



The Value of Reflux Monitoring On and Off Acid Suppression

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AMBULATORY REFLUX MONITORING

Often used when symptoms and endoscopy are not sufficient to make a diagnosis or treatment decisions

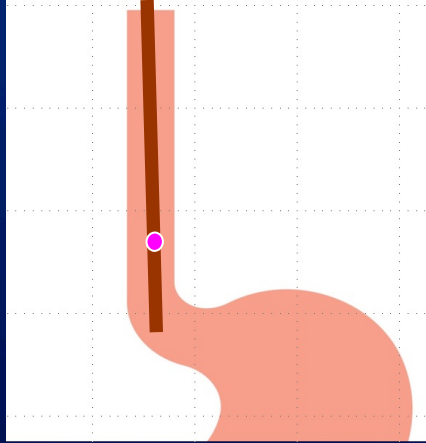
- When GERD diagnosis is not certain
- As pre-operative evaluation before anti-reflux surgery
- Explore the role of reflux in extraesophageal presentations
- Evaluate belching
- Work-up of patients with incomplete response to PPI

AMBULATORY REFLUX MONITORING

pH-metry

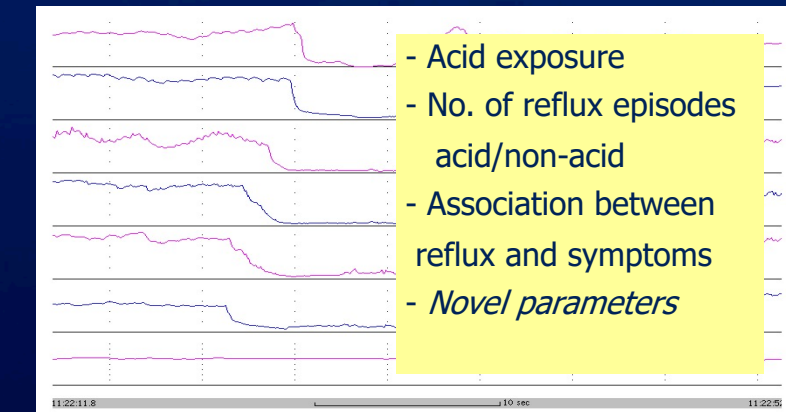
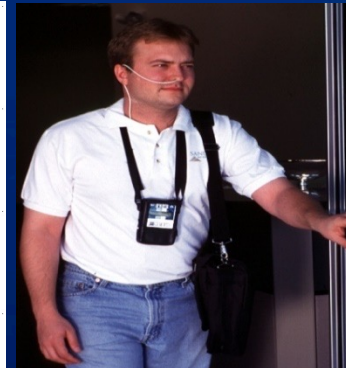
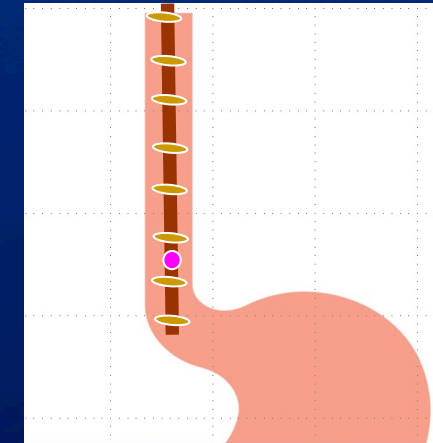
catheter-based: 24 hrs

