

This month's Editor's Choice paper addresses the issue of aerosol formation during oxygen therapy including high-flow nasal cannula (HFNC). Bem et al used laser light scattering and a particle counter to assess aerosol formation. An advantage of this trial is that human subjects were studied while receiving oxygen therapy. The authors conclude that HFNC in and of itself does not increase aerosol formation compared to standard oxygen therapy. Li and Scott contribute an accompanying editorial concluding that HFNC is an unlikely aerosol-generating procedure and HFNC alone does not increase risk to caregivers.

Chaudhary et al provide a single-center retrospective review of mechanical ventilation and outcomes in COVID-19, with an emphasis on race and underserved populations. They reviewed the records of 128 critically ill subjects with COVID-19 over a 2-month timeframe. Nearly all the subjects (97%) required intubation, 64% were Black, and 63% died in the hospital. Subjects who died were less responsive to PEEP and F_{IO_2} , maintaining a low P_{aO_2}/F_{IO_2} compared to survivors. This was not impacted by race. They concluded that Black subjects had similar mortality rates from COVID-19, but differed in factors that were associated with increased risk of death. In all races/ethnicities, subjects who died were older, had a positive fluid balance and less improvement of P_{aO_2}/F_{IO_2} , PEEP, and F_{IO_2} requirement. Hatipoğlu opines that poor hospital outcomes begin in the inequities in social constructs leading to increased co-morbidities in these groups.

Chandell and others evaluated the success of the ROX index in predicting the need for intubation in COVID-19 in a multicenter retrospective trial. The ROX index ($[S_{PO_2}/F_{IO_2}]/breathing frequency$) has been shown to predict the success of HFNC in hypoxemic respiratory failure. Subjects were grouped into early and late HFNC failure. In nearly 300 subjects they found that 60% were successfully treated with HFNC and that a ROX > 3.0 in the first 12 h predicted success. There were 61 early and 47 late HFNC failures, and mortality after HFNC failure was 45%. They concluded that HFNC was a viable strategy and confirmed the value of the ROX index. Varipapa and Sonti contribute an accompanying editorial highlighting the issues of early and late HFNC failure and the possible impact on outcomes. They note that early intubation in some patients is warranted owing to severity of illness.

Kong et al evaluated the use of bedside lung ultrasound (LUS), comparing ultrasound findings with computed tomography (CT) in subjects with COVID-19. A LUS score based on presence of B-lines and pulmonary consolidation was developed. B-lines were identified in 97% of subjects and 83% demonstrated consolidation. They found an excellent correlation between LUS and CT scores. The authors suggest that ultrasound could serve as a noninvasive bedside tool to evaluate the severity of lung injury in COVID-19.

Messina and colleagues reviewed their use of a critical care outreach team and the use of respiratory support outside the ICU during the COVID-19 surge in Italy. In the spring of 2020, 125 subjects were cared for by the outreach team. Noninvasive respiratory support including HFNC, NIV, and CPAP was provided on the floor and no emergent intubations were required. The authors conclude that noninvasive respiratory support outside the ICU under supervision of a critical care team was safe and effective in the midst of a surge.

Alqahtani et al evaluated the interaction of binge drinking, e-cigarette use, and chronic lung disease. Using the Behavioral Risk Factor Surveillance System they found e-cigarette use was higher in subjects with chronic lung disease and that binge drinking moderated e-cigarette use. The authors suggest further research to determine any cause-and-effect relationship.

Jensen and coworkers evaluated the impact of pneumatic tube transport on blood gas and other analytes. Samples were analyzed after walking samples to the lab and following pneumatic tube transport. No clinical or significant differences were identified.

McClelland et al evaluated the impact of e-cigarette use and exposure to secondhand e-cigarette vapor. Subjects who vaped developed increased heart rate, breathing frequency, oral temperature, and a decrease in oxygen saturation after 20 min. Subjects exposed to secondhand vapor had higher oral temperatures but no other changes. These immediate physiologic changes may have long-term consequences.

Culbreth and others evaluated the factors impacting dual use of e-cigarettes and traditional cigarettes in adults. They evaluated a large existing database of 3,800 subjects. They found that dual use of both e-cigarettes and traditional cigarettes was an important public health problem. A history of depression, child maltreatment, and poverty were associated with dual cigarette use.

Benzo et al evaluated the feasibility of a home-based pulmonary rehabilitation (PR) program and health coaching in subjects with COPD. Subjects with moderate to severe COPD unable to attend in-person PR were enrolled for 8 weeks receiving video-guided exercise and health coaching. In 154 subjects, adherence was 80%, but there were no differences in breathlessness. There were improvements in self-management abilities. They concluded that home-based rehabilitation programs are feasible in individuals with COPD that cannot attend in-person PR.

Kinnear and others studied home NIV in subjects with thoracic scoliosis over 25 years. They evaluated NIV initiation and survival in a small group of 53 subjects. The 5, 10, 15, 20, and 25-year survival rates were 96, 88, 61, 46, and 39% respectively. They concluded that home NIV in subjects with scoliosis is well tolerated with a 25-year survival of 40%.

Beaumont et al conducted a double blind randomized controlled trial comparing local anesthesia to no pre-treatment for arterial puncture. The primary outcome was pain as measured on a numerical pain rating scale. There was a decrease in the pain scale with use of a local anesthetic, but the change was not statistically significant.

Cammarota and colleagues evaluated tissue doppler imaging of the diaphragm in subjects succeeding and failing ventilator liberation. In 100 subjects, extubation was successful in 79%. Subjects who failed extubation showed greater diaphragmatic activation using doppler imaging. The practical use of this technique by bedside staff needs to be assessed.

Haaksma et al evaluated the utility of holistic LUS in predicting extubation failure in subjects successfully passing a spontaneous breathing trial. In a group of 83 subjects, 18% of whom failed extubation, LUS was a weak predictor of extubation failure. This work does not support the use of LUS to improve prediction of extubation success.

Frérou et al evaluated transcutaneous carbon dioxide (P_{tcCO_2}) monitoring during different preoxygenation methods prior to intubation. In 200 subjects, they recorded the progression of P_{tcCO_2} from intubation to post initiation of mechanical ventilation. They found that P_{tcCO_2} variability during intubation differed by the method of preoxygenation. A decrease in P_{tcCO_2} after initiation of mechanical ventilation was associated with postintubation hypotension.

Hess pens a tribute to Robert Kacmarek, who passed away in April. Dr Kacmarek was the longest-serving member of our Editorial Board and authored over 100 articles in the Journal over his career. His contributions were unparalleled and will long be remembered.

Gianni et al provide a narrative review of inhaled nitric oxide delivery systems. A number of new systems have been introduced that do not require compressed gas cylinders. Hu and others contribute a systematic review of transfusion-related acute lung injury (TRALI). They identified 13 studies, concluding that TRALI was associated with the number of transfusions and infusion of fresh frozen plasma. They concluded that patient factors play a more important role than blood products or type.