

This month's issue of RESPIRATORY CARE includes original research as per usual as well as a series of papers based on lectures and presentations from the AARC Congress 2020 LIVE! meeting. In a typical year, one summer issue is dedicated to the proceedings from the Journal Conference. COVID-19 altered that paradigm. I am grateful to the authors who helped bring this issue to fruition.

This month's Editor's Choice paper evaluates the use of transpulmonary pressure to guide lung protective ventilation in obese subjects. Rowley and colleagues retrospectively reviewed ventilator settings, gas exchange, and pulmonary mechanics in 20 subjects with a body mass index of >47 kg/m² following esophageal manometry. Determination of transpulmonary pressure resulted in an increase in PEEP and improved pulmonary compliance as well as a lower driving pressure. After 24 h, oxygenation was improved at a lower F_{IO₂}. The authors concluded that the use of esophageal pressure to guide ventilator management in obese subjects provide improved lung protection. Diehl provides an accompanying editorial suggesting that esophageal manometry might offer a personalized approach to mechanical ventilation.

Igo et al report the results of a quality improvement project to reduce unplanned extubations (UEs) in the neonatal ICU. Using an inter-professional task force and plan, do, study, act, (PDSA) cycles that included surveys of staff attitudes, creation of a data collection tool, and staff education regarding patient transfers and daily assessment of endotracheal tube securement, UEs were evaluated against a historical control of 9.9 UEs/100 ventilator days. Post-intervention the UE rate fell to 1.6/100 ventilator days. The authors concluded that ongoing surveillance and staff education are required for sustained improvement.

Drescher and Al Ahmad performed a retrospective analysis of 136 subjects with sepsis receiving noninvasive ventilation (NIV). NIV failure and subsequent intubation occurred in approximately half of the subjects. NIV failure was associated with greater severity of illness, higher lactate, and requirement for a higher F_{IO₂} at NIV initiation. In this population only NIV failure was independently predictive of death.

Sorg and colleagues re-visit the shortcomings of shared ventilation in a lung model addressing each of the previously described risks which limit safe application. They address separate control of tidal volume (V_T) and PEEP and separate measurement of V_T and PEEP for each patient. They developed a flow diverter valve which allowed distribution of V_T to each lung model while not altering flow waveform. This single valve reduces flow to one patient while increasing flow to the other. A separate system using disposable pneumotachographs allows monitoring V_T and PEEP valves were used for differential PEEP. They found that the system allowed individual setting of V_T and PEEP, controlling for end-expiratory lung volume regardless of the disparity in lung model settings.

Studenly and others evaluated synchrony in a lung model during simulated pediatric NIV using a nasal cannula interface. They compared NIV using both pressure control continuous mandatory ventilation and pressure support. They found ineffective triggers to be the most common asynchrony in both modes. They suggested that NIV with a nasal cannula (which is commonly used) should be re-evaluated in face of these findings.

Willis and colleagues report on their findings regarding the practices and perceptions of face mask use in a pediatric hospital during the COVID-19 pandemic. They distributed a survey to clinical and non-clinical staff at the height of the COVID pandemic. The response rate was 24% with three-quarters of responses coming from clinical staff. Most respondents reported wearing a cloth mask outside the hospital. The most common challenges reported were

glasses fogging, skin irritation, and headaches. Qualitative data revealed themes of feeling unsafe, beliefs/practices about COVID-19 and masks, mandates/enforcement of wearing masks, availability of personal protective equipment, and care delivery challenges. Respondent beliefs and resulting practices with face mask use impacted compliance and reported health issues.

Dean Hess provides a paper based on his Egan Lecture on evidence-based respiratory care. He provides a definition of evidence-based approaches and the levels of evidence which support common practices in respiratory care. The evidence base supporting NIV for COPD and lung-protective ventilation in ARDS is robust. However, he notes that a number of common respiratory care procedures including incentive spirometry following an operative intervention fail to have supportive evidence. Hess concludes that the principles of evidence-based medicine are a necessary approach to respiratory care practice.

Bob Owens' paper is based on his Petty Lecture on long-term domiciliary NIV in COPD. He reviews the importance of oxygen therapy for improving long-term outcomes in COPD and compares the relative impact of NIV in improving ventilation of COPD patients at home. The concept of high-intensity NIV – using high inspiratory pressures and backup breathing frequencies to reduce arterial carbon dioxide levels – and the impact on quality of life and mortality is discussed. He concludes that caregivers need to better identify and treat patients with COPD who might benefit from NIV, although many practical questions remain.

Tom Piraino pens a paper on noninvasive respiratory support in acute care, including both NIV and high-flow nasal cannula. Piraino's paper is based on his Kittredge Lecture. This work reviews the success of noninvasive methods to support gas exchange in hypoxemic and hypercapnic respiratory failure. This paper reviews practical applications of technology and evidence-based guides for use as well as common causes of failure.

The New Horizons Symposium has been a staple of AARC Congress for many years. The 2020 New Horizons addressed the topic of respiratory care of the high-risk surgical patient. Sameed and colleagues discuss the preoperative evaluation of high-risk patients including pre-operative evaluation and tuning. Liu et al review the treatment of post-operative hypoxemia with conventional oxygen therapy, HFNC, CPAP, and NIV.

Saunders and Davis contribute a Year in Review discussing the important papers in the last calendar year with regard to pharmaceutical therapy for COVID-19. Branson and Rodriguez provide a Year in Review on shared ventilation, noting that during 2020, the publications related to shared ventilation increased 10-fold compared to the entire previous history.

Austin and Branson contribute a special article on the use of the anesthesia workstation as an ICU ventilator, a practice attempted in many facilities during the COVID-19 peak. The nuances of anesthesia ventilators and different intended uses rendered this practice more difficult than anticipated. This paper highlights differences and shortcomings of the anesthesia ventilator in the ICU.

Andersen and coworkers provide an invited review on the use of mechanically assisted cough in patients with neuromuscular disease, with an emphasis on the effects on upper airway responses. This paper provides an understanding of the larynx and laryngeal function in the face of alternating airway pressures.

A new AARC Clinical Practice Guideline on management of pediatric patients with oxygen in the acute care setting is provided by the AARC working group.