

ADVANCES IN GERD

Current Developments in the Management of Acid-Related GI Disorders

Section Editor: Joel E. Richter, MD

Diagnosing Gastroesophageal Reflux Disease With Endoscopic-Guided Mucosal Impedance



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G&H What tests are currently being used to diagnose gastroesophageal reflux disease?

MV Current diagnostic tests for gastroesophageal reflux disease (GERD) include endoscopy, pH or impedance-pH monitoring, and barium swallow. Endoscopy may reveal esophagitis that would point to GERD; however, 70% to 80% of patients with GERD often have a normal endoscopy. Therefore, clinicians rely on other tests, such as pH or impedance-pH monitoring. pH monitoring can be performed using either a catheter-based system or a wireless system. The challenges with either test are the cost of the procedure, patient discomfort, and lack of sensitivity. Patients being tested with the catheter system may not eat, drink, or perform activities as usual, which results in lower sensitivity. The wireless system has better sensitivity; however, the 2-day monitoring only provides a snapshot of the patient's esophagus as opposed to an evaluation of the chronicity of the disease and the consequence of that chronicity. Thus, if a patient has had GERD for 10 years, a 2-day monitoring test may not reflect the true nature of the patient's esophagus.

Barium swallow has been used to diagnose GERD as well, although its sensitivity is even lower than that of pH or impedance-pH monitoring, and is rarely used by gastroenterologists to detect GERD. The procedure is currently geared more toward surgeons, who use the test for anatomic purposes in order to assess hernias or motility disorders.

G&H How does endoscopic-guided mucosal impedance identify GERD?

MV The endoscopic-guided mucosal impedance test is a new technique that employs a through-the-scope catheter that touches the lining of the esophagus to determine changes in the epithelium due to chronic gastroduodenal contents. The test is essentially a measure of conductivity of esophageal epithelium to current. Patients with chronic GERD have an altered esophageal epithelium, which results in high conductivity and low mucosal impedance. By using this device to touch the lining of the esophagus at various locations, clinicians can differentiate GERD from non-GERD status without the need for prolonged ambulatory monitoring methods.

G&H What are the advantages and limitations of this method compared with other diagnostic tests?

MV The advantages are that the test takes only 2 minutes to perform, is a simple through-the-scope procedure performed during endoscopy, and has no need for prolonged uncomfortable testing with through-the-nose pH or impedance-pH monitoring.

The disadvantage is that the test needs further validation with outcome studies. We know that we can diagnose GERD, but what we do not know is whether the outcome will be different. For example, there are

no data on surgical outcomes in patients who undergo surgery for GERD due to epithelium alteration based on mucosal impedance. There are studies on the use of acid-suppressive therapies such as proton pump inhibitors (PPIs), but other outcome studies are lacking.

G&H How safe is this procedure? Is a learning curve involved in performing it?

MV Endoscopic-guided mucosal impedance is a very safe procedure; it only takes a few minutes to complete the entire test and receive results.

There is a slight learning curve involved to ensure that any saliva or liquid in the esophagus is removed, as liquid can artificially result in a lower mucosal-impedance reading. However, the test itself is simple to perform. Most gastroenterologists already know how to place a catheter through the working channel of an endoscope because dilations are performed that way. The concept is the same for endoscopic-guided mucosal impedance.

However, because the procedure is new and not yet commercially available, it is not taught during fellowship. I teach it to my fellows from the perspective of general use, but when the procedure is available for everyone to use in another 1 to 2 years, I am sure it will be taught like other techniques, such as pH or impedance-pH monitoring.

G&H How accurate is mucosal impedance in distinguishing between GERD and non-GERD conditions?

MV My colleagues and I recently published the results of a study in which we assessed the differentiation between mucosal-impedance patterns in GERD and non-GERD conditions. This study showed that endoscopic-guided mucosal impedance reliably distinguishes between GERD, non-GERD, and eosinophilic esophagitis (EoE) based on mucosal-impedance values and esophageal patterns of mucosal impedance along the esophagus. For example, in GERD, distal esophageal mucosal impedance is low and slowly increases proximally in the esophagus, while in EoE, mucosal-impedance values stay low all along the esophagus, suggesting that there is known alternation in the epithelium of patients with EoE. Thus, patients who do not have GERD have a different pattern of mucosal impedance.

G&H Can mucosal-impedance measurements be used to distinguish between patients with active and inactive EoE?

MV Results of a study I published in collaboration with colleagues at the Mayo Clinic showed that mucosal impedance can distinguish between patients with active vs inactive

EoE. Mucosal-impedance values are low in active disease and normalize upon treatment, and this is also true in GERD, in which mucosal-impedance values recover post-PPI therapy.

Potentially, this means clinicians would not need to perform biopsies anymore; if patients undergo mucosal-impedance measurements following PPI therapy and their mucosal-impedance values normalize, the clinician would know that the patient's treatment was on the right track.

G&H Is there a difference in treatment results between adult and pediatric patients?

MV Preliminary data suggest that endoscopic-guided mucosal impedance can be used effectively in the pediatric population for GERD and EoE, as researchers are seeing the same patterns as in the adult population. My colleagues at Vanderbilt University Medical Center are currently employing this procedure in their pediatric population of GERD, non-GERD, and EoE patients and will have more robust data later this year.

G&H What role does PPI therapy play in mucosal impedance?

MV If a patient has GERD or erosive esophagitis, he or she is often treated with PPIs to heal the esophageal damage. PPIs are also used to treat patients with EoE to distinguish between those with EoE vs those with PPI-responsive EoE. Endoscopic-guided mucosal impedance parallels these findings by showing that mucosal-impedance values improve upon PPI therapy. Therefore, mucosal impedance can inform clinicians whether PPI therapy is effective and if the patient is potentially taking medication. In EoE, the procedure shows whether a patient has EoE or PPI-responsive EoE.

An important application of mucosal impedance will be in patients with refractory symptoms to determine if there is continued reflux or if symptoms are due to non-GERD conditions. A pattern similar to GERD in patients who display symptoms despite the use of PPI therapy would suggest continued GERD and might alert the provider to increase acid-suppressive therapies. A normal mucosal impedance would suggest that any continued symptoms are non-GERD in etiology. This is the future direction that the mucosal-impedance technology will be employed in to help manage this important group of patients.

G&H Can or should endoscopic-guided mucosal impedance be combined with other diagnostic tests? Will it replace them?

MV Endoscopic-guided mucosal impedance is currently considered a stand-alone test. This procedure may ultimately replace pH and impedance-pH testing.

Mucosal impedance provides more than just a 1- or 2-day test result; it informs clinicians of the chronicity of epithelial damage due to GERD or changes from EoE and the response of the epithelium to appropriate therapy.

G&H What are the next steps in research?

MV Studies are needed to determine the role of mucosal impedance in patients with refractory GERD and EoE. There are numerous patients who have refractory symptoms, and in many of them, GERD is not the cause of the symptoms. Clinicians perform diagnostic tests to determine whether patients have GERD, and I am hoping that endoscopic-guided mucosal impedance could prove whether the symptoms are GERD-related to save time and prevent the need for more testing.

I think we also need to further refine endoscopic-guided mucosal impedance in the pediatric population, as well as refine EoE therapies and determine where

mucosal impedance fits with the pattern of disease. One of the challenges with EoE is that it is a patchy disease, so perhaps this test will help eliminate the need for biopsy.

Dr Vaezi is affiliated with Vanderbilt University, which along with Sandhill co-owns a patent on the mucosal-impedance device discussed in this column.

Suggested Reading

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