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Abstract:
Purpose: To investigate long-term effects of staff training and electronic clinical decision support (CDS) on adherence to lung-protective ventilation recommendations.
Materials and Methods: In 2012, group instructions and workshops at two surgical intensive care units (ICUs) started, focusing on standardized protocols for mechanical ventilation and volutrauma prevention. Subsequently implemented CDS functions continuously monitor ventilation parameters, and from 2015 triggered graphical notifications when tidal volume (V_T) violated individual thresholds. To estimate the effects of these educational and technical interventions, we retrospectively analyzed nine years of V_T records from routine care. As outcome measures, we calculated relative frequencies of settings that conform to recommendations, case-specific mean excess V_T, and total ICU survival.
Results: Assessing 571,478 V_T records from 10,241 ICU cases indicated that adherence during pressure-controlled ventilation improved significantly after both interventions; the share of conforming V_T records increased from 61.6% to 83.0% and then 86.0%. Despite increasing case severity, ICU survival remained nearly constant over time.
Conclusions: Staff training effectively improves adherence to lung-protective ventilation strategies. The observed CDS effect seemed less pronounced, although it can easily be adapted to new recommendations. Both interventions, which futures studies could deploy in combination, promise to improve the precision of mechanical ventilation.

Keywords:
clinical decision support, tidal volume, lung protective ventilation, ARDS, Arden Syntax

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