Editor’s Commentary

Leak around the mask during noninvasive ventilation (NIV) may cause inadequate support or patient-ventilator asynchrony. In their bench study, Ueno et al evaluated the response to leaks in 3 NIV ventilators and 2 ICU ventilators. They found that some of the ventilators compensated for leak better than others, but with the larger leak none of the ventilators maintained the set PEEP or pressure support. As Cabrini et al point out in their editorial, there is a potential adverse consequence to reducing leak around the mask, specifically in the form of facial skin breakdown and patient discomfort. Thus leak compensation is important.

An increasing number of patients require prolonged mechanical ventilation (PMV), which is associated with high morbidity and poor long-term survival. Kojic et al reviewed the medical records of the residents of a single county admitted to the ICUs at the 2 Mayo Clinic Rochester hospitals who underwent tracheostomy for PMV. There was a considerable incidence of tracheostomy for PMV, and the presence of COPD was an independent predictor of 1-year mortality. As discussed by O’Connor in her editorial, more work is needed to optimize the care of ICU survivors who require PMV.

The lambda-mu-sigma (LMS) method calculates the lower limit of normal for spirometric values as the 5th percentile of the distribution of Z scores. Vaz Fragoso et al evaluated whether the LMS method is valid for evaluating respiratory impairment in middle-aged subjects. They found that, in white middle-aged persons, LMS-defined airflow limitation and restrictive-pattern were significantly associated with mortality and respiratory symptoms. An approach that reports spirometric values based on LMS-derived Z scores might provide an age-appropriate and clinically valid strategy for evaluating respiratory impairment.

Although the statistically derived lower limit of normal (LLN) for the FEV1/FVC is considered superior to a fixed cutoff value for diagnosing airway obstruction, the fixed-cutoff method continues to be used and advocated. Aggarwal et al evaluated the misclassification of spirometrically determined airway obstruction arising from the use of the fixed-percent method, in comparison to the LLN method for FEV1/FVC. They found that negative age-dependence of FEV1/FVC results in over-diagnosis of airway obstruction in middle-aged and elderly men, and under-diagnosis in young men, with the fixed-percentage method, and recommend that airway obstruction should be assessed with the LLN of FEV1/FVC.

In adults, the FEV1/FVC falls with age and is not the same for men and women. Quanjer and Ruppel write an insightful editorial related to the papers by Vaz Fragoso and Aggarwal, in which they make an evidence-based plea to abandon the use of fixed ratio of FEV1/FVC for diagnosing COPD.

In their paper, Chatburn et al evaluated respiratory care work assignment based on work rate instead of work load. As Ford points out in his editorial, few departments have the information systems needed to accurately capture work rate. However, an understanding of this concept provides managers the opportunity to engage staff and create staffing programs that minimize hourly variability in demand.

In recent years, portable ventilators have decreased in size and increased in performance. Blakeman et al tested the triggering, battery duration, and tidal volume delivery of 7 currently available portable ventilators. There was wide variability in battery duration and triggering sensitivity. Five of the ventilators performed adequately for tidal volume delivery across several settings, but the combination of high respiratory rate and low tidal volume presented problems for 2 of the ventilators.

The effects of exercise training programs on physical activity in daily life in patients with COPD were evaluated by Probst et al. The 2 exercise/training regimens were a high-intensity whole-body endurance-and-strength program and a low-intensity calisthenics-and-breathing-exercises program. Neither training program significantly improved time spent active or energy expenditure in daily life. The training regimens similarly improved quality of life and functional status. Exercise capacity and muscle force significantly improved only in the high-intensity endurance-and-strength group.

The respiratory therapy profession continues to grow both in number and scope of practice. Instructional technology, including distance learning, will probably play a key role in educating RT students to meet the increasing demand for practitioners. Varekojis et al found that, while distance education plays an important supportive role in RT education, there is still a preference for face-to-face instruction and Internet-facilitated courses among program directors. The laboratory and clinical settings are hands-on environments that require instructor supervision in order for students to demonstrate proficiency and critical thinking skills.

Exercise desaturation in patients with COPD is a pathophysiological phenomenon that is not wholly understood, and whose clinical consequences are still unclear. Garcia-Talavera et al reported that, in patients with moderate to severe COPD, desaturation within the first minute of the 6-min walk test predicts the need for long-term home oxygen at 5-year follow-up.

Li et al evaluated the bacteriological differences between COPD exacerbation and community-acquired pneumonia. For the patients in this study, P. aeruginosa was the most common pathogen in patients with COPD exacerbation, and S. pneumoniae was the most common in the patients with community-acquired pneumonia. P. aeruginosa was especially common in the patients with serious or extremely serious COPD.

Adhesive tape is commonly used to secure the endotracheal tube in anesthesia and intensive care settings. Shimizu et al compared endotracheal tube extubation force with adhesive tape versus an endotracheal tube holder. With tape strips of sufficient length and width, a conventional tape method was superior to the 2 tested commercial endotracheal tube holders in holding the tube in place in the manikin.

The sleep apnea-hypopnea syndrome is associated with elevated oxidative stress, which is associated with reduced levels and functional impairment of progenitor cells. In 13 patients with sleep apnea-hypopnea syndrome who required nasal CPAP, Murri et al found that progenitor cell levels rose significantly and reached values close to those in the control group after one month of CPAP. This was accompanied by a significant decrease in oxidative stress.

This month’s case reports relate to surgical resection and liposomal amphotericin B to treat cavitary pulmonary zygomycosis in a patient with diabetes, high-frequency chest-wall oscillation in an NIV-dependent patient with type-1 spinal muscular atrophy, and pulmonary hypertension as a fatal complication of neurofibromatosis type-1. The teaching cases this month are acute hypoxemic respiratory failure in sarcoidosis and skin ulcers as a sign of disseminated tuberculosis.