Reducing Days of Mechanical Ventilation in the Adult Surgical ICU with Spontaneous Breathing Trials

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What is the problem or challenge you identified?
The Michigan Trauma Quality Improvement Program (MTQIP) mechanical ventilation utilization data for 2012 identified that Hurley Medical Center, Flint, MI was underperforming when compared to other trauma centers, with only one of the 25 other centers in the region having a worse performance for days spent on the ventilator. Our participation in the regional collaborative quality initiative (CQI) in Michigan as a level I American College of Surgeons (ACS) verified Trauma center identified that our institution was an outlier for ventilator days when compared to other trauma centers in our state. A variety of mechanical ventilation strategies were in use to facilitate separation or liberation of the patient from mechanical ventilation. However, considerable variations in weaning practices can adversely increase ventilator weaning affecting rates of ventilator-associated pneumonia (VAP). Each day the patient receives mechanical ventilation, the crude rate of VAP increases by 1% and the rate of death increases two fold. We hypothesized that variability in weaning practices amongst the surgical critical care staff prolongs the weaning process and leads to an increase in ventilator days while impacting the rate of ventilator-associated pneumonia in our surgical ICU.

Describe the intervention you developed/change you implemented to address the problem:
A weaning protocol was established utilizing daily spontaneous breathing trials (SBTs) and daily spontaneous awakenings to decrease the variability in weaning practices in our ICU. The Richmond Agitation-Sedation Scale (RASS) was used to guide our sedation in our adult ICU aiding our daily assessment to identify patients that could undergo SBTs and spontaneous awakenings, respectively. We conducted a 24 month retrospective review from 2013-2015 of all trauma patients admitted to our adult ICU.

How did you measure the effects of the change?
Data was submitted to the MTQIP for analytical evaluation to gauge improvement in mechanical ventilator utilization for the studied time period. We observed that during the 24 month period of 2013-2015 that ventilator days were decreased by 2.89 days per patient. As a consequence of the reduction in ventilator days, there was a 1% decrease in the VAP rate. The improvement in ventilator days moved our hospital from being a far outlier to rapidly approaching the median for trauma hospitals reporting data to the MTQIP collaborative in our region.

How did you sustain the change?
Implementation of our SBTs and spontaneous awakening protocol has become the mantra of the critical care service. Unless otherwise ordered, all ventilator patients under the critical care service receive the SBT protocol. Further, all clinical guidelines associated with VAP management, sedation (RASS) and sepsis management are collocated with our SBT weaning protocol assuring increased accountability among the critical care nurses, physician assistants, clinical pharmacists and physicians assessing ventilated patients. The performance improvement surrounding ventilator utilization by our participation in the MTQIP collaborative has generated other mechanical ventilator protocols that allow drilling down on measured variables that we can track continuously. We plan to maintain compliance and sustainability by assuring that our weaning protocol is revised appropriately every two years and continuously updated and uploaded to the Hurley Medical Center Resource Home Page.
References

