Editor's Commentary

Tidal volume limitation is an accepted strategy for mechanical ventilation of patients with acute lung injury and ARDS. With low tidal volume ventilation, there is a potential for respiratory acidosis unless the respiratory frequency is appropriately increased. Typically, respiratory rate is limited to 35 breaths/min due to concerns related to auto-PEEP. Mireles-Cabodevila and Chatburn introduce a new ventilatory strategy that they call mid-frequency ventilation. This approach uses a conventional ventilator, pressure control ventilation, tidal volumes of 4 to 6 mL/kg, and respiratory frequency greater than 35 breaths/min. The results of this study are intriguing. However, as pointed out in the accompanying editorial by Hardin and Harris, it remains to be seen whether this approach will prove useful for lung protective ventilation. Clearly, clinical studies will be required before this approach can be fully endorsed.

Tiotropium is used in maintenance treatment of COPD, but short-acting bronchodilators are usually used during an exacerbation and there are no guidelines on when to start it following an exacerbation. It is against that background that the paper by Drescher et al is of interest. This paper will also be of interest to respiratory care managers whose departments use respiratory therapist protocols in the care of patients receiving inhaled bronchodilators. The protocol used in this study calls for use of tiotropium in the initial treatment of inpatients with COPD, addition of formoterol if the patient does not show improvement, and short-acting beta agonists as necessary. As pointed out in an accompanying editorial by Tashkin, this study is limited by its retrospective design. However, these results could lead to cost-effective changes in the care of patients with COPD exacerbations.

The N95 mask and PAPR (powered air-purifying respirator) are important personal protective equipment worn by healthcare providers for respiratory protection. They are rarely worn together. The results of the bench study by Roberge et al suggest that the N95 mask provides additional protection when used with the PAPR, particularly if the PAPR should fail. In a comprehensive editorial, Radonovich et al point out that it is difficult to generalize the results of this paper because the authors glued the mask to the face of the mannequin. The editorial raises several provocative questions related to respirators and their protection against routine exposures to airborne pathogens.

The importance of asthma education interventions for parents of children with asthma is well accepted. Saville et al extend this concept from parents to childcare workers in preschools. They found that an educational initiative increased childcare providers' familiarity with the components of an asthma trigger control plan. As pointed out in the editorial by Masini and Krishnaswamy, asthma education can be provided to the asthma community of parents, the immediate family, babysitters, teachers, coaches, clergy, co-workers, and others.

In traditional ventilators the exhalation valve was fully closed throughout the inspiratory phase. Most current generation ventilators use an active exhalation valve that allows gas to be released during the inspiratory phase if the patient makes an active expiratory effort. Jiao and Newhart found that the pressure over-shoot during simulated active exhalation was less in ventilators with an active exhalation valve than in an older ventilator without this feature. They also report that pressure over-shoot and under-shoot, as measured at the proximal airway, occur even with active exhalation valves. However, the clinical importance of these findings is difficult to infer from a bench study. Perhaps most important is that exhalation valve performance on modern ventilators is superior to that of previous generation ventilators.

Inhaled recombinant human DNase improves clearance of secretions in patients with cystic fibrosis. The pharmaceutical company that distributes DNase recommends the Hudson T Up-draft II, Marquest Acorn II, Pari LC+, Pari BABY, or Durable Sidestream nebulizer. Mesh nebulizers may offer greater convenience for the patient, but their efficiency in delivering DNase has not been determined. Johnson et al report that the MicroAir, a mesh nebulizer, is convenient, efficient, and has an output comparable to the Pari LC+. Because this was a bench study, further studies are needed to establish the clinical effectiveness of the MicroAir to administer DNase in patients with cystic fibrosis.

In a survey of Dutch ICUs, Veelo et al report large differences in tracheostomy tube management as it relates to cuff management, tracheostomy tube changes, and decannulation. Although the survey was conducted in Europe, this variability likely also occurs in North America and elsewhere around the world. Published tracheostomy-management guidelines are needed.

Because medications are frequently combined in the nebulizer cup, it is important to determine their chemical and physical compatibility. Bonasia et al evaluated mixtures of levalbuterol with ipratropium, cromolyn, acetylcysteine, and budesonide. They found that the 2-drug admixtures were compatible for at least 30 minutes at room temperature, which is important information when these drug combinations are used.

It is well known that there is in an obesity epidemic in North America. It is important for the readers of the Journal to familiarize themselves with the problems of obesity, which often have respiratory implications. One such problem is the obesity hypoventilation syndrome. Powers reviews the effects of obesity on pulmonary function, discusses the relationship between sleep apnea and the obesity hypoventilation syndrome, and discusses the treatment of this disorder.

The case report by Phatak et al describes the combined use of heliox with inhaled nitric oxide in the care of an infant with localized interstitial pulmonary emphysema and pulmonary hypertension. Although novel and intriguing, the need for such a combination of gases is likely extremely rare. In an accompanying editorial, Betit appropriately raises concerns about the safety of this combination therapy and recommends a systematic approach to application of novel therapies, and their combinations, to clearly know which work and which do not.

High flow humidified oxygen by nasal cannula has received much clinical enthusiasm in recent years. This has occurred despite lack of controlled trials of benefit or reported mechanisms to explain its effects. For example, is this just another way of delivering high flow oxygen or does it also result in continuous positive airway pressure? Calvano et al used a high-flow nasal cannula with a patient who required a high fraction of inspired oxygen but could not tolerate a nasal or facial mask. This improved the patient's arterial oxygenation, but unfortunately offers little guidance regarding the appropriateness of more widespread use of this therapy.

This month's teaching case by Agarwal et al makes the teaching point that allergic bronchopulmonary aspergillosis can present as pulmonary mass lesions and should be considered in the differential diagnosis of patients with asthma.