Management of Ventilator Dependent Patients: Improving Setting and Processes of Care

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Background: In 1997, leadership at Loyola University Medical Center identified substantial variation in the care of medically complex, ventilator-dependent patients across multiple, adult intensive care units. Internal data demonstrated use of at least 10 different approaches to the weaning of patients from a ventilator, despite published evidence demonstrating two best practices. Comparative data from the University HealthSystem Consortium indicated a potential cost saving of $2.7 million from care redesign.

Purpose of the Study: The goal of this study was to improve the quality and costs of care for ventilator dependent patients in adult ICUs. The initial project objective was to achieve a 20% reduction in the average number of days spent on a ventilator prior to transfer, for those patients requiring long-term care. The second phase objective was to reduce hours spent weaning from the ventilator at LUMC by 50%.

Methods: Clinical and administrative leadership chartered an improvement project supported by the Center for Clinical Effectiveness. A physician-led multidisciplinary team, including the medical directors of three ICUs, was convened. The team identified potential reasons for the high variability and costs of care for patients on long-term mechanical ventilation:

- Lack of understanding of resources available to expedite discharge to long term care
- Lack of communication among units caring for ventilator dependant patients
- Inconsistent awareness and use of current evidence regarding ventilator management
- Lack of materials to help standardize care

The team elected to first address the problem of timely transfer. A protocol was developed and a team composed of a nurse case manager, respiratory therapist and physician-intensivist

regularly visited all patients on a ventilator more than 4 days. This team assisted the primary service with details of patient transfer to Loyola's long-term ventilator facility.

Following excellent success in phase one, an evidence-based protocol, driven primarily by respiratory therapists and nurses, was developed to standardize ventilator- weaning practices (Figure 1). An intensive educational process was undertaken prior to implementation.

Results:

Phase 1: The number of days on a ventilator decreased 35%, from a mean of 21 to 13.6 days after protocol implementation. During the subsequent 18 months, the care of 250 patients was impacted, saving 1,875 ICU bed-days and $1.5 million in direct variable costs (Figure 2).

Phase 2: The average time patient spent weaning from a ventilator decreased 30%, from 43 to 30 hrs following protocol implementation (Figure 3).

Conclusions and Implications: This project resulted in major improvements in quality and resource utilization. Key lessons include:

- Senior leadership involvement is key for project credibility and to create urgency for change.
- Data demonstrating unacceptable variation in care helps to create a willingness to change among physicians
- Beginning with a change that helped physicians (moving patients to long-term care) and that did not encroach upon their "professional autonomy" was helpful.
- Sharing initial success helped garner physician acceptance for phase 2, the ventilator weaning protocol
- Diverse clinical expertise, i.e. nurse case-manager and respiratory therapy, was vital to project success.

