



Ambulatory Impedance-pH Monitoring

A NEW TOOL FOR DIAGNOSING NON-ACID GERD

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Gastroesophageal reflux disease (GERD) is the most common GI-related diagnosis made during physician office visits. According to the American Academy of Family Physicians, GERD affects approximately 19 million Americans. Additionally, its treatment costs about \$10 billion a year,¹ making GERD the most expensive disease of the alimentary tract.²

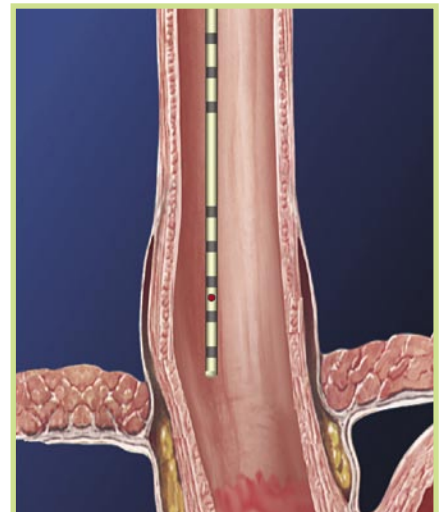
GERD is often diagnosed through a well-taken patient history. For patients who present with classic GERD symptoms, such as heartburn or regurgitation, the primary care practitioner typically recommends lifestyle changes and administers an empirical trial of acid-suppressive medical therapy.³ Patients who respond to therapy are diagnosed with GERD. Those who fail to respond to therapy—somewhere between 35 and 40 percent of medicated patients⁴—are referred to a gastroenterologist for further evaluation.

Interestingly, new research indicates that GERD should not be ruled out for patients who fail acid-suppressive medical therapy. Unresponsive symptoms may be caused by non-acid GERD.^{5,6} In other words, medical therapy may suppress stomach acid yet not remove the reflux itself, which is why symptoms may continue. In fact, research has validated that patients with persistent symptoms while on acid-suppressive medical therapy have non-acid GERD about 35 percent of the time.⁷

Until recently, it was impossible or difficult to accurately detect non-acid GERD. However, physicians at Gastroenterology of the Rockies are now able to accurately detect non-acid GERD using a new diagnostic tool called combined impedance-pH monitoring. In fact, by combining measurement of impedance and pH, it is possible for our physicians to not only identify GERD but also determine whether acid or non-acid GERD is the likely cause of symptoms.

Classifying GERD

Combined impedance-pH monitoring represents a change in the GERD testing paradigm. The currently accepted gold standard for assessing GERD is the 24-hour pH monitoring study,⁸ which detects the reflux of acidic material into the esophagus. This conventional study employs a pH sensor placed 5 cm above the lower esophageal sphincter to detect when pH drops from above 4.0 to below 4.0, thereby indicating acid reflux.² Although 24-hour pH monitoring identifies when pH drops below 4.0, it provides limited information about pH that rises above 4.0 (i.e., non-acid reflux).



The catheter contains multiple impedance sensors and a pH sensor.

Using impedance-pH monitoring, gastroenterologists can characterize both acid and non-acid reflux events. The test even provides detailed characterization of the reflux episode's composition (gas, liquid or mixed). Patients who are medicated or unmedicated may undergo the test.

Like the traditional 24-hour pH test, the impedance-pH catheter is passed through the nose and into the esophagus. The catheter remains in place for 24 hours. During this time, the amount of acid and non-acid

reflux entering the esophagus from the stomach is continuously measured. An acid event is defined as a drop of pH from above 4.0 to below 4.0. Non-acid reflux is an impedance-detected event during which the pH stays above 4.0 and does not drop more than 1 pH unit.

To measure impedance, the catheter's impedance sensors are positioned throughout the esophagus. Impedance sensors detect reflux as bolus movement along the entire length of the esophagus and even up into the mouth and, potentially, the airway. Based on different impedance patterns, a reflux episode can be classified as containing gas, liquid or both. Air conducts electricity poorly and therefore has very high impedance, whereas liquid gastric contents have low impedance.

During the monitoring period, patients are instructed to reproduce their daily routine as much as possible. Impedance and pH events are recorded with a sample frequency of 50 Hz and stored on a data logger. Upon completion of the study, the catheter is removed, and the data is

downloaded and analyzed using dedicated software. The software quantifies the number of GERD episodes, bolus presence time at various levels in the esophagus, and esophageal acid exposure time.

