as a biomarker for GERD used assays that did not discriminate between these isoforms. In this issue of CHEST (see page 333), Hallal et al7 aimed to address this problem. They report on 34 children on mechanical ventilation in the ICU. The children were studied with 24-h pH-impedance monitoring, and tracheal secretion samples were collected and assayed for pepsin A and pepsin C. All patients tested positive for pepsin A in their secretions, while 76.5% tested positive for pepsin C. All patients also had multiple episodes (median, 60; interquartile range, 20-85) of weakly acidic reflux extending to the proximal esophagus. Moreover, three of the 15 children not on acid-suppressive therapy during the pH-impedance study had substantial acid reflux (13%, 14%, and 45% distal acid-exposure times). Based on these findings, the authors concluded that gastric aspiration is nearly universal in critically ill pediatric patients who are mechanically ventilated and may contribute to the development of pulmonary complications such as ventilator-associated pneumonias. Although clearly of great interest, the full pathophysiologic significance of these findings is unclear. They confirm that the pepsin detected in these aspirates originated, in part, from the stomach, hence implicating the origin, in part, from the stomach. And they confirm that this critically ill population exhibits very substantial proximal esophageal reflux. Nonetheless, the role of pepsin in promoting organ injury remains speculative. Pepsin requires an acidic environment, both to be activated and to be active, so its presence in the tracheobronchial tree, which is nonacidic, is not necessarily pathologic. Pepsin-mediated cytokine release in bronchial epithelial cells has been reproducibly noted only at low pH levels, mainly at about pH 1.5.4 It has been hypothesized that reactivation may occur by subsequent acid reflux/aspiration or by endocytosis into an acidic intracellular environment, but neither mechanism has yet been demonstrated.3 Illustrative of that point, despite having pepsin in the airway and weakly acidic refluXue in the proximal esophagus, none of the children in this study had clinical symptoms of nosocomial pneumonia after 1-week follow-up.

In conclusion, the results of this study are interesting from both a clinical and a physiologic standpoint. The finding that 100% of tracheal aspirates were positive for pepsin A (but not C) suggests that discriminating between pepsin A and pepsin C is essential. Ideally, one would like to strengthen that supposition with data from a pediatric control population verifying that pepsin C can be a “normal” finding. Such data are available in adults, with the finding of 22% positive samples of pepsin C, but not A, in asymptomatic individuals undergoing elective orthopedic surgery.9 Together, these observations cast doubt on the validity of nonspecific pepsin assays. More importantly, it is unclear how these findings correlate with clinical outcomes, because the role of pepsin in mediating supraesophageal manifestations of GERD remains unclear. At this junction, all we can reliably say is that pepsin, specifically pepsin A, is a viable biomarker for gastric juice aspiration. It also seems prudent to prophylactically treat at-risk patients who are mechanically ventilated with proton pump inhibitors. Regardless, this study adds to the growing body of literature on pepsin and GERD; confirms our suspicions that pepsin in tracheal aspirates is, in part, gastric derived; and highlights important questions that will hopefully stimulate further research in this area.

References

Learning to Look Through the Bronchoscope

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“See one, do one, teach one.” For many physicians, this was how we were expected to learn. Similar to no longer working unlimited hours, things have changed. Procedures are more complex now with the addition of more
techniques, such as endobronchial ultrasound and other navigational tools, than were available even 5 years ago. In this issue of *CHEST* (see page 321), Ernst et al are tasked with a very difficult problem: How, or is it even possible, to determine competency of trainees in bronchoscopy?

One of the difficulties the authors are presented with is addressing the many faces of competency. They evaluated training for pulmonologists in and out of the United States. In addition, they evaluated the measurement of bronchoscopy training competency of thoracic surgical residents as well as other surgical residents. Competency-based medical education is defined as “an outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies.” I feel that the authors’ task is made more difficult because we have not established the best, or even a consistent, way to teach bronchoscopy, let alone understand how to tell if trainees are competent in bronchoscopy.