wireless: 48-96 hrs



acid reflux

pH-impedance catheter: 24 hrs



Acid and non-acid reflux

USEFULNESS OF pH MONITORING

Test OFF PPI

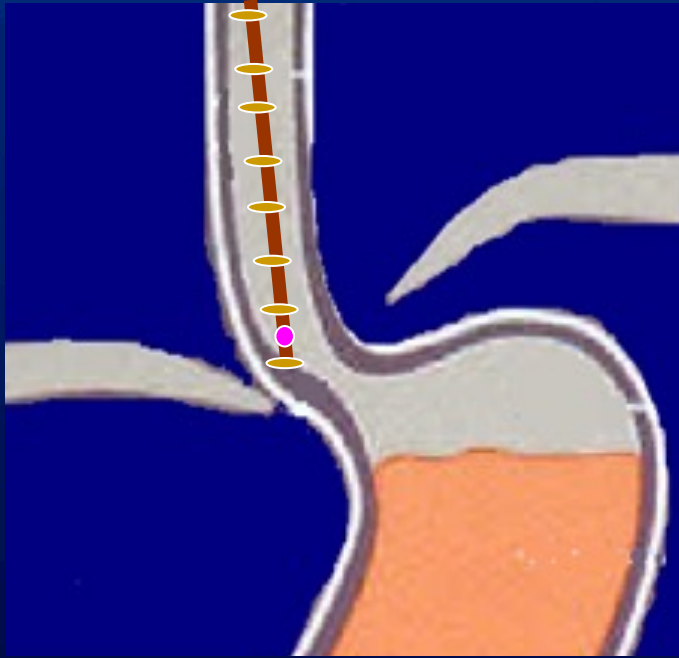
- **Abnormal 24-hour pH score predicts a successful outcome of fundoplication** Campos et al. J Gastrointest Surg 1999
- **Patients with normal preoperative pH score had worse symptomatic outcomes** Khajanchee et al. Am J Surg 2004

USEFULNESS OF pH MONITORING

Test OFF PPI

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Campos et al. J Gastrointest Surg 1999
- **Patients with normal preoperative pH score had worse symptomatic outcomes**
Khajanchee et al. Am J Surg 2004
- **Likelihood of abnormal pH test ON PPI**
 - 10% typical symptoms
 - 1% atypical symptomsCharbel et al. Am J Gastroenterol 2005

USEFULNESS OF pH-IMPEDANCE MONITORING



- Detects non-acid and weakly acidic reflux (pH>4)

RELEVANCE OF NON-ACID REFLUX:

- Symptoms similar to those produced by acid reflux
- Predominant form of reflux in patients taking a PPI
- Treatable: anti-reflux surgery, TLESR inhibitors

** parameters that predict response to treatment??*

*“Reflux monitoring ON PPI should be performed
with pH-Impedance”*

Villa N, Vela MF. Gastroenterol N Am Clin 2013

Katz P, Gerson L, Vela MF. Am J Gastroenterol 2013

USEFULNESS OF pH-IMPEDANCE MONITORING

Clinical Gastroenterology and Hepatology 2015;13:874–883

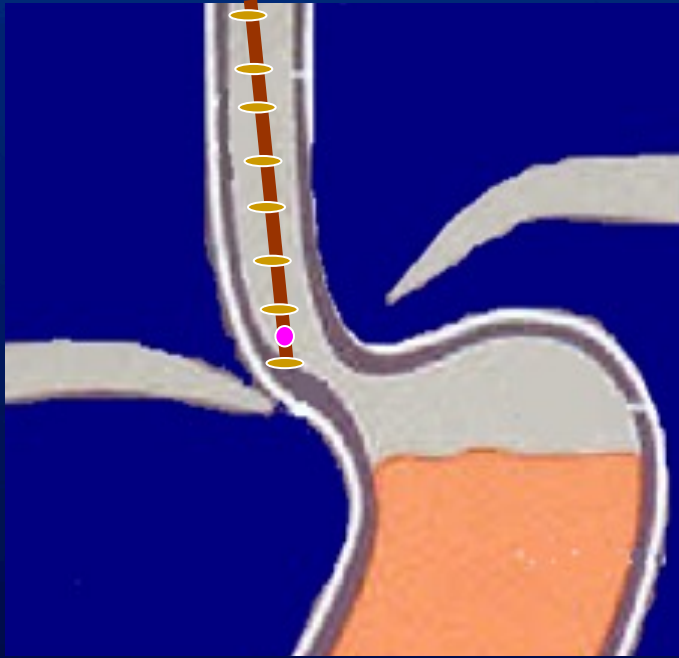
Development of Quality Measures for the Care of Patients With Gastroesophageal Reflux Disease

