tracheostomy patients should be considered.¹⁷

Skin integrity

Skin integrity is an independent determinant of survival in patients requiring prolonged mechanical ventilation and is

a potentially modifiable factor.¹⁸ The most important risk factors for development of pressure ulcers while in ICU are total score on Braden Scale, mobility, activity, sensory perception, moisture, friction/shear, nutrition, age, blood pressure, length of stay, APACHE II, vasopressor administration, and co-morbid conditions.¹⁹ Where it is chronic, central neurological involvement and small fiber pathology (which explains chronic sensory impairment and pain in neuro-critical care survivors) are the main features.²⁰

Whole body rehabilitation (Fig. 1)

Increasing evidence supports early physiotherapy for the critically ill patient^{21,22}.

RCT in ICU settings have already shown that early physical and occupational rehabilitation of mechanically ventilated patients translates into better weaning outcomes.²³

In weaning facilities the studies evaluating the impact of rehabilitation in prolonged mechanical ventilated patients



Figure 1 A ventilator-dependent tracheostomized patient walking with assistance from the staff.

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