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Lorenzo Berra
Theodor Kolobow

Reply to the comment by Dr. Spronk et al.

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Sir: We thank Dr. Spronk et al. [1] for the interesting and stimulating comments on our recent contribution on the Mucus Shaver [2]. We take this opportunity to comment on the three major concerns raised in their letter.

1. As well as for any maneuver requiring disconnection of the patient from the ventilator, it might be possible that the use of the Mucus Shaver allows derecruitment of the lungs in patients with high levels of positive end-expiratory pressures. These patients need to be carefully managed, and ventilator detachment is not advised. However, cleanness of the tracheal tube is extremely important for maintaining adequate ventilation and decrease resistance. The design of the Mucus Shaver could be modified in the case of patients with acute respiratory distress syndrome, for example, the shaving balloon by being mounted on the closed suctioning catheter to minimize adverse events due to disconnection of the ventilator circuit [3]. In a clinical trial testing the Mucus Shaver on 12 prolonged mechanically ventilated patients we experienced no desaturation or adverse events [4].

2. Narrowing and occlusion of the tracheal tube is a multifactorial event. Extremely important variables associated with tracheal tube narrowing include certain patient characteristics (e.g., secretion production, smoking, chronic obstructive pulmonary disease, and pneumonia), airway humidification (e.g., relative moisture, heating of the *humidifier, hygroscopic-hydrophobic heat and moisture exchanger), and length of intubation [5, 6, 7]. Interestingly, in a clinical observational study Boque et al. [8] showed that partial occlusion of the tracheal tube can occur after only 24 h of mechanical ventilation, and that it may present an unsuspected difficulty in respiratory weaning. Due to the importance of predicting occlusion of the tube and to the difficulty in detecting it with standard parameters (peak pressure), several methods have been proposed to assess occlusion of the tube at the bedside [9, 10, 11]. Our novel device is an attempt to overcome this threat in intubated patients.

3. We agree with Dr. Spronk et al. that both the subglottic space and the lumen of the endotracheal tube are reservoirs of pathogens that can seed the lungs. Moreover, our experimental studies point out that the force of gravity plays the major role in the aspiration process even in intubated patients with inflated cuff. In an experimental model we have shown that horizontal orientation to the endotracheal tube prevents bacterial colonization of the lower respiratory tract in animals ventilated for 72 h [12, 13] and during 6 days of mechanical ventilation (unpublished data). We are now planning to start a clinical trial assessing the safety and efficacy of preventing aspiration in patients intubated with endotracheal tube kept horizontal vs. standard semirecumbent position.

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L. Berra (✉)
Massachusetts General Hospital, Anesthesia and Critical Care,
55 Fruit Street, Boston 02113, MA, USA
e-mail: lberra@partners.org
Tel.: +1-617-7269367
Fax: +1-617-7248511

T. Kolobow
NHLBI, NIH,
Bethesda Md, USA