

In our Editor's Choice paper, Vignaux and colleagues conducted a bench study to investigate whether neonatal ventilators and adult ventilators equipped with neonatal/pediatric modes reliably administer pressure support. No ventilator performed equally well in all tested conditions for all explored parameters. However, neonatal ventilators tended to perform better in the presence of leaks. As Hokenson and Shepherd indicate, these data also suggest an explanation for the fact that assisted ventilation is not always successful in reducing work of breathing and ventilator-patient asynchrony.

The goal of the study by Golshahi et al was to evaluate in vitro aerosol drug delivery using condensational growth techniques during nasal high flow cannula therapy using realistic breathing profiles and incorporating intermittent aerosol delivery techniques. Intermittent aerosol delivery of submicrometer condensational growth aerosols was found efficient in delivering nasally administered drugs in an in vitro airway model. As Ali notes, well-characterized studies such as this are necessary to warrant in vivo studies. Whether or not the use of condensational growth techniques becomes clinical reality is yet to be determined.

Sulemanji et al investigated whether the use of a unidirectional breathing pattern improves breathing efficiency in subjects with severe COPD. Unidirectional breathing (in through the nose and out through the mouth, or vice versa) might create positive end-expiratory pressure, stabilize small airways and increase expiratory flow and exhaled tidal volume in subjects with expiratory flow obstruction. The results of this study suggest that a reduction in anatomic dead space may be the underlying mechanism for the proposed benefits associated with unidirectional breathing in patients with COPD.

The in vitro study by Lin and colleagues compared the efficiency of 3 pneumatic nebulization modes during mechanical ventilation – inspiratory intermittent, continuous, and expiratory intermittent. They found that aerosol drug delivery with a jet nebulizer placed between the ventilator and humidifier was not dependent on nebulization mode during simulated pediatric and adult conventional mechanical ventilation. They suggest that use of expiratory intermittent mode and continuous nebulization should be considered to reduce treatment time.

Reychler and colleagues conducted a randomized crossover comparison of central and peripheral delivery of drug targeting nebulization. Lung and regional deposition of inhaled technetium-99m DTPA was measured by scintigraphy following peripheral and central targeted modalities of administration with the Akita device in 6 healthy subjects. They found that choosing 2 different specific drug targeting nebulization modes did not influence the amount of drug delivered into the lungs in healthy male subjects. Moreover, the modes did not modify the site of deposition in this study.

The paper by Ehrmann et al evaluated tidal volume control and efficiency of synchronization of ventilator integrated jet-nebulization systems. This bench study evaluated aerosol delivery from 4 ventilators. Jet nebulizer systems integrated into the ventilators were reliable in terms of tidal volume control. Gas compression in driving gas tubing to the nebulizer delayed synchronization and reduced nebulization yield if the nebulizer was placed close to the Y piece. Increasing inspiratory time with no end-inspiratory pause reduced the expiratory loss of medication if placement of the nebulizer upstream in the inspiratory limb was not feasible.

Lemiale and colleagues sought to identify risk factors for mechanical ventilation in subjects with malignancies and acute respiratory failure. Hypoxemia, extent of pulmonary

infiltration on chest radiograph, or hemodynamic dysfunction were risk factors for invasive mechanical ventilation. Interestingly, mortality was not different between NIV failure and first-line intubation.

Manthous et al found that, in their hospital, acid blockers and bronchodilators were often continued inappropriately following critical illness. A specific pharmacy technician-driven method of medication reconciliation reduced this by half, but did not eliminate the medication error.

Facial skin breakdown is a recognized complication of NIV. The aim of the study by Yamaguti et al was to determine the frequency of skin breakdown and to identify potential treatment-related risk factors for its development in adults with acute respiratory failure receiving CPAP or NIV. Use of an oronasal mask and use time greater than 26 h were independently associated with the development of skin breakdown.

The aim of the study by Hortal and colleagues was to identify at what time point after a physiotherapy session spirometry should be performed to obtain the best result compared to baseline, and to determine whether there are inter- and intra-individual differences between children and adults with cystic fibrosis. They found that performing spirometry 30 min after a session in adults and immediately in children might be optimal if individual peak time values cannot be used.

Meng and colleagues evaluated the diagnostic and prognostic value of plasma adrenomedullin (ADM) levels on hospital admission in subjects with COPD exacerbation. Their results suggest that plasma ADM might be a useful biomarker to confirm COPD exacerbation. ADM also independently predicted the need of ICU admission, but it was not associated with long-term mortality.

The aim of the study by Crisafulli et al was to assess the early inflammatory response and clinical presentation of subjects with COPD exacerbation mediated by inhaled corticosteroids (ICS). The results of this study demonstrate a lack of ICS influence in the early systemic inflammatory response to and clinical presentation of COPD exacerbation.

Rovina and colleagues conducted a study to describe the clinical characteristics of subjects with documented influenza A (H1N1) 2009 admitted in a chest hospital, the disease outcome and risk factors associated with ICU admission. The outcome of these subjects was influenced by the severity of the disease on admission, the subjects' underlying conditions, and complications during hospitalization.

The study by Chou-Chin aimed to investigate the effects of pulmonary rehabilitation on the sleep quality of subjects with COPD. Pulmonary rehabilitation resulted in significant improvements in sleep quality, with concurrent improvements in quality of life and exercise capacity. This suggests that pulmonary rehabilitation might be an effective non-pharmacologic treatment to improve sleep quality in patients with COPD.

In a second paper related to pulmonary rehabilitation, Marques and Jácome evaluated the impact of pulmonary rehabilitation in subjects with mild COPD. They found that subjects with mild COPD benefit from pulmonary rehabilitation, but more robust study designs and with long-term follow-up are needed to inform guidelines for mild COPD.

The aim of the study by Spooner et al was to investigate changes in end-expiratory lung volume (EELV) at supine and two levels of head of bed elevation. They found that head of bed elevation significantly increases global and regional EELV. They suggest that, unless contraindicated, all mechanically ventilated patients should be positioned with head of bed elevation.