

The Editor's Choice for July is a study of inhaled iloprost in post-operative cardiac transplant subjects. Enomoto and colleagues retrospectively reviewed data from 80 subjects over a 5-year period. They compared subjects who received iloprost to those who received epoprostenol with respect to duration of mechanical ventilation and adverse events. Their results suggest that iloprost was associated with shorter duration of mechanical ventilation without additional safety concerns. These conclusions must be tempered owing to the retrospective nature of the trial and dependence on staff reporting of safety-related events. Kallet's accompanying editorial reviews the potential advantages of iloprost including intermittent delivery, prolonged half-life, and ease of drug delivery following discontinuation of ventilatory support. Inhaled vasodilators can result in important physiologic changes that correct measurable derangements, but we still await evidence for an impact on outcomes.

Mechanical insufflation-exsufflation (MI-E) has become a standard of care in the treatment of neuromuscular disease and its use in mechanically ventilated patients is increasing. In amyotrophic lateral sclerosis (ALS) with bulbar involvement, MI-E can be associated with collapse of the larynx, preventing an effective cough. Lachal and others developed a bench test to simulate upper airway closure during MI-E using a collapsible tube and lung model. In this simplistic model, the collapsible tube resulted in an increase in peak expiratory flow at each of the modeled scenarios. Andersen et al contribute an accompanying editorial reviewing the complexity of the larynx in structure and function. Her group was the first to identify laryngeal collapse in ALS with bulbar involvement and correctly opine that further study in subjects and realistic models are needed.

Li Blassi et al describe the impact of manual and ventilator hyperventilation on secretion movement in an animal model of pneumonia. Using radioactive markers to measure mucociliary clearance, neither method of hyperventilation improved secretion movement. They conclude that these maneuvers may not have any clinical benefit. The accompanying editorial by Tucci and colleagues detail the intricacies involved in mucus movement in the respiratory tract. They highlight the small amount of secretions produced in the Li Blassi study and discuss how patients with larger volumes of secretions likely benefit from these techniques. Mucociliary clearance, secretion mobilization, and the techniques therapists use in airway clearance need rigorous evaluation.

Airway clearance techniques in pediatric patients, including chest physiotherapy, have demonstrated conflicting results. Shutes et al introduce the Airway Clearance and Expansion Index (ACE-I) to help identify those patients likely to benefit from an intervention. Using a score composed of cough, breath sounds, radiographic findings, and secretions they report that therapists and physicians could use the ACE-I score to identify those patients most likely to benefit from secretion clearance. Importantly, this study does not address the utility of airway clearance techniques in this population.

Sherman and others studied the adherence of adults with cystic fibrosis (CF) to their airway clearance regimens over a 12-month time frame. They report that only half of the subjects maintained adherence (self-reported) across the

study duration. Social cognitive variables including self-confidence and perceived concerns were predictors of adherence.

Huprikar et al compared forced vital capacity (FVC) and slow vital capacity (SVC) in defining airway obstruction and the identification of COPD. They found that the use of FVC alone failed to recognize subjects with symptomatic pulmonary disease. They conclude that using FVC and SVC together improves the diagnosis of COPD.

Rebreathing CO<sub>2</sub> during noninvasive ventilation is a concern with low expiratory pressure and larger masks. Signori and colleagues evaluated CO<sub>2</sub> rebreathing using a mannequin and lung model. They report that use of a dual limb circuit reduce CO<sub>2</sub> rebreathing and the presence of a bias flow enhances this impact.

Perretta et al evaluated pediatric respiratory therapists' response during a simulation of an uninubated patient with respiratory distress. They assessed the ability of therapists to initiate bag valve mask ventilation (BVM) and use airway maneuvers with a 1-min time frame. They found that respiratory therapists didn't share a standard mental model for initiating BVM during impending respiratory failure or implementing airway adjuncts. Establishing algorithms and training in these principles were potential solutions.

High-flow nasal cannula therapy success is in part predicated by the delivery of gases heated and humidified to body temperature. Chikata and others evaluated temperature and humidity performance of 3 devices at flows of 60-100 L/min. In this bench study they found that conventional humidifiers could not maintain the desired temperature and humidity at high flows. Combining 2 humidifiers in parallel provided the required conditioning.

Simoni et al evaluated the use of oscillatory PEP and thoracic compression on secretion removal and impedance in subjects with bronchiectasis. This randomized crossover single-blinded study enrolled normal subjects and subjects with bronchiectasis. They concluded that oscillatory PEP was effective in secretion removal and reducing respiratory system resistance, while thoracic compression only improved resistance. Both techniques were well tolerated.

Kaneko and colleagues evaluated cough strength and physical activity in elderly subjects living in senior living facilities. They measured a number of pulmonary function variables and found that FVC and maximum inspiratory pressure were related to cough peak flow. These data could identify patients amenable to muscle training and those at potential risk for pulmonary infection/aspiration.

Pulmonary rehabilitation and strength training have been demonstrated to improve short-term outcomes in COPD. Silva et al describe strength training using resistance training compared with traditional weight training. They found that training with elastic resistance provided similar changes in muscle strength and exercise capacity. They suggest that the ease of use of elastic resistance training may allow simpler adoption into a daily routine.

Miller and colleagues provide a narrative review of clinical competency during airway suctioning in adults. This scoping review evaluated 36 papers from the literature and found that the majority of work includes nursing personnel performing endotracheal suctioning in the ICU.

Smallwood contributes a 2018 Year in Review of pediatric mechanical ventilation, discussing the important papers on this topic.