

This Month's Editor's Choice by Fleming and colleagues describes optimization of respiratory therapy resources by de-implementing low value therapies. The authors identified aerosol therapy with hypertonic saline and N-acetylcysteine being ordered despite lack of any evidence base. They used the AARC Clinical Practice Guideline on airway clearance to educate prescribers regarding the lack of efficacy using these agents. This resulted in a small reduction in unnecessary therapy. Then respiratory therapists (RTs) were empowered to inform prescribers that orders for these treatments were discontinued when therapy was not evidence based. This resulted in a large decrease in unnecessary treatments (>90%) saving 4 full-time equivalents per year. Hinkson provides an accompanying editorial reviewing the importance of evidence based respiratory care against the backdrop of COVID-19, RT shortages, and burnout.

Blanchet and others evaluated the accuracy and bias of 4 pulse oximeters in 193 ICU subjects. In 211 matched pulse oximetry (S_{pO_2}) and arterial oxygen saturation (S_{aO_2}) measures, they found that in this population of predominantly light-skinned subjects, oximeter performance varied widely between devices. One oximeter overestimated S_{aO_2} (+0.9%) while 3 others underestimated S_{aO_2} (-3.1%, 0.3%, -0.2%). S_{aO_2} was underestimated with one oximeter in 91.3% of the cases while it was overestimated in 55.2% of the cases with another. They concluded that there was significant bias and moderate accuracy between S_{pO_2} and S_{aO_2} . Hess provides commentary, reviewing the determination of oximeter accuracy and the factors which alter it. He notes that the true accuracy of S_{pO_2} is not as precise as most clinicians believe.

Tavares et al report bleeding and thrombotic complications of extracorporeal membrane oxygenation (ECMO) in 60 COVID-19 subjects compared to 67 ECMO subjects without COVID. Thrombotic complications were similar between groups. Higher rates of severe bleeding, airway bleeding (37 vs. 15 %), and hemothorax (13 vs. 3 %), were found in COVID-19 subjects. COVID-19 ARDS was also associated with longer duration of ECMO support (47 vs 19 d). They concluded that COVID-19 subjects requiring ECMO for hypoxemic respiratory failure had severe bleeding complications and required prolonged support.

Maamar and others performed a non-interventional cohort study using 930 subjects admitted over a 15-y period with ARDS and a P_{aO_2}/F_{IO_2} ratio ≤ 150 mm Hg. They examined the association between severe hypercapnia ($P_{aCO_2} \geq 50$ mm Hg) in the first 5 days and death in ICU for subjects receiving lung protective ventilation. They found severe hypercapnia in 59% of subjects on day 1 and a sustained relationship between hypercapnia and mortality up to day 5. They suggest that severe hypercapnia was associated with mortality in ARDS subjects on lung protective ventilation.

Miya and others evaluated the association between ventilator parameters and mortality in children with respiratory failure on ECMO. This secondary analysis of an existing dataset included 237 subjects, 64% of which were neonates. Overall in-hospital mortality was 35%. They found higher PEEP on day 1 of ECMO was associated with lower odds of mortality. No ventilator parameters were associated with mortality in the pediatric subjects. They concluded that PEEP is a modifiable parameter that may improve neonatal survival during ECMO.

Mueller et al performed a small study of 10 subjects receiving non-invasive electromagnetic stimulation of the phrenic nerves. Half the subjects were awake volunteers and half were anesthetized. They found that time to capture of the phrenic nerves was < 1 min and tidal volumes were increased without skin irritation or pain. They suggest that noninvasive diaphragm stimulation is feasible in this select patient group.

Sousa and colleagues evaluated an automatic resuscitator in a porcine model of ARDS. They found that this pneumatic device allowed adequate ventilation and oxygenation for up to 4 h. They concluded that the device can be used in short-term attended ventilatory support settings until appropriate devices can be acquired.

Campos et al performed a longitudinal study to examine the association between aerobic fitness, assessed using ventilatory threshold variables measured during cardiopulmonary exercise testing (CPET), and the risk of exacerbations in individuals with cystic fibrosis (CF). They found that lower oxygen consumption at the ventilatory threshold predicted exacerbations. They concluded that CPET variables at the ventilatory threshold can be used to monitor exacerbations in people with CF.

Guilló Moreno et al used a neonatal model of respiratory distress to evaluate the efficacy of two recruitment maneuvers, one applied for 8.5 s and the other for 17 s. Lung injury was created using saline lavage and recruitment maneuvers utilized a peak inspiratory pressure of 30 cm H₂O and PEEP of 15 cm H₂O. They reported that both techniques reversed alveolar collapse with few hemodynamic consequences.

Poureslami and others performed a cross-sectional study to test the construct validity of the performance-based, disease-specific Vancouver Airways Health Literacy Tool (VAHLT) for individuals with chronic airway disease. They evaluated 320 subjects determining the impact of age and education on health literacy (HL). They found that older age and less education were highly correlated with HL, emphasizing the importance of addressing these factors in HL interventions.

Loberger and colleagues performed a retrospective review of a quality improvement database evaluating the duration of spontaneous breathing trials (SBT) in pediatric subjects. They compared 1-h and 2-h SBTs using extubation failure and rescue NIV as endpoints. They found greater use of NIV rescue in the 1-h SBT group (odds ratio 3.94) but not with extubation failure. They concluded that a 1-h SBT may better balance extubation outcomes and length of invasive ventilation for the general pediatric ICU population.

Alqahtani et al performed a cross-sectional study using a questionnaire to collect sociodemographic information and assess susceptibility to e-cigarette use in subjects. This included exposures to e-cigarettes and advertising. They concluded that subjects without chronic lung disease were more susceptible to e-cigarette use than those with chronic lung disease who utilized medical treatment.

Yang et al compared two closed loop techniques of ventilation in a lung model. Both algorithms were similar except one technique included automated adjustment of rise time and flow termination of spontaneous breaths. At an extreme setting of minute ventilation (250% of a normal minute volume), the technique with automated control of rise time and flow termination provided a lower tidal volume and faster respiratory rate. They suggest that this may have an impact in patients with severe obstructive disease.

Szymczak and others contribute a short report on health care utilization in ARDS survivors 2–3 years after discharge. They report that outpatient and in-patient health-care utilization remained high for survivors of ARDS even after 36 months, reflecting a persistent high morbidity in this population. Additional research is needed to identify factors that support recovery of ARDS survivors. Guerreiro et al provide a short report on the use of the S3-NIV questionnaire administered at hospitalization and discharge in subjects with acute respiratory failure. They found the questionnaire to be reliable in assessing patient-important outcomes.

Zaga and others provide a narrative review on techniques to evaluate speech in ventilated subjects with a tracheostomy. Miller and colleagues contribute a special article on burnout and well-being in the respiratory care profession.