The goal for competency requires the learning of a new skill. One of the difficulties with any project that has to do with teaching is to first remember that we are physicians, not trained educators. A teacher never begins a semester without a lesson plan. When they get a new class, a new textbook, or change the curriculum to add updated information, they change their lesson plans accordingly. Education is a process. It begins with the basics, builds upon them, and adds more material as the semester continues. Then one needs to pass the first semester to move onto the second. This same system exists in middle school, high school, and undergraduate and graduate schools. Yet, when we get trainees into advanced postgraduate training, we have them jump right into patient management, often without “teaching” them, because, quite frankly, we were taught the same way.

As physicians, traditionally our first approach to a problem is to research it. We do a literature search, we review meta-analyses of the subject, and read all of the new articles pertaining to a topic. This same approach is often used when developing a presentation for a lecture. Often speakers will display slide after slide with graphs and tables from a variety of studies, each chosen to support the viewpoint of the speaker. In many respects, instead of educating, we often review the facts. Although many of us are academics, clinicians, and researchers, for the most part, we are not trained educators. The article by Ernst et al is a wake-up call in many ways. The authors give a summary of eight suggestions, all of which are ungraded, consensus-based statements. This was a very well done report. The appropriate scientific method, as stated in the literature, was used: The authors asked questions, collated and reviewed data, and the cumulative answer is that everyone is approaching the process of educating residents and fellows in bronchoscopy differently, so not enough facts existed to give scientifically graded recommendations.

Education in bronchoscopy is not as simple as asking “Which way do I push the lever to make the tip of the scope flex?” The field and art of bronchoscopy are immensely complex. Initially, the trainee must learn not just the airways, but the anatomy that surrounds the airways. Where are the mediastinal structures? What is the lymphatic drainage path for each lobe of the lung? How do the two-dimensional CT scans on the computer screen in front of them relate to the airways they will be traveling through? The new bronchoscopist needs to learn their tools: dimensions and abilities of different bronchoscopes, the use of ultrasound in the chest, how supportive tools such as fluoroscopy or electromagnetic navigation can be used to improve their performance. The new bronchoscopist must become an expert in the diseases they will be evaluating, understanding their natural history and how they will affect the airways, lungs, and/or pleura that they will be evaluating.

All learners learn differently. Students have different intrinsic skills that allow them to do different tasks really well. There are seven learning styles taught to educators: visual (spatial), aural (auditory), verbal (linguistic), physical (kinesthetic), logical (mathematical), social (interpersonal), and solitary (intrapersonal). As most people do not know their ideal learning style, and without having to test each trainee for their optimal learning style, it would be paramount that components of an educational method in bronchoscopy include

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organizational void has been addressed by a consensus statement developed as a collaborative effort by the Society of Critical Care Medicine (SCCM), the American College of Chest Physicians (CHEST), and the Association of Organ Donors

Making the Most of What Is Offered

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“Do what you can, with what you’ve got….”

Theodore Roosevelt

A huge imbalance exists between the number of donor organs and the number of patients on the waiting list for the various solid organs, and this shortfall continues to grow. In 2000, 11,917 donors provided organs for 23,248 transplants while 71,628 patients were actively listed for organ transplantation. By 2012, the number of donors had increased to 14,011 (a 17.6% increase), providing organs for 28,503 transplants (a 22.6% increase), but the number of patients listed for transplantation had increased to 117,040 (a 63.4% increase). On average, 21 people die every day waiting for a transplant.

The available options to satisfy the demands of this growing patient list are to innovate with new therapies for the various forms of advanced organ failure, to develop alternate options for organ replacement (such as xenotransplants and stem cell transplants), or to maximize the currently available donor pool. The latter option represents the lowest hanging fruit at this time since the other alternatives are in the distant future of clinical reality. However, until now, surprisingly little attention has been paid to standardization of donor management as a means to optimize the number and quality of potentially transplantable organs.

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Organ Donors

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