Rena Yadlapati,^{*} Andrew J. Gawron,[‡] Karl Bilimoria,^{§,||} Rajesh N. Keswani,^{*} Kerry B. Dunbar,[¶] Peter J. Kahrilas,^{*} Philip Katz,[#] Joel Richter,^{**} Felice Schnoll-Sussman,^{‡‡} Nathaniel Soper,^{§§} Marcelo F. Vela,^{|||} and John E. Pandolfino^{*}

“If planning to perform reflux monitoring on antireflux medication, then impedance-pH monitoring should be performed to enable measurement of persistent acid or nonacid reflux”

Clin Gastroenterol Hepatol 2015

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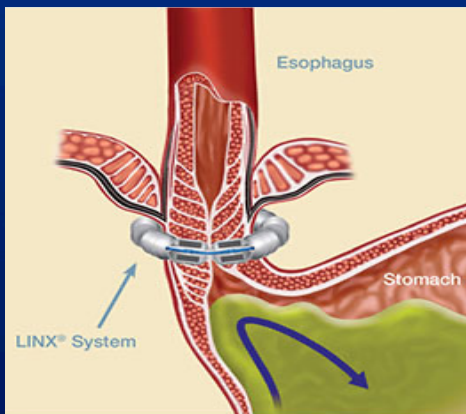
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Multicenter Randomized Controlled Trial: Magnetic Sphincter Augmentation vs PPI for Refractory Regurgitation



- 152 patients with moderate-severe regurgitation on once daily PPI
- Randomized to magnetic sphincter or PPI BID
- Magnetic sphincter superior for resolution of regurgitation: **89% vs 10%**

Bell et al. *Gastrointest Endosc* 2018

Patients in the PPI BID arm allowed to crossover to magnetic sphincter at the end of the trial

Post-hoc analysis of pH-impedance:

- > 80 reflux episodes on pH-impedance prior to treatment predicts satisfaction with anti-reflux procedure
- Reduction of reflux episodes after treatment to <35 is associated with symptomatic improvement

Value of pH Impedance Monitoring While on Twice-Daily Proton Pump Inhibitor Therapy to Identify Need for Escalation of Reflux Management

C. Prakash Gyawali,¹ Radu Tutuian,² Frank Zerbib,³ Benjamin D. Rogers,^{1,4} Marzio Frazzoni,⁵ Sabine Roman,^{6,7} Edoardo Savarino,⁸ Nicola de Bortoli,⁹ Marcelo F. Vela,¹⁰ and Daniel Sifrim¹¹

