

This month's Editor's Choice paper explores the transition from ICU ventilator to home ventilator in pediatric subjects. Willis and co-workers reviewed data from 56 children discharged over a 7-y period before and after implementation of a standardized protocol. The majority of subjects were from the neonatal ICU with a diagnosis of bronchopulmonary dysplasia. They report that following implementation of the protocol, there were fewer attempts to successful transition and ventilator transition duration was shorter. Iyer and Newth provide commentary, describing the process of transition as complex involving multiple providers and the family. They suggest that this process requires selection of the right patient at the right time, and using appropriate equipment and ventilator settings to approximate the ICU ventilator. They agree that a protocolized approach is able to mitigate factors associated with transition failure.

Borges et al report on their 10-y experience of home mechanical ventilation in children. They evaluated hospital readmissions and mortality in a small group in Brazil ($N = 27$). Different from the report by Willis et al, the majority of subjects had cerebral palsy. Readmissions were primarily for respiratory infections and readmission within the first 6 months was associated with death. Willis opines that these patients typically have substantial medical needs and utilize a higher proportion of health care resources compared to other chronic conditions. She advocates for a national home ventilator registry to facilitate research and share best practices.

Vianna and others describe open endotracheal suctioning and hyperinflation with no change in F_{IO_2} and a PEEP of 0 cm H_2O compared to 0 PEEP and an increase in F_{IO_2} of 0.2. They studied critically ill mechanically ventilated subjects in a crossover trial. They found no differences in the degree of oxygen desaturation or ventilation as measured by expired carbon dioxide. Restrepo provides commentary comparing this work to AARC clinical practice guidelines, and highlighting differences. While closed circuit suctioning is a standard of care in the U.S., this is not possible in many nations.

Griffon et al describe the use of noninvasive measures of gas exchange to monitor noninvasive respiratory support in children at home. Hypercarbia was a common finding, while oxygen desaturation was rare. They concluded that $> 10\%$ of pediatric subjects at home had abnormalities in gas exchange that could be corrected by intervention.

Kim and colleagues present an analysis of indirect and direct ARDS in pediatric subjects. This retrospective review over 10 years included 162 subjects with ARDS. Most subjects (80%) had direct ARDS. They found that death in direct ARDS was associated with more aggressive ventilation and lower P_{aO_2}/F_{IO_2} . These relationships did not exist in indirect ARDS where pediatric SOFA score and lactate predicted mortality.

Benoit et al describe the differences in adherence to vest therapy using electronic and objective measures in subjects with cystic fibrosis. They evaluated adherence to therapy in a year-long study and found that adherence in adolescents (13–19 y) was significantly lower than younger age groups. They conclude that treatment adherence falls as children age, and more complex prescriptions also reduce adherence.

Gilder and others evaluated avoiding endotracheal suctioning in subjects mechanically ventilated following cardiac surgery. Subjects requiring mechanical ventilation < 12 h were randomized to avoidance of suctioning or routine care. They found no differences in complications or safety measures, including the escalation of oxygen therapy.

Innocenti et al performed a retrospective study of noninvasive ventilation (NIV) use in the emergency department to determine factors associated with mortality or NIV failure. In 644 subjects, two-thirds with hypercarbia, they measured the HACOR (heart rate, acidosis, consciousness, oxygenation, and respiratory rate) score at initiation, at 1 h, and 24 h later. Mortality was 23% and was associated with higher HACOR score.

Costa and colleagues evaluated measurement of the timed inspiratory effort (TIE) index using surface electromyography (sEMG). In this prospective observational trial, sEMG was used to determine muscle strength. They concluded that subjects passing a weaning trial had greater respiratory muscle strength.

Galerneau et al evaluated automatic tube compensation (ATC) function in ICU ventilators in a lung model and conducted a survey of ATC use. The bench assessment evaluated tidal volume (V_T) delivery at different levels of simulated effort and lung mechanics. Not surprisingly, V_T was inversely proportional to compliance. Differences between devices were small. Sixty-four percent of survey respondents reported using ATC.

El-Khatib and co-workers compared oxygenation ratio ($OR = P_{aO_2}/F_{IO_2}$) to oxygenation factor ($OF = OR/\text{mean airway pressure}$) in 150 subjects with ARDS. Subjects were classified as having severe, moderate, or mild ARDS. Receiver operating characteristic curves for OR and OF at lung compliance, driving pressure, and mechanical power thresholds known to predict survivals in ARDS were constructed. The use of OF reclassified half of moderate ARDS cases as severe. They concluded that OF is a superior ARDS oxygenation index than OR and could aid in classification of ARDS severity.

Miller et al evaluated the timing of tracheostomy in subjects following liver transplantation. This retrospective analysis from the National Inpatient Sample categorized early tracheostomy as < 14 d and routine tracheostomy as > 14 d post-operation. In over 2,000 subjects they reported that early tracheostomy was associated with a Charlson Comorbidity score of 3+ and lower in-hospital mortality. They concluded that early tracheostomy following liver transplant was associated with lower in-hospital mortality and earlier discharge compared to a delayed approach.

Dale and co-workers studied the educational experiences of caregivers related to the use of home mechanical insufflation-exsufflation (MI-E). They used semi-structured interviews with new and established MI-E users and family caregivers regarding their satisfaction with their education on device use. Both new and experienced users were confident in MI-E use and the current education appeared to meet user needs. They concluded that ongoing education and follow-up is necessary for prolonged benefit.

Cardinale and others evaluated pharyngeal oxygen concentrations in a group of COPD subjects receiving nocturnal NIV and oxygen therapy by nasal cannula. They hypothesized that leaks during NIV might result in reduced F_{IO_2} . The F_{IO_2} during NIV was reduced by 0.05 on average. They suggest that failure of nocturnal NIV trials might be due to insufficient oxygen delivery.

Godwin et al evaluated emergency department intubations for asthma from the National Emergency Airway registry over a 3-y period. They determined the incidence of intubations, methods and medications used, device(s) used, peri-intubation adverse events, as well as successes and failures. In a sample of 173 subjects, they found that the majority of asthmatic subjects were intubated using rapid sequence intubation after preoxygenation with bilevel by mask and induction with ketamine. Common complications were not different from those with other indications for intubation.

Guerra-Londono et al evaluated postoperative pulmonary complications (PPCs) in morbidly obese subjects with respect to intraoperative ventilation and surgical procedure. PPCs occurred in 7.5% of cases and there was no effect of intraoperative V_T . Only the use of laproscopic surgery was associated with fewer PPCs.

Willis provides a narrative review on transitioning subjects with chronic respiratory disease from pediatric to adult care. She stresses that successful transition includes establishing a standardized process, adequate planning, and effective communication.

Fahy and colleagues provide a special article regarding the use of a flexible enclosure to reduce caregiver exposure during intubation of patients with COVID-19.