Update in GERD

*How to use pH and pH-impedance monitoring in Clinical practice*

AGA Postgraduate Course

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GERD is a condition which develops when the reflux of stomach content causes troublesome symptoms and/or complications.

- **Esophageal Syndromes**
  - Symptomatic Syndromes
    - Typical reflux syndrome
    - Reflux chest pain syndrome
  - Syndromes with Esophageal Injury
    - Reflux esophagitis
    - Reflux stricture
      - Barrett's esophagus
    - Adenocarcinoma
  - Established Association
    - Reflux cough
    - Reflux laryngitis
    - Reflux asthma
    - Reflux dental erosions
  - Proposed Association
    - Sinusitis
    - Pulmonary fibrosis
    - Pharyngitis
    - Recurrent otitis media
**PPI Trial Algorithm?**

Patient with retrosternal discomfort (heartburn/chest pain) or regurgitation

- PPI Trial
  - QD PPI therapy 4 weeks
  - **Success**
  - Step down and stop; restart on lowest effective dose if relapse occurs
    - **Success**
  - Aim for lowest dose “on-demand therapy” For NERD

- **Failure**
  - Compliance
    - **Failure**
      - Improve Acid suppression
        - **Failure**
          - Refer for further evaluation
          - **Success**
      - **Success**
    - **Success**
  - Continue TX at current dose

* Always consider alternative diagnosis when treatment failure occurs

PPI Non-responders are Heterogeneous

- **Acid Reflux Symptoms**
  - Abnormal acid exposure
  - Hypersensitive [(+] S-R correlation]

- **Non-acid Reflux Symptoms**
  - Volume refluxers
  - Hypersensitive [(+] S-R correlation]

- Overlap between well-controlled GERD and Functional Esophageal Disorder

- Do Not Have Reflux at ALL
  - Functional heartburn...or just functional
  - Unrelated disease (EoE, EMD, Cardiopulm etc..)

Pandolfino JE, Vela, MF. Gastrointest Endosc. 2009 Apr;69(4):917-30,
New techniques have been limited in their ability to define mechanistic phenotypes

- **Combined catheter based pH-impedance**
  - Great value as a research tool.
  - No outcome measure that predicts likelihood to respond to surgery or escalation of therapy.
    - Number of reflux events, Baseline impedance, post-reflux swallow peristaltic wave index
  - Phenotype description is flawed by its reliance on symptom-reflux correlation.
    - SAP/ SI
  - Major insurers are not covering this device.

- **Bravo- prolonged wireless pH monitoring**
  - Prolonged studies may be able to rule out GERD.
  - Value is focused mainly on documenting acid exposure off medications and potentially stopping PPI.

- **Mucosal impedance probe**
  - New methodology that can be performed in less than 5 minutes during endoscopy.
  - Not validated against the “gold standard”
PPI NR Work up- Simple Approach

Patients failing optimized compliant PPI therapy

- EGD performed to assess anatomy and stratify GERD severity * r/o alternative diagnosis
- Reflux testing off PPI with Bravo or pH-Impedance
  Consider HRIM if belching/rumination/motor disorder considered

Abnormal Reflux Burden

- Yes-40%
  GERD
  Optimize PPI Behavioral/lifestyle Reflux Inhibitors?
  No response Further work-up [pH-impedance/HRIM]

- No-60%
  Reflux Sensitivity
  Functional Heartburn
  Alternative DX

Esophagitis LSBE

EoE Other
Phenotyping PPI Non-responders:
Low pre-test probability of refractory GERD
Bravo pH testing

Why *Off* medication is important in pH alone

**Cleveland Clinic Experience**

<table>
<thead>
<tr>
<th>Group</th>
<th>QD PPI 79</th>
<th>BID PPI 56</th>
<th>QD PPI 40</th>
<th>BID PPI 75</th>
</tr>
</thead>
<tbody>
<tr>
<td>% time pH&lt;4</td>
<td>1.2% (0-28%)</td>
<td>0.3 (0-15%)</td>
<td>0.3 (0-30%)</td>
<td>0 (0-4.8%)</td>
</tr>
<tr>
<td># abnormal</td>
<td>24 (31%)</td>
<td>4 (7%)</td>
<td>12 (30%)</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