Gastroenterology 2021 *in press*

Healthy volunteers given BID PPI



Patients with proven GERD treated with BID PPI

European heartburn-predominant cohort
n=43



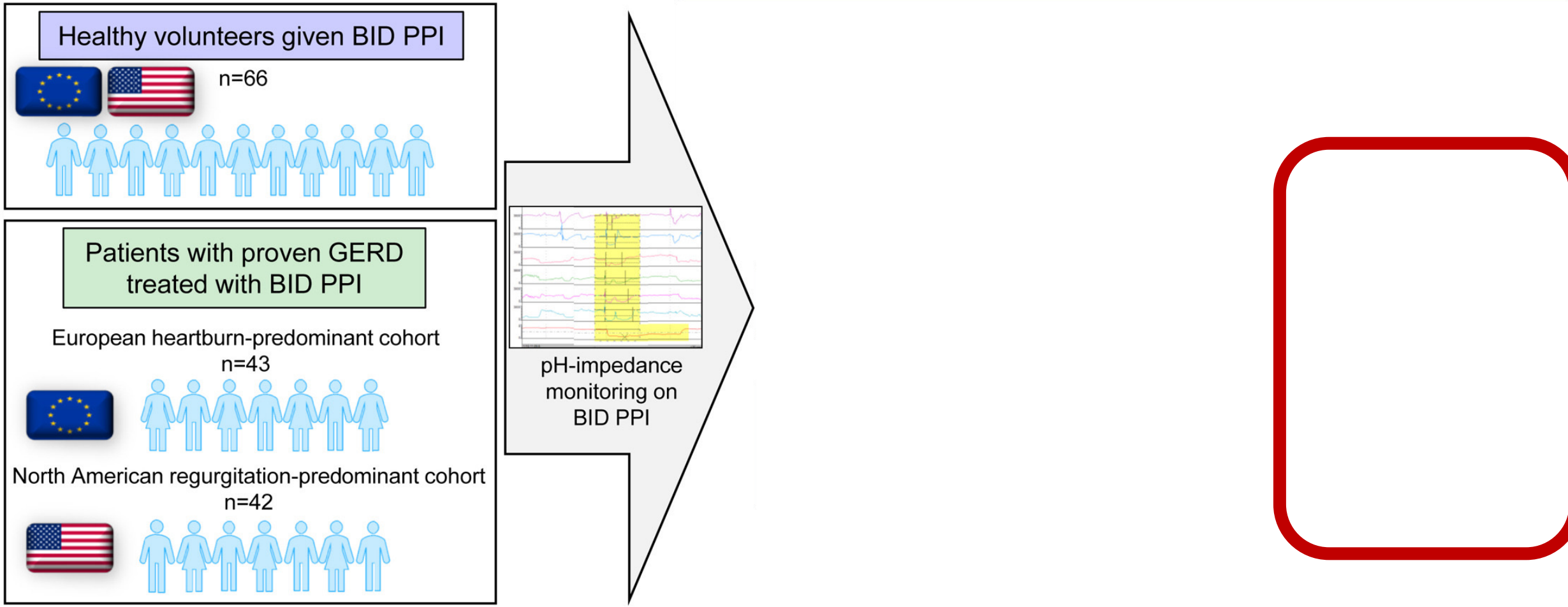
North American regurgitation-predominant cohort
n=42



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Gastroenterology 2021 *in press*

