

This month we publish the proceeding of the 54<sup>th</sup> RESPIRATORY CARE Journal Conference, Respiratory Care Controversies III. Thanks to Richard D Branson and William E Hurford for chairing this conference. And thanks to the faculty, who were responsible for the success of the conference.

Klompas and Berra address the role of ventilator-associated events (VAEs) as a quality indicator. Strategies to prevent VAEs are aligned with accepted best practices in critical care. VAE surveillance has the potential to catalyze better care. However, the complete VAE definition is neither sensitive nor specific for ventilator-associated pneumonia (VAP), is non-physiological compared to other ICU metrics, susceptible to gaming, and may bring about changes in clinician behavior that could paradoxically harm patients.

Aerosolized antibiotics, when added to intravenous antibiotics, have pharmacologic benefits. Aerosolized antibiotics reach infected lung parenchyma without crossing the alveolar capillary barrier and thus may increase antibacterial efficacy and decrease systemic toxicity. However, studies to date have not clearly shown improvements in time to extubation, mortality, or other patient-centered outcomes. Zhang, Berra, and Klompas summarize the characteristics of aerosolized antibiotics, review the advantages and disadvantages of using aerosolized antibiotics, and call for future clinical investigations.

Holets and Marini address automated weaning versus use of spontaneous breathing trials. Automated weaning is theoretically superior because of its ability to rapidly recognize deviations from desired behavior and enforce compliance with a standardized strategy unencumbered by external influences. Whether currently available methods for automated weaning fulfill that potential depends on patient type, care environment, and cause of ventilator dependence.

Mireles-Cabodevila and Kacmarek debate whether airway pressure release ventilation (APRV) should be the primary mode in ARDS. APRV has been shown to promote alveolar stability and it allows unrestricted spontaneous ventilation. Outcomes depend on precise settings, where small variations can lead to undesired outcomes such as derecruitment or large tidal volumes. Evidence is lacking that APRV improves relevant clinical outcomes in patients with ARDS. The authors conclude that, unless definitive data are forthcoming demonstrating outcome benefits for APRV, there is no reason to consider this approach to ventilator support.

High tidal volumes are associated with ventilator-induced lung injury in ARDS. Davies, Senussi, and Mireles-Cabodevila address the question of whether or not high tidal volumes have this same effect in normal lungs. There is a growing body of evidence supporting the use of lung protective ventilation in all patients. Use of 6 mL/kg does have the potential to induce hypercapnia and effect patient-ventilator synchrony, but these are manageable in the majority of cases.

Two recent multicenter trials of high frequency oscillatory ventilation (HFOV) failed to show benefit in subjects with ARDS. Whether this reflects problems with HFOV per se or reflects poor management strategies by those using HFOV, or both, is unclear. Nguyen, Schmidt, and MacIntyre address whether HFOV should be abandoned in adults. If HFOV is to be considered a viable option, it should be reserved for those failing conventional ventilation and applied by clinicians with experience with this strategy.

While local oxygen toxicity to the lungs is well accepted, recent evidence has called into question the negative consequences of hyperoxemia in other organs. Hyperoxia following cardiac arrest, traumatic brain injury, and stroke worsens outcomes. The role of hyperoxemia in mechanically ventilated patients, in the face of non-toxic inspired oxygen concentrations, is less clear. Kallet and Branson review the evidence for and against the use of conservative oxygen targets in mechanically ventilated patients.

Marini, Josephs, Mechlin and Hurford debate the question, should early prone position be a standard of care in ARDS with refractory hypoxemia? Many recommend widespread adoption of prone positioning as a standard for patients with ARDS who fail to respond to usual therapy. The survival benefit of prone positioning, however, has been most evident in selected patients, and alternatives to prone exist to improve refractory hypoxemia. It is therefore reasonable to argue that prone positioning should not be considered as a care standard, but rather should be restricted to specific care settings and phases of illness.

The use of neuromuscular blocking agents (NMBAs) early in the course of ARDS, with concomitant deep sedation, can increase oxygenation and possibly decrease mortality. The mechanism is unclear, but likely involves factors such as improving patient-ventilator synchrony, decreasing oxygen consumption, and decreasing the systemic inflammatory response. But use of NMBAs and deep sedation is not without consequence. The paper by Grawe, Hurford, and Bennett describes the rationale and evidence for NMBAs in the setting of ARDS.

Holets and Davies address a number of provocative questions related to the transport of mechanically ventilated patients. Should we always use a transport ventilator? What is the risk of using manual ventilation? How are PEEP and  $F_{IO_2}$  altered? Is there an impact of inability to trigger during manual ventilation? Is hyperventilation or hypoventilation a common problem? Does hyperventilation or hypoventilation result in complications? Are portable ventilators worth the cost? Can portable ventilators reproduce ICU ventilator function?

Should intermittent mandatory ventilation be abolished? Issues with work of breathing, ventilator weaning, and lack of clear advantages for this mode has many calling for a moratorium on its use. Spontaneous breathing, however, has a number of positive effects on gas exchange, distribution of ventilation, and hemodynamics. Kacmarek and Branson explore these issues.

Early mobilization decreases the consequences of ICU-acquired weakness. However, it might entail patient risks and staffing needs that might have a negative financial impact. The review by Schmidt, Knecht, and MacIntyre examines whether early mobilization should be routinely performed in mechanically ventilated patients.

The heterogenous nature of lung injury and its unique presentation in individual patients results in an uncoupling between oxygenation and compliance, arguing for titration of PEEP according to mechanics. Ambiguities and technical limitations limit use of advanced techniques such as esophageal manometry and pressure-volume curves. Evidence suggests a relatively narrow range of PEEP is required to manage most cases of ARDS. Kallet suggests that the role of sophisticated monitoring of respiratory mechanics in severe ARDS is open to question.