Suspected Reflux Symptoms Despite Adequate Acid Suppression—How Esophageal pH and Impedance Testing Can Help

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What are possible reflux symptoms

GERD signs and symptoms include:

- A burning sensation in the chest sometimes spreading to the throat, along with a sour taste in the mouth
- Chest pain
- Difficulty swallowing (dysphagia)
- Dry cough
- Hoarseness or sore throat
- Regurgitation of food or sour liquid
- Sensation of a lump in the throat

Case Scenario

42 yo female with persistent feeling of throat burning for the past 3 years. She has tried multiple PPI regimens. Currently she is on omeprazole 40 mg twice daily for the past 6 months.

- She confirms that she is taking her medication as prescribed; 30 minutes before meals twice per day.
- She reports following a strict GERD diet and lifestyle modifications.
- An EGD was completed within the past 6 months that was visually normal and biopsies for eosinophilic esophagitis and dysplasia were negative.

The patient also underwent High resolution esophageal manometry. This confirmed the absence of achalasia or other motility disorder.

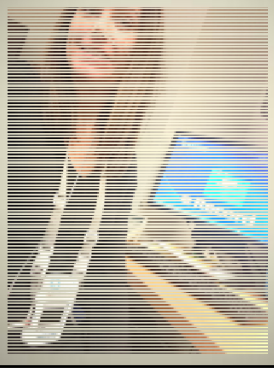
So what's next?

1. Does the patient truly have persistent acid reflux despite therapy?

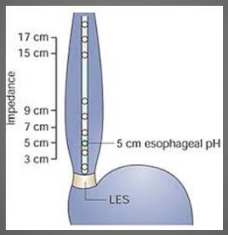
2. Is she suffering from non-acid reflux?

3. Does the patient have functional heartburn or dyspepsia?

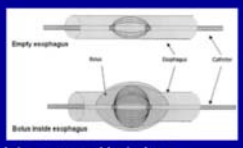
pH/Impedance testing will help determine this.



Combined pH Impedance Catheter



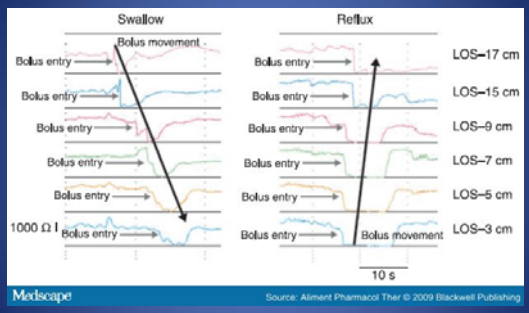
Impedance Testing Principles

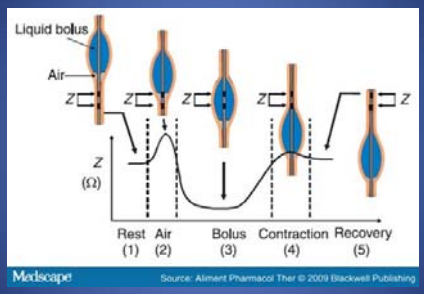


- 2 steel rings separated by isolator
- Alternating-current generator to apply electrical PD
- Circuit closed through electrical charges (ions) contained in structures surrounding the catheter

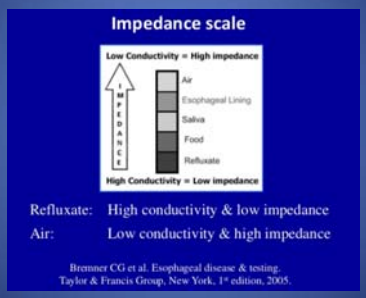
Gastrointest Endoscopy Clin N Am 2005 ; 15 : 257 – 264.

Impedance changes during swallowing and reflux of a bolus, detected by multichannel impedance monitoring. Proximal to distal progression of changes in impedance indicates antegrade bolus movement, as seen during swallowing, whereas distal to proximal progression indicates retrograde bolus movement, as seen during reflux





Impedance Testing Principles



Refluxate: High conductivity & low impedance
Air: Low conductivity & high impedance

Brenner CG et al. Esophageal disease & testing. Taylor & Francis Group, New York, 1st edition, 2005.

What Is Measured?

Distal Esophageal pH channel

- Continuous measurement of pH
- Acid reflux defined as pH of less than 4 in the esophagus
- Symptom correlation via patient log is evaluated
- Number of episodes and total reflux time measured

Impedance channels

- Impedance measures the decrease in resistance that occurs when a substrate such as liquid is near a channel
- This signals refluxate, or swallowed liquid, is present
- Reflux is shown when the decrease in resistance starts in the bottom probe and progresses proximally with time

How is the test performed?