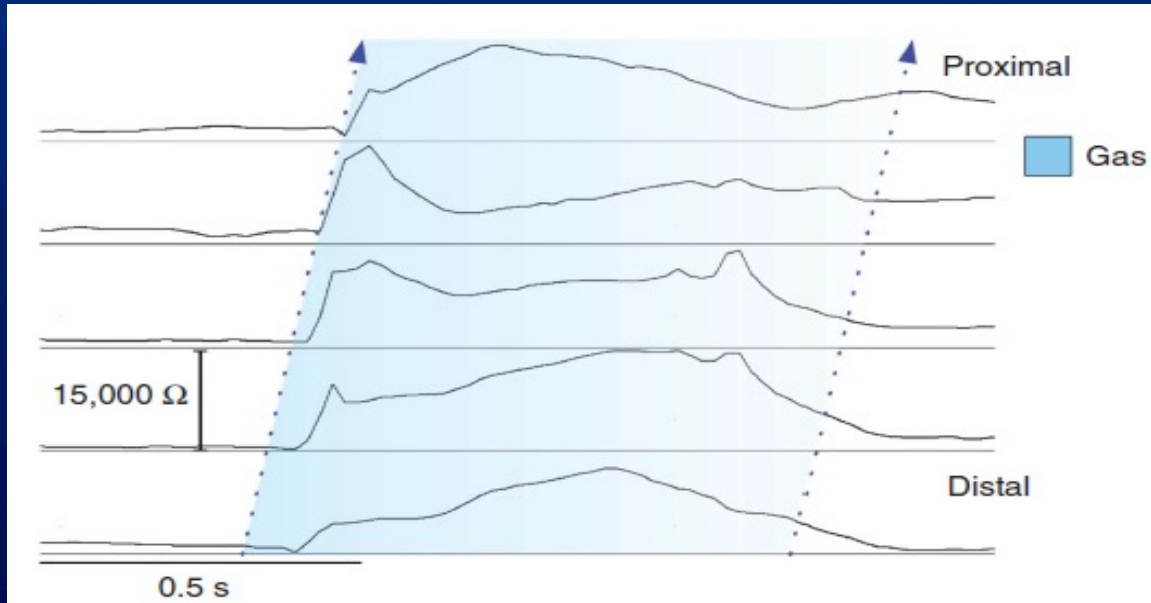


pH-IMPEDANCE MONITORING

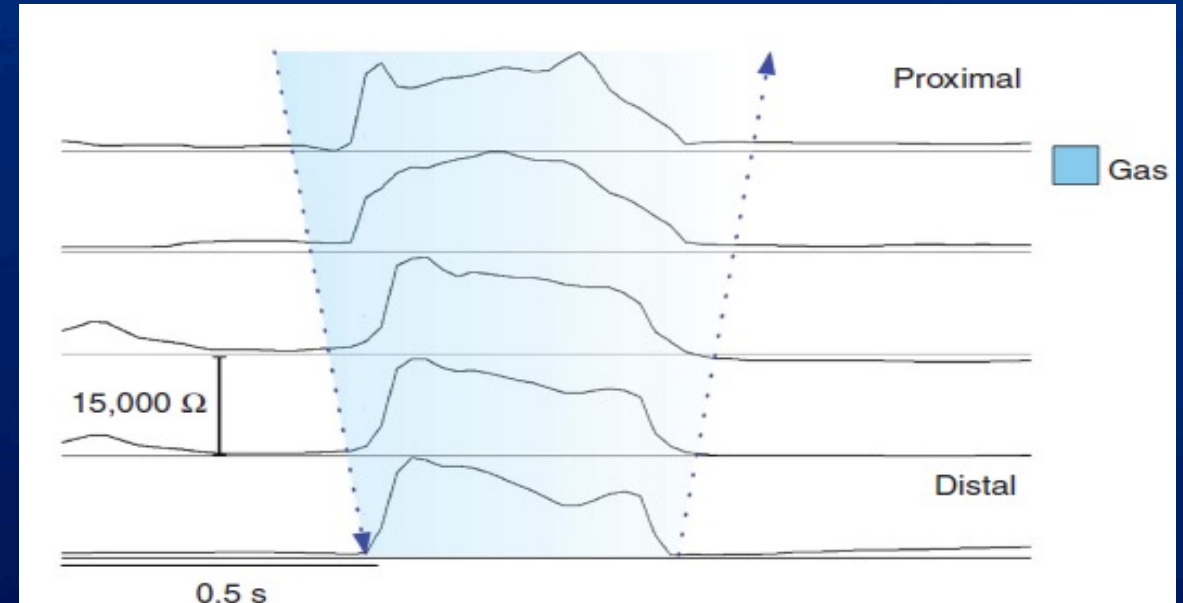
- **Novel parameters**

- *Post-swallow peristaltic wave index (assess clearance mechanism)*
- *Baseline impedance (evaluate mucosal integrity)*
- *Supragastric belching (detect behavioral disorder)*

pH-IMPEDANCE MONITORING: SUPRAGASTRIC BELCHING



Gastric belch



Supragastric belch

- Responds to cognitive behavioral therapy

Kessing, Am J Gastroenterol 2014

Glasinovich, Am J Gastroenterol 2018

PERSISTENT SYMPTOMS DESPITE PPI: EVALUATION

1. Optimize PPI dosing
2. Exclude other potential etiologies (EGD, ENT/Pulmonary consultation, etc.)
3. Perform reflux monitoring
 - is GERD confirmed or unconfirmed?
 - wireless pH or pH-impedance?
 - on or off PPI?

