

This month's Editor's Choice is by Martínez-Alejos and coworkers evaluating the impact of mechanical insufflation-exsufflation (MI-E) on sputum volume removed from mechanically ventilated patients. In a small sample of 26 subjects, they compared sputum volume after expiratory rib cage compression with and without MI-E. The addition of MI-E increased sputum volume and resulted in improved pulmonary compliance. There were no differences in hemodynamic consequences or adverse events. Volpe and Guimarães contribute an accompanying editorial encouraging further study of MI-E in ventilated patients, optimizing expiratory flow bias, and evaluating patient-centered outcome variables.

Kallet and colleagues evaluate outcomes of patients excluded from ARDSNet studies and the application of lung protective ventilation (LPV). Mortality at 90 days was nearly twice as high in the group of patients excluded from ARDSNet trials. In both groups, adherence to LPV was associated with lower mortality. Mireles-Cabodevila and others provide commentary suggesting that caring for patients with ARDS requires that we put out best foot forward and provide LPV at initiation of mechanical ventilation.

Lena et al evaluated asynchrony before and after tracheostomy in a heterogeneous group of subjects requiring prolonged ventilation. Asynchrony was measured using automated analysis for two 24-h periods. After analyzing 920 h of ventilation, there were no differences in the number or type of asynchronies and respiratory mechanics were unchanged. Kriner comments that the asynchrony index in these subjects was < 2% at baseline making any improvement difficult to detect.

Fau et al performed a bench evaluation of heated humidifiers commonly used for noninvasive respiratory support in infants. They created variable failures, including disconnection from gas flow, disconnection of temperature probes, and failure to address repeated alarms, alone and in combination. They determined a risk of burn scale based on the highest gas temperature. These 'misuse' cases demonstrated a severe risk of inducing skin burns with five devices and a moderate risk with one.

Bertelli and coworkers compared deadspace during ARDS and ARDS as a consequence of COVID-19. They evaluated the association between ARDS type and deadspace, respiratory compliance, and organ failures during the first 24 h of mechanical ventilation. Using corrected minute ventilation, they reported higher deadspace in COVID-19 ARDS. However, compliance was similar across a wide range, and PEEP requirements were similar.

Li and coauthors used an international online survey to determine the use of high-flow nasal cannula (HFNC) and adjunctive aerosol therapy. A quarter of respondents delivered aerosol therapy via HFNC, while 40% delivered aerosol therapy via a nebulizer and mouthpiece, and a third discontinued HFNC during aerosol therapy. They concluded that utilization of HFNC was variable and practices associated with concomitant aerosol therapy were not consistent with available evidence for optimal use.

Schlueter and others performed a retrospective analysis of the impact of body mass index (BMI) on initial respiratory support in a multicenter database from pediatric ICUs. In 1,721 subjects, 36% were overweight. There was no difference in initial respiratory support between groups, but overweight subjects were more likely to require intubation after HFNC.

The authors suggest that use of HFNC in patients with elevated BMI may increase the requirement for intubation.

Fujinaga et al used a nationwide database to evaluate the impact of BMI on ventilator dependence. Over a one-year period, 11,801 subjects were included, 388 were ventilator dependent at ICU discharge. They found that the risk for ventilator dependence at ICU discharge increased among underweight subjects even after adjusting for potential confounders and that while obesity was also associated with a higher risk of ventilator dependence, the association was less pronounced. The risk of ICU mortality, hospital mortality, and tracheostomy also increased in underweight subjects.

Ocal and others studied the delivery of salbutamol by a jet nebulizer in the presence of biofilm from *Acinetobacter baumannii* in a bench model. Biofilm in the endotracheal tube had no impact on salbutamol deposition. Placement of the nebulizer between the model and a heat and moisture exchanger also did not impact delivery.

Moore and colleagues performed an in vitro bench study of three nebulizers delivering inhaled tobramycin on the bacterial persistence and antibiotic susceptibility of *Pseudomonas aeruginosa* isolates. They determined peak and trough concentrations of tobramycin. They concluded that less efficient nebulizers did not deliver sufficient drug resulting in suboptimal tobramycin concentrations driving antibiotic resistance, emulating standard on/off cycles. These data suggest use of approved nebulizers for tobramycin delivery is clinically important to achieve desired drug concentrations.

Higashimoto and others evaluated the impact of pulmonary rehabilitation (PR) on erector spinae muscles in subjects with COPD. This retrospective analysis evaluated a control group and a group evaluated after PR. Erector spinae muscle cross sectional area was evaluated using computed tomography. Only PR reduced the yearly decline in erector spinae muscle mass.

Chao et al measured long-term adherence to NIV in a group of 86 subjects, collecting data from the ventilator recordings. Adherence was defined as use > 4 h per day versus non-adherence which was < 4 h per day. The majority of subjects had neuromuscular disease and were treated at home. At one month, adherence was 57% and at 6 months it was 62%, but average daily use in minutes increased. The authors concluded that average daily use may be a better measure of adherence and improve understanding of NIV trials.

Fujita and others evaluated resting breathing wakefulness in COPD subjects as a marker of dyspnea using the modified Medical Research Council (mMRC) score. They evaluated 40 subjects by measuring breathing pattern with respiratory inductance plethysmography and calculated instability using the coefficient of variation (CV) for tidal volume (V_T) and total cycle time. The CV for V_T was greater in subjects with an mMRC score ≥ 2 and was associated with exacerbation frequency. They concluded that resting breathing pattern during wakefulness might be a tool to assess dyspnea and predict COPD exacerbations.

Karthika and others provide a narrative review on quality management in respiratory care. They argue that every respiratory therapy department should have a quality improvement team to assist with the process of training, implementation, and analysis.