Finding the Value of the Specialized Weaning Center

The number of patients requiring prolonged mechanical ventilation (PMV) is growing and will likely continue to grow significantly into the near future.[1] PMV has no universally agreed upon definition, but it is most frequently described as the need for mechanical ventilation for > 14–21 d.[2,3] Whereas patients requiring PMV represent only about 5% ICU admissions, they account for a disproportionate number of total ICU days.[3] Consequently, they incur high health care costs, put a significant strain on ICU staffing, and have a high mortality, with > 50% not surviving 1 year from ICU discharge.[2,4] Understanding outcomes and best care models for patients who require PMV is critically important.

Specialized weaning centers (SWCs) have been developed with the goal of optimizing care in a multidisciplinary manner to improve overall outcomes in patients with chronic critical illness requiring PMV. These centers or units may be known as specialized weaning centers, long-term acute care hospitals, critical illness recovery hospitals, or prolonged ventilation weaning centers depending on the country in which they are located. In general, these centers provide value by achieving at least one of the following outcomes relative to continued care in the ICU: similar clinical outcomes at a lower cost or better clinical outcomes at a similar cost. The COVID-19 pandemic has highlighted another critical value of these centers in increasing ICU capacity by off-loading PMV patients from overcrowded ICUs.[5]

The study in this issue of the Journal[6] is a case control study using health administrative databases of Toronto area residents and included 201 SWC subjects and 201 matched prolonged ICU survivors. The investigators sought to describe the long-term outcomes of survivors from a single SWC in Toronto compared to ICU survivors who required mechanical ventilation and were in the ICU for ≥ 21 d. Criteria for admission to the SWC included medical stability, mechanical ventilation for ≥ 21 d, presence of a tracheostomy tube, and assessment of "weanability" within 90 d of admission. Patients who required hemodialysis, had high spinal cord injuries, or were unable to be involved in directing their care were not admitted to the SWC. Subjects admitted to the SWC were managed using a standard multidisciplinary protocol, and patient data were assessed through up to 11 years of follow-up.[6]

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Through this follow-up period, the investigators found that SWC survivors had a lower risk of death at 1 year, but a higher health care utilization and total cost. Notably, hospital length of stay was much longer in SWC group (134 d) than ICU alone group (41 d). When adjusted for length of hospital admission and care location transfers, there were actually no differences in cost between groups at 6 and 12 months. As one might expect, increased duration of hospitalization and number of care transfers were associated with lower likelihood of discharge to home for all subjects.

Drawing firm conclusions from this study is difficult for several reasons. Chief among these is the challenge in accurately matching patients between groups given the retrospective design and limitations of data available in the health administrative databases. Other potential confounders must also be discussed. First, the SWC subjects had to have been on the ventilator for ≥ 21 d and tracheostomized, but the control group only had to have been in the ICU for ≥ 21 d and requiring mechanical ventilation but not necessarily for the entire 21-d period. It is also concerning that subjects were not matched for principle diagnosis, an important driver of PMV outcomes. Second, the decision to transfer a subject to the SWC was at the discretion of the ICU clinical team, so any inherent biases based on perception of likely benefits from the SWC or continuing ICU care were not captured. Third, when the SWC subjects were weaned or reached 90 d in the SWC, they were always transferred back to the referring hospitals. Time 0 for the post-discharge health care utilization analyses in this study was defined as the day of ICU or SWC discharge. Any subject who deteriorated during their time at the SWC or remained on the ventilator would be transferred back to the ICU, thus starting the time frame for post-discharge cost of care. However, if they had remained in the ICU the whole time, this additional cost would not be captured.[6]

It is tempting to suggest that future clinical trials should focus on enrolling patients when they meet specified

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criteria and randomize them to receive care in an SWC versus continued care in the ICU. This type of study design would allow for more accurate comparisons of meaningful clinical outcomes and cost. However, our overarching goal is to better understand how to manage patients who have survived acute critical illness with respiratory failure as they transition to chronic critical illness and PMV. The answer to this question is less related to the location of care but rather the model of care. Whether a patient is weaned from a ventilator and rehabilitated in an ICU or an SWC is less relevant than the approach that is taken. Centers with the best outcomes in PMV patients actively promote interdisciplinary communication and coordination, promote a culture of quality improvement, utilize lower nurse-to-patient ratios with ready availability of psychologists and spiritual care providers, and have specific yet flexible respiratory therapy-driven weaning protocols.[7]

The nursing, respiratory, rehabilitation, and physician team approach and needs differ significantly from the initial severe acute critical illness phase to the chronic critical illness phase. Staffing models must be adjusted to control cost and appropriately support the patients' needs. Management approaches must be adjusted to best achieve liberation from mechanical ventilation and optimal physical recovery. Fortunately, clinical trials have begun to focus more on this phase of care. Specific weaning protocols that get away from more protracted weaning processes demonstrate shorter time to liberation from mechanical ventilation.[4] Similarly, basing the decision to decannulate a patient's tracheostomy tube on suctioning frequency rather than a more standard 24-h capping trial reduced time to decannulation, duration of hospital stay, and incidence of pneumonia and tracheobronchitis.[8]

How best care models are implemented and how they translate to health care costs will be dependent on a number of factors that may not be uniform across different regions or countries, where the structure of the system and payers may be vastly different. What we can hope to achieve is the best model of care possible implemented in the most efficient way within a given system.

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