Unproven GERD

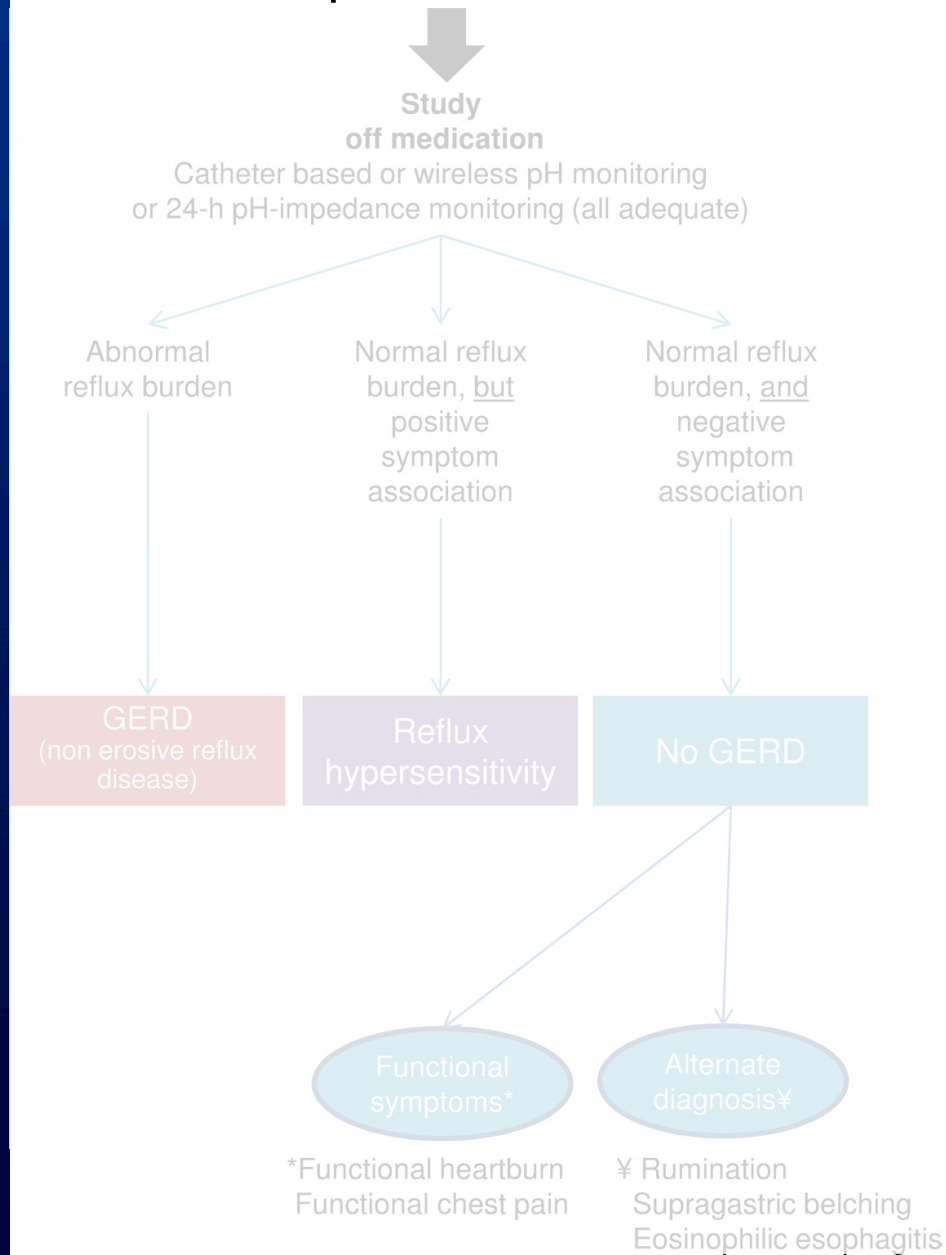
Proven GERD

Unproven GERD

Proven GERD

Unproven GERD

Proven GERD



REFLUX MONITORING SUMMARY

- pH test (catheter or wireless)
 - Should be performed off PPI
 - Best means to confirm or rule out GERD
 - Useful in pre-operative evaluation
 - Clarify whether GERD is present in extraesophageal presentations, PPI-refractory patients with unconfirmed GERD
- pH-impedance monitoring
 - Useful in patients with confirmed GERD and ongoing symptoms despite PPI
 - Test on PPI for acid and nonacid reflux - results of testing guide therapy
 - Identify supragastric belching
 - Novel parameters (PSPW index, baseline impedance)