Charbel et al., *Am J Gastroenterol.* 2005 Feb;100(2):283-9
Assess the Tracings – Days 1 & 2
Assess the Tracings – Days 3 & 4
Phenotyping PPI Non-responders:
High pre-test probability of refractory GERD pH-impedance monitoring

Pandolfino JE, Vela, MF. Gastrointest Endosc. 2009 Apr;69(4):917-30,
Phenotype 1
Persistent acid reflux on medication

Phenotype 2
No acid reflux on medication
Positive symptom-reflux association

Phenotypes 3/4
No acid reflux on medication
No significant association between symptom and reflux

Time
Reflux-symptom Association on PPI Therapy

acid reflux vs weakly acidic reflux vs no reflux

168 patients with symptoms

Symptoms
144 (85%)

No symptoms
24 (15%)

Positive SI
69 (48%)

Negative SI
75 (52%)

Functional Alternative DX

+SI acid
16 (11%)

+SI non-acid
53 (37%)

Acid Breakthrough

Non-Acid Reflux

GERD: Pitfalls

• Patients may have a good response to PPI and not have GERD.
• Patients may have a positive pH study and not have GERD.
• Patients may have a good symptom correlation on pH-impedance testing and not have GERD.
• Be careful with belching, regurgitation and nausea/vomiting.
tLESR

Liquid reflux

LES relaxation and crural inhibition
GERD: Pitfalls

• 23 year old female with sore throat, acid taste and regurgitation with meals.
  – *She has a good response to PPI in terms of the acid taste but still has regurgitation*
  – *EGD was c/w a gaping EGJ and a small hiatus hernia.*
  – *pH-impedance was c/w normal acid exposure and a symptom index of 90% for regurgitation / SAP 100%.*
Rumination #1 HRM only

- Liquid reflux
- Increased IGP pressure
Rumination #2 HRIM

- Increased IGP pressure
- Liquid reflux
- Regurgitation with swallowing
GERD: Pitfalls

• 43 year old female with chest pain, belching and regurgitation with meals.
  – *She has a good response to PPI in terms of the heartburn but continues to have severe debilitating belching*
  – *EGD was c/w a normal EGJ and a small hiatus hernia.*
  – *pH-impedance was c/w normal acid exposure and a positive symptom index of 60% for belching/regurgitation.*
Supragastric Belching

Air reflux

No LES relaxation
GERD: Pitfalls

- 55 year old male with heartburn and regurgitation presenting for pre-operative testing for antireflux surgery.
  - He has a good response to PPI in terms of the heartburn but continues to have regurgitation.
  - EGD was normal.
  - Consult for manometry
GERD: Pitfalls
Northwestern Refractory GERD Approach
Heartburn, Regurgitation, Chest Pain

Document Compliance

EGD and possible reflux testing if EGD (-) and symptoms continue

Consider motility (HRIM) testing for atypical presentation
Rule out eating disorder/rumination

Define Phenotype-Reflux Testing

Proven Refractory Reflux
Hernia
- Optimize medications
- Lifestyle modifications
- Behavioral Intervention
- Consider Intervention*
  - Hernia repair
  - LINX/ Fundoplication

Proven Refractory Reflux
Normal Anatomy
- Optimize medications
- Lifestyle modifications
- Behavioral Intervention
- Baclofen/Neuromodulator
- Consider Intervention*
  - Stretta/Esophyx/LINX?

Proven Reflux
Functional HB/sensitivity.
- Optimize medications
- Lifestyle modifications
- Behavioral Intervention
- Baclofen/Neuromodulator

Not Reflux
Functional HB/sensitivity*
- Stop PPI
- Lifestyle modifications
- Behavioral Intervention
- Neuromodulator

* R/O major motility disorder, belching syndrome and gastric emptying issue if not done already
A 23 year old female patient presents to your clinic with the chief complaint of severe heartburn not responding to multiple proton pump inhibitors. She is currently on Nexium 40 mg twice a day. The heartburn lasts for hours and is not related to meals. She has undergone an endoscopy which revealed a slightly irregular z line, no hernia and biopsies of the SCJ and body were normal.

Which test is most appropriate in this patient to assess PPI non-response?

a) High-resolution manometry
b) Bravo pH monitoring off medication
c) 24 