This month’s Editor’s Choice is retrospective review of ventilator alarms in the pediatric intensive care unit (PICU). High- and medium-priority alarms from two ventilators used in different ICUs were evaluated over 6 months. Langga et al identified 11 distinct ventilator alarms, with high-priority alarms more common with one ventilator and medium-priority alarms more common with the other. On average, 22.5 alarms occurred per ventilator day. Scott provides commentary on the importance of alarm settings, concerns about alarm fatigue, and the need for research aimed at alarm management that maximizes patient safety.

Urner and coworkers performed a secondary analysis of subjects undergoing diaphragmatic ultrasound and applied machine learning techniques to clinical data to stratify subject risk of diaphragmatic atrophy. Data from 191 subjects representing 761 study days failed to yield a variable predictive of diaphragmatic atrophy. However, a single measurement of diaphragmatic thickening fraction within 48 h of initiating ventilation was a good predictor of risk. Hilty and Sascha opine that big data and machine learning are only as good as the value of data entered. They remind us to ‘mind the gap’ between physiology and big data.

Dianti and others compared the measurement of deadspace to tidal volume ratio (Vd/Vt) to estimated Vd/Vt in subjects with ARDS. They also evaluated the measures in predicting driving pressure (∆P) changes during extracorporeal carbon dioxide removal (ECCO2R). The agreement between measured and estimated ∆P was low, with more than half the error secondary to differences in Cproduction. Predicted reductions of ∆P with ECCO2R were similar, but only measured Vd/Vt predicted mortality. The authors conclude these cannot be used interchangeably in clinical practice. Kallet opines that the role of Vd/Vt in assessing the severity of ARDS and as a prognostic factor is evidence-based, but that researchers should careful in these determinations when Vd/Vt is estimated.

Varipapa et al performed a retrospective cohort study of high-flow nasal cannula (HFNC) used to treat hypoxemic respiratory failure in an effort to identify variables associated with HFNC success and failure. In a group of 74 subjects (32 requiring intubation and 42 remaining on HFNC), they identified net fluid balance in the first 24 h as an important predictor of success. These differences in fluid balance were nearly 2.5 L/day. They also note that the respiratory rate-oxygenation index effectively predicted success.

McPeck and others conducted a bench study of continuous aerosol therapy during mechanical ventilation comparing a vibrating mesh nebulizer (VMN) with a breath-enhanced jet nebulizer (BEJN). The VMN was positioned on the dry side of the humidifier and the BEJN on the wet side. They measured inhaled mass using radiolabeled saline at 6 flows. VMNs failed to completely nebulize the saline in 20% of studies and deposited 13% of the dose in the humidifier. They concluded that BEJNs were more reliable than VMNs at a 10-12 mL/h infusion rate.

Krasinkiewicz and colleagues performed a single-center, retrospective chart review of mechanically ventilated pediatric subjects over 12 months to evaluate extubation readiness practices and barriers to extubation in individuals who passed a readiness screen. Of 427 subjects, 69% underwent a readiness screen prior to extubation. The most common reasons for delaying extubation were planned procedure (29%), neurological status (23%), and absence of pulmonary function testing at follow-up. These findings may predict which patients are likely to progress to obstructive lung disease.

Editor’s Commentary

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