fects. If occult gastrointestinal ischemia is responsible for multiple organ failure, this could be an exciting finding. Not surprisingly, important basic questions remain. For example, when does gastrointestinal ischemia become critical and is there an accurate way to measure it?

Gastric tonometry has obvious limitations in the measurement of gut perfusion. Among the many assumptions inherent in its use are the following: (1) gastric tissue Pco₂ and tonometer Pco₂ are equal; (2) alterations in pH and subsequent changes reflect changes in perfusion; and (3) perfusion, metabolism, and Pco₂ have all reached a steady state. Furthermore, even if these assumptions are correct, there is no universal agreement on the definition of normal gastrointestinal pH. Therefore, goals of resuscitation based on pH are inadequately defined. Last and most important, even if we measure gastrointestinal perfusion accurately, will more attention and aggressive treatment of gastrointestinal ischemia alter morbidity or mortality?

In 1995, treatment of critically ill patients continues to be largely supportive and expectant. We are saddled with global measurements of oxygen delivery and consumption while struggling to find evidence of ischemia at the cellular level. The gut may very well play an important role in the development of MSOF. However, the best approach to keep the gut functioning normally is unknown. Attention to details such as feeding patients earlier, more judicious use of antibiotics, or avoiding certain pressors may prove more important in preventing MSOF than using data from gastric tonometry to raise the gastrointestinal pH to an arbitrary number in patients who otherwise appear fully resuscitated. To objectively assess the role of increased gastrointestinal perfusion, a study of critically ill, globally resuscitated patients with evidence for gastrointestinal ischemia is needed. Only a well-controlled and well-designed study that has a clear definition of gastrointestinal ischemia and predetermined objective goals of resuscitation comparing two groups whose only treatment variable is optimization of gut perfusion will clarify the issue.

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References


Invasive Diagnostic Methods for Nosocomial Pneumonia

Revisiting the Folklore

Recently, several investigators have confirmed the generally accepted notion that nosocomial pneumonia is not only common, but also highly lethal and costly. Nosocomial pneumonia confers considerable mortality in excess of that resulting from the underlying disease alone and significantly prolongs length of hospital stay. Unfortunately, as any clinician who has cared for mechanically ventilated patients in an ICU knows, establishing the diagnosis of pneumonia is often difficult. Utilizing gold standards similar to those proposed in the First International Consensus Conference for Clinical Investigation of Ventilator-Associated Pneumonia (VAP), numerous studies have demonstrated that invasive bronchoscopic evaluation is superior to clinical judgment and radiologic evaluation for the diagnosis of VAP. Certainly, there are some important concerns regarding these data that must be recognized. First, multiple methods, including protected specimen brushing (PSB), standard bronchoalveolar lavage (BAL), protected BAL plugged telescoping catheter (PTC), and mini-BAL, directed both bronchoscopically and blindly, have been utilized in varied patient populations. Each of these studies has defined sensitivities and specificities for the procedures based on and by establishing “threshold” values for quantitative cultures that define pneumonia. Unfortunately, these differ among studies. Second, the experience of the bronchoscopists and laboratories in performing both the tests and Gram’s stains with quantitative cultures, respectively, may vary considerably. Third, and perhaps most important, the prior or current use of antimicrobials may negatively affect the results of invasive studies, reducing both sensitivity and specificity. Despite the need for interpretative caution,
however, recent data pooling the results of 18 studies evaluating the PSB technique demonstrated a high overall accuracy, with a sensitivity of 89% and specificity of 94.3%. Similar or better values for sensitivity and specificity have resulted utilizing Gram’s stain and quantitative culture data from BAL studies, especially if no antibiotic therapy has been instituted prior to the procedure.

So why the controversy? Several reasons exist. First, physicians have long been frustrated by diagnostic inaccuracy when dealing with the possible development of a highly lethal disease, such as nosocomial pneumonia. Many retain the belief that the careful, bedside assessment and diagnosis of VAP may be more accurate than numerous comparisons in invasive studies suggest. Additionally, some physicians are not willing to discontinue or withhold antibiotic therapy when invasively determined quantitative culture and Gram’s stain data are negative or when they are borderline, since this form of “negative” result might indicate an early stage of infection, or “prepneumonia.” Second, meaningful values for “positive” results are a matter of ongoing discussion.

In this issue of CHEST (see page 1632), Timsit and colleagues have demonstrated that lower threshold values for quantitatively cultured specimens obtained by PSB, PTC, and BAL, as well as direct examination of BAL Gram’s stains, produced an important increase in sensitivity for all procedures, with only a small decrease in specificity.

The notion of utilizing lower thresholds than those previously recognized in the literature is not uncommon. Some clinicians have been reluctant to withhold treatment when the clinical suspicion of VAP is high, and invasive methods show fewer than generally accepted thresholds for quantitative cultures of 10⁵ CFU/mL by PSB or fewer than 10⁴ CFU/mL by BAL, but are not completely sterile. Interestingly, the current study also demonstrates that quantitative culture results did not appear to be significantly altered when prior antibiotic therapy (but not new antibiotics used to treat developing clinical pneumonia) had been instituted, a finding different from some previous studies.

The controversy is still not settled. There may be significant institutional variability in defining a positive test, and thresholds may need to be evaluated within given institutions utilizing specific procedures. Further, regardless of the agreed-on thresholds and the rather impressive sensitivity and specificity data in many studies, to our knowledge, no study has been done that demonstrates that outcome is definitely changed utilizing these techniques, compared with standard clinical assessment and empiric therapy. Obviously, this type of study, in specific patient populations and with standardized procedures, is greatly needed.

However, recent data show that significant numbers of episodes of VAP are polymicrobial, are caused by highly resistant organisms that confer added mortality and that often are not recovered by culturing suctioned sputum, and are treated more specifically and successfully when invasive culture data are obtained. These facts, together with the high sensitivity and specificity values for invasive diagnostic procedures, especially those obtained in specific patient populations, have resulted in the common usage of invasive diagnostic procedures for nosocomial pneumonia. While further outcome data are needed, we believe that we will probably do better for many patients when we know specifically what we are treating, that using invasive diagnostic testing, particularly initial Gram stain and subsequent quantitative culture of BAL specimens, will improve outcome in appropriately chosen groups of critically ill, mechanically ventilated patients. The use of lower thresholds, such as those suggested in the current study, reduces the number of false-negatives without decreasing specificity.

Folklore, defined as traditional customs or widely held practices, has always been an important and valid part of the practice of medicine. As with all folklore, medical folklore represents an evolution of clinical interventions based on bedside observations and theoretic applications by practicing physicians. A large body of data, including the current study, continue to support the notion that invasive testing is useful in some patient populations for the diagnosis of VAP. Just as with the use of pulmonary artery catheters for patients in shock or afterload reduction for congestive heart failure, outcome data and the science of medicine should help further guide and refine the already developing practices for invasively diagnosing nosocomial pneumonia at the bedside, as we all attempt to deal with a lethal disease in a rational way.

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