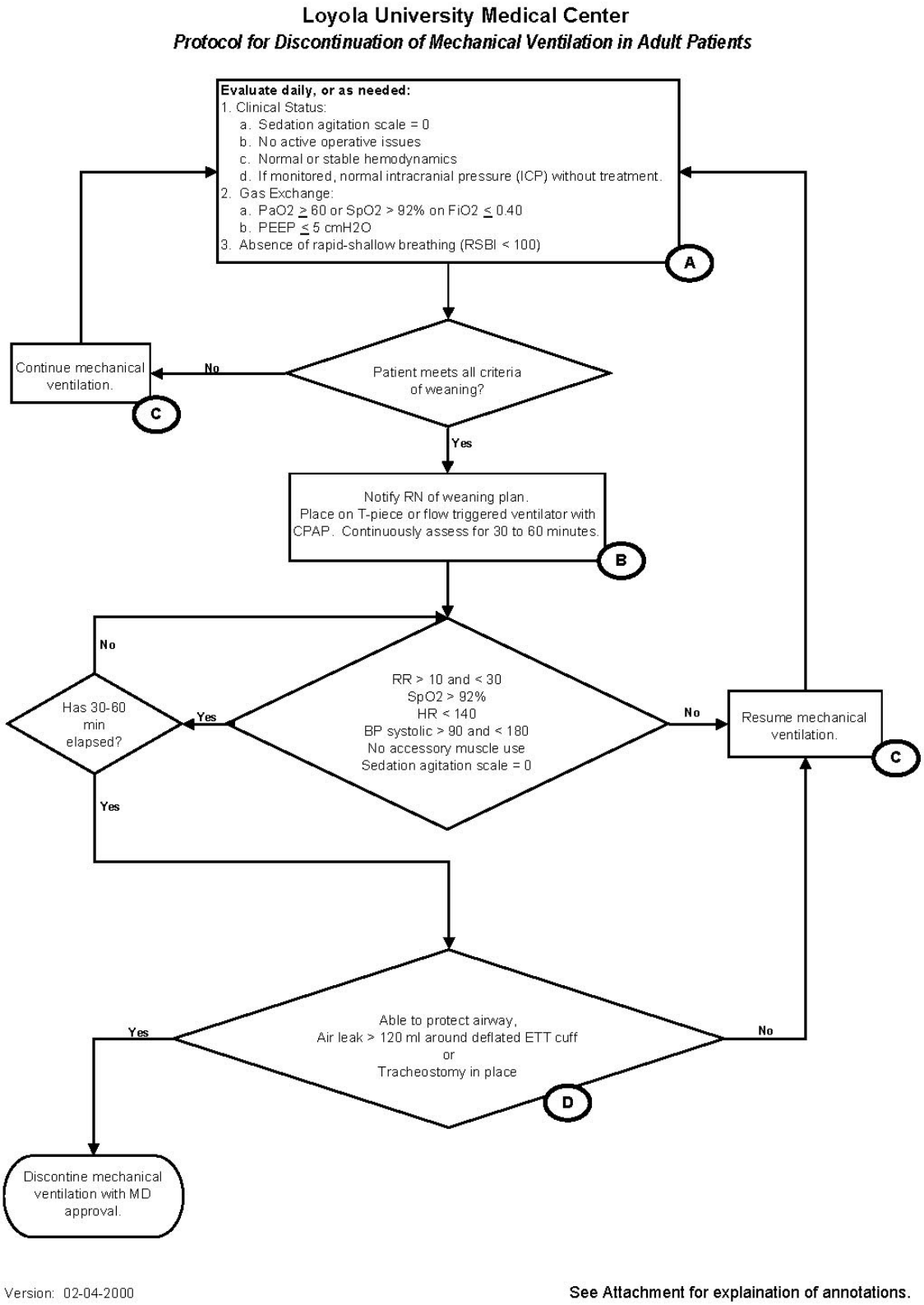

Figure 1. Respiratory therapist driven protocol to wean patients from mechanical ventilation.

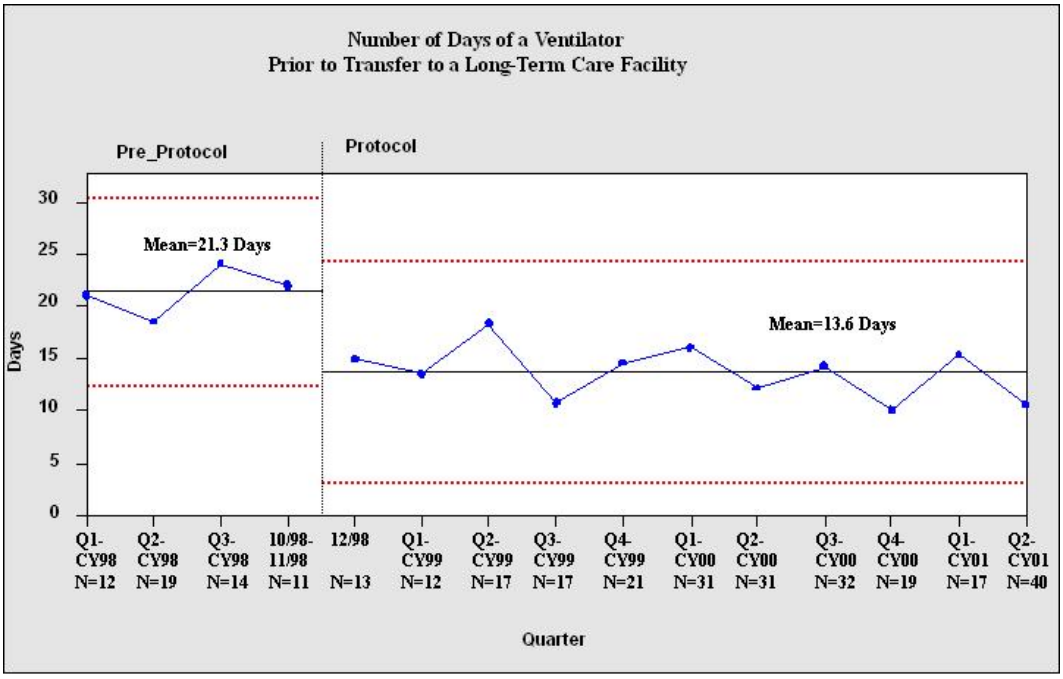

Figure 2. Impact of a protocol and transfer team on the number of days on a ventilator prior to transfer to Loyola's long-term care facility

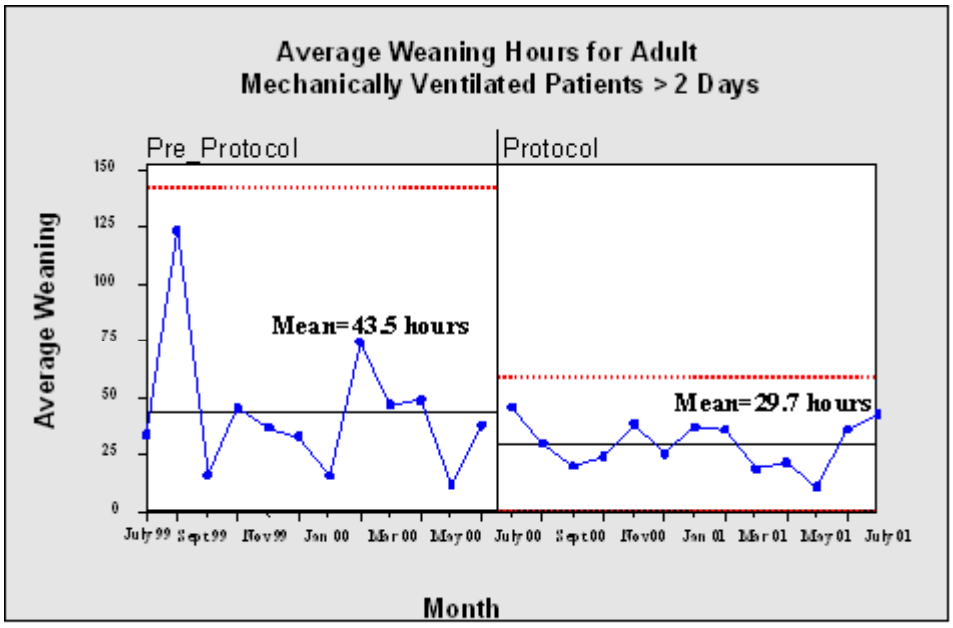

Figure 3. Impact of a respiratory therapist driven protocol to wean patients from mechanical ventilation.