References


To the Editor.—We wish to address the now almost universally accepted notion, well summarized in a recent manuscript “Ventilator-associated Pneumonia or Endotracheal Tube-associated Pneumonia: An Approach to the Pathogenesis and Preventive Strategies Emphasizing the Importance of the Endotracheal Tube” by Pneumatikos et al.

The authors emphasize that “The accumulation of contaminated secretions from oropharynx or gastrointestinal tract in the subglottic space is a crucial event in the pathogenesis of VAP [ventilator-associated pneumonia].” Hence, the authors’ center of attention is directed to the pooled secretions around the cuff; they believe that “an important factor that determines the probability (yes, even certainty) of a non-trivial bacterial colonization” is the position of the neck/trachea, with important consequences for the patient (analogous to the biologic concept of gravity).

We will like to thank Wochlick et al. for their interesting comments. The pooled secretions around the cuff (between ETT [endotracheal tube] and tracheal mucosa), drainage of secretions from subglottic space, and decontamination of the subglottic secretions; while patient position has no impact on the incidence of ventilator-associated pneumonia, as it is not even mentioned, or alluded to.

Indeed, we have shown it is the patient position that is the sine qua non factor that determines the probability (yes, even certainty) of whether bacteria colonized orplanted (or subglottic) contents and tracheal/lung secretions, will gravitate towards the oropharynx, and back into the lungs, with important consequences for the patient (analogous to the waste-water tubing in the sewer line). The authors are kind to cite our study in sheep, using the Mucus Shaver and Mucus Slurper which, when combined with keeping the orientation of the trachea below horizontal, prevented accumulation of secretions within the lumen of the endotracheal tube, the trachea, and the lungs, without need for conventional tracheal suction. Let unsaid, our subsequent studies showed that tilting/keeping the trachea (and sheep) below horizontal alone resulted in equally good outcome: No pneumonia, and no lung bacterial colonization.

It is the latter observation that has consumed, over many years, most of our subsequent attention. Insufflating small tantalum discs into the trachea of sheep, beyond the tip of the endotracheal tube, has allowed us to monitor transport of so insufflated tantalum discs across and beyond the tip of the endotracheal tube and observe its travel during the course of mechanical ventilation. The results were as follows: With the sheep’s body/head oriented in the semirecumbent position, mucus-tracheal contents rather rapidly gravitate towards the lungs, then enter the mainstem bronchi, and lodge at the most distal end of the bronchi.

However, with the head/neck oriented horizontally/below horizontal (about 5–15 degrees), all mucus and secretions, together with the insufflated tantalum discs, exited the bronchi and the trachea, then entered the endotracheal tube, and then exited into the expiratory line water trap and not into the lungs.

In a recent prospective controlled trial, 80 intubated infants were randomized to supine position (n = 30) or to lateral position (n = 30) to keep the orientation of the neck/trachea at or below horizontal. After 5 days of mechanical ventilation, tracheal cultures were positive in 26 infants (87%) in the supine position group and in 9 infants (30%) in the lateral group (P < 0.05). In the adult patient population, similar results have been observed (unpublished observations, Lorenzo Berra, M.D., Department of Anesthesia and Critical Care, Massachusetts General Hospital, Boston, Massachusetts, June 2009), showing feasibility of such patient management and excellent clinical outcome.

In summary, while medical devices (Mucus Shaver, Mucus Slurper, antiseptic impregnated endotracheal tubes, HiLo Evac endotracheal suction) and profound analyses with relevant model control are necessary. Therefore, based on our cohort, we may be able to present a more thorough assessment of this topic in the future.

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