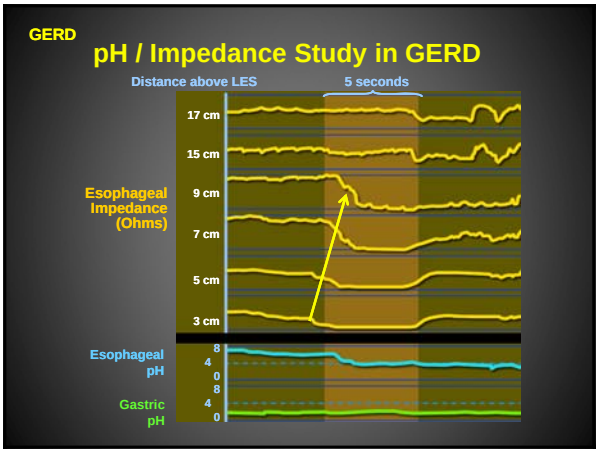
- The patient is instructed to remain on their current PPI regimen to ensure the efficacy.
- They are asked to remain NPO after midnight.
- The patient's preferred nostril is numbed with viscous lidocaine.
- Then the catheter is advanced to 5 cm above the GE junction.

How is the test performed?

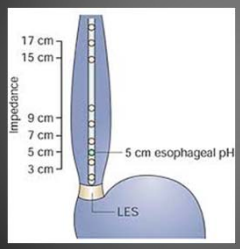
- The patient is given a log to record when they have symptoms, eat, take medication and sleep.
- They are also instructed to press pre-set buttons on the recorder that also time stamps the above on the recording.

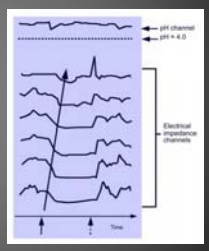
How is the test performed?

- The patient is asked to perform their usual activities except showering.
- The catheter remains in place for 24 hours
- They return to the motility suite for removal of the catheter and to return the recording device
- They are also asked to bring in their log.



Combined Esophageal pH/Impedance Test: NERD

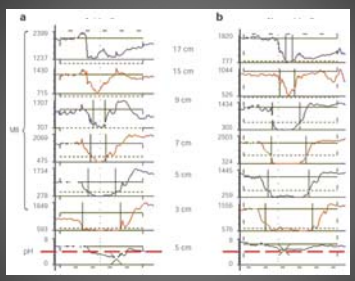




Two episodes of reflux, one acidic, the other non acidic…

Impedance

pH



pH less than 4 pH above 4

pH/Impedance report

- The patient's study was read as:

DeMeester score of 13 (n <14.72)
Distal Episodes of 102 (n <73)

How to interpret the results

- The acid reflux value is normal. This means that the patient's current PPI regimen is controlling their acid reflux.

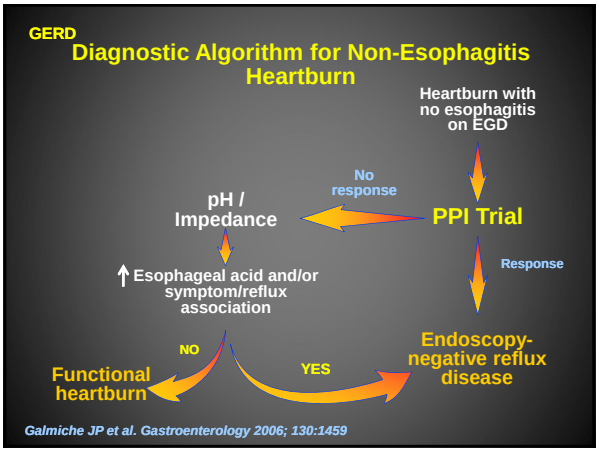
How to interpret the results

- The non-acid reflux values are elevated.
- Based on this report the patient has clinically significant non-acid reflux.

So what does this mean?

- The patient's PPI therapy is sufficient in managing acid but not non-acid reflux.
- Alternative therapy should be considered.

- In patients with GERD who have reflux symptoms despite taking a PPI, more than 80% of reflux-related symptom episodes were associated with non-acid reflux (i.e. with pH>4), also called NERD
- Patients with NERD have less esophageal acid exposure but have greater esophageal sensitivity than patients with erosive esophagitis, perceiving less intense stimuli such as weakly acidic reflux



Conclusion

- **pH/impedence testing can help differentiate reflux vs non-reflux vs functional symptoms in patients with persistent GERD symptoms despite adequate therapy and negative endoscopic and manometric evaluation.**