

## New Insights about an Old Foe

**T**HERE are few concerns more central to the anesthesia community than avoiding the pulmonary aspiration of gastric contents. Although numerous other topics populate the pages of the specialty's journals, the appearance of a new article about aspiration risk can be immediately appreciated for its relevance. Aspiration is a familiar and long-standing concern, but there is more to learn about how to prevent it. In this month's issue of ANESTHESIOLOGY, Dr. Turan *et al.*<sup>1</sup> report their findings on the effects of two modern sedative agents, dexmedetomidine and propofol, on lower esophageal sphincter pressure and the gastroesophageal pressure gradient. Their investigation suggests that both drugs decrease lower esophageal sphincter pressure similarly and dose dependently and that the gastroesophageal pressure gradient changes little. That is, both drugs might increase the risks of aspiration of gastric contents, but the physiologic changes on the gastroesophageal junction are minimal.

The authors studied a range of doses, titrated mathematically as target-controlled infusions, monitored the Bispectral Index, and also used a clinical sedation scale. Correlation to the American Society of Anesthesiologists definitions of levels of sedation\* is not evident. Their measures of lower esophageal sphincter pressure and gastroesophageal pressure gradient are appropriate and validated, and the power of the sample to measure a meaningful difference is reasonable, although the completed sample (8) was lower than the calculated size (11). Dexmedetomidine and propofol can, in theory, increase aspiration risk by worsened function of the gastroesophageal barrier, but the magnitude of the effects are small and both drugs affect the function similarly.

These findings raise issues in the debate on aspiration risk that could transform it. Aspiration of gastric contents, for all the concerns about it, is a rare phenomenon. This rarity may reflect the excellence in clinical practice or the relatively low risk for aspiration in most patients. Why then is the anesthesia community so interested in aspiration of gastric contents? First, the consequences of severe aspiration are still severe. As patients with greater numbers of comorbidities are undergo-

ing increasingly more complex procedures, their risks could increase. Many new procedures, such as endovascular aneurysmal repairs, can be performed with sedation. Because the patients in the study by Turan *et al.* were healthy volunteers, the results should be extrapolated with caution to patients with a greater disease burden. The effects of the study drugs in isolation do not necessarily reflect their effects when combined with other medications, and typical operative and interventional medicine patients in the United States take multiple medications. Even more interesting is the association between the risk factors and the disease. How relevant are lower esophageal sphincter pressure and gastroesophageal pressure gradient to aspiration risk? These issues were addressed more than 20 yr ago in relatively small studies<sup>2,3</sup> that did not completely clarify the issue. Both studies used healthy volunteers. Although physiologic pressures were measured rigorously, correlation to clinical outcomes was limited to subjective symptoms.

Aspiration concerns figure prominently in ongoing sedation debates. Patients considered at high risk for aspiration should be considered for a presedation anesthesiology consultation, according to the American Society of Anesthesiologists Guidelines for Sedation by Non-Anesthesiologists.<sup>4</sup> Both propofol and dexmedetomidine are drugs that interest nonanesthesia providers of sedation. Debate continues about the appropriate credentials for clinicians who can safely administer these and other anesthetic agents. This article does not suggest that these drugs can minimize concerns in at-risk patients. On the contrary, at-risk patients were not the study population. It is also not a study of pediatric anesthesia and sedation.

Dexmedetomidine is not available in all countries. For practitioners who do not use this agent, the propofol data underscore the need for vigilance. Many issues surrounding the aspiration and sedation debates are still relevant whether or not dexmedetomidine is used.

The study of lower esophageal sphincter pressure and the gastroesophageal pressure gradient refocuses aspiration concerns to the stomach. Recent studies have highlighted the role of the aspiration of pharyngeal contents in postoperative complications<sup>5,6</sup> and strongly suggest that pharyngeal secre-

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\* American Society of Anesthesiologists Committee on Quality Management and Departmental Administration: Continuum of depth of sedation: Definition of general anesthesia and levels of sedation/analgesia. Approved by the ASA House of Delegates October 13, 1999. Last amended October 27, 2004. Available at: [www.asahq.org/publicationsAndServices/standards/20.pdf](http://www.asahq.org/publicationsAndServices/standards/20.pdf). Accessed August 18, 2009.

◆ This Editorial View accompanies the following article: Turan A, Wo J, Kasuya Y, Govinda R, Akça O, Dalton JE, Sessler DI, Rauch S: Effects of dexmedetomidine and propofol on lower esophageal sphincter and gastroesophageal pressure gradient in healthy volunteers. ANESTHESIOLOGY 2010; 112:19-24.

tions may be the agents causing pulmonary complications. These studies evaluated neuromuscular blocking agents, finding that even small levels of neuromuscular blockade impaired pharyngeal reflexes, and residual neuromuscular blockade correlated with pulmonary complications. To date, this line of inquiry with sedative and hypnotic agents has been minimally explored.

The article by Turan *et al.* will be of interest to three audiences. First, for the anesthesia community, new discoveries confirm the need for constant vigilance to avoid a critical complication. Second, for nonanesthesia providers who provide sedation, new insights into drugs and aspiration risk will inform debates about what types of medications and what levels of sedation are appropriate to their practice. Last, for members of the scientific community, new and relevant discoveries are welcome. For the first group, the study underscores the need to look for factors contributing to aspiration risk and to advocate for a wide margin of safety regarding this complication. For the second group, this study does little to change the widely held belief about propofol and dexmedetomidine: They are generally safe in healthy patients with empty stomachs. As the authors state, “clinicians might better focus on other side effects of propofol and dexmedetomidine, such as respiratory depression and bradycardia.” For the last group, these findings promote ongoing discussions about aspiration risk with other medications and combina-

tions of medications, other mechanisms, and a reconciliation of physiologic findings to clinical outcomes.

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