Based on the measurements, patients fall into one of three symptom association groups:

- Acid reflux associated with symptoms
- Non-acid reflux associated with symptoms
- No association of reflux and symptoms

A study indicating non-acid reflux is useful in selecting patients who may benefit from anti-reflux surgery, perhaps the best way to treat the condition.⁵

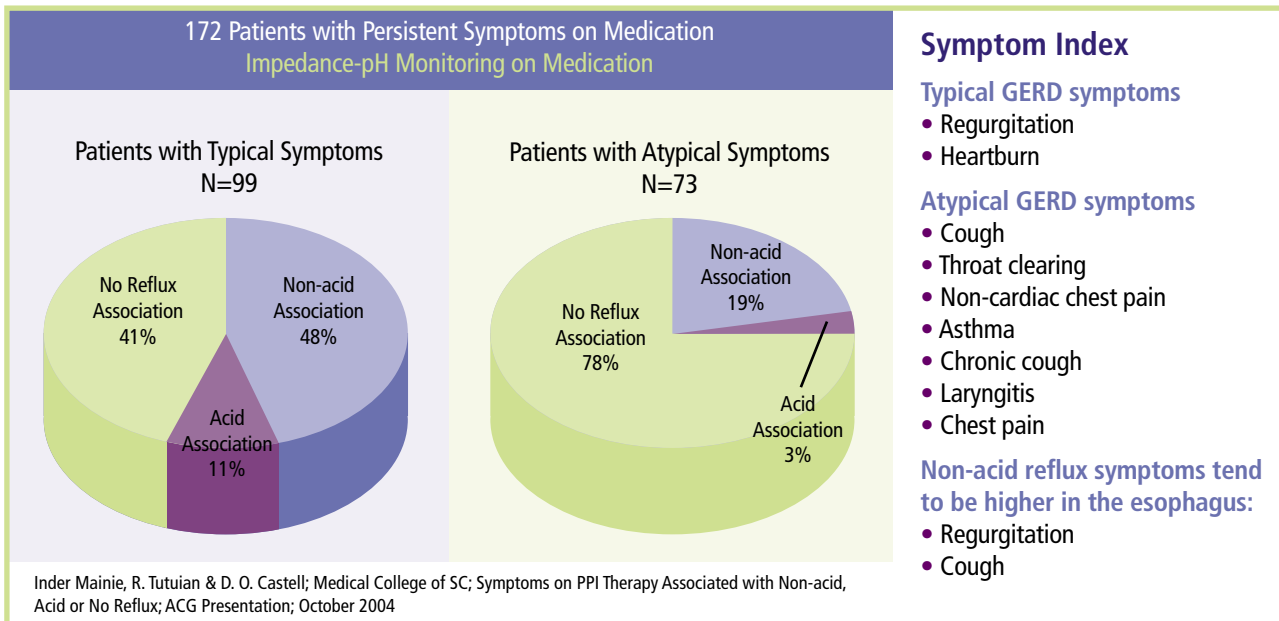
Acid and Non-acid Reflux

Impedance-pH monitoring has been shown to record reflux accurately at all pH levels and is emerging as a useful tool to study both acid and non-acid GERD.^{6,8}

One study, conducted by Dr. I. Mainie and associates from the Medical University of South Carolina in Charleston, evaluated monitoring esophageal impedance as well as acidity on 121 medicated patients with typical GERD symptoms. The researchers reported that 42 percent of the patients had non-acid reflux; 10 percent had acid reflux; and the remaining 48 percent had neither acid nor non-acid reflux. Even when monitoring 52 patients with atypical symptoms, such as cough, 19 percent had non-acid reflux and 4 percent had acid reflux index.⁹

Agrawal and colleagues¹⁰ also used combined impedance-pH monitoring of symptoms in 75 patients. Overall, 63 percent of patients had completely negative studies (no reflux association with any symptom); 34 percent had symptoms that were positive for non-acid reflux; and 3 percent were positive for acid reflux.

"GERD" Continued on page 7



GERD

Continued from page 5

Similar results were found by Katz and colleagues. In this study of 71 patients exhibiting symptoms while on therapy, 30 percent had non-acid reflux associated with symptoms and 11 percent had acid reflux."

Thus, impedance-pH monitoring in medicated patients with either typical or atypical symptoms has been shown to be a useful way to exclude GERD—acid or non-acid—as the cause.

Conclusion

Non-acid reflux is an important cause of persistent symptoms in patients who fail to respond to acid-suppression medical therapy. Combined impedance-pH monitoring is an effective method of testing patients with persistent symptoms on or off acid suppressive therapy, for it can clarify whether symptoms are associated with acid or non-acid reflux.

Although this new type of monitoring represents a shift in the reflux-testing paradigm, it still presents traditional pH information. Data from the pH sensor reports esophageal acid exposure time. Impedance data simply expands the amount of acquired information to identify any relationship between symptoms and either acid or non-acid reflux events. Armed with this comprehensive diagnostic information, the gastroenterologist can make a fully informed diagnosis.

Gastroenterology of the Rockies physicians currently offer patients combined impedance-pH monitoring studies at the practice's Lafayette office. Sandy Brubaker, a nationally recognized GERD health care practitioner and trainer, assists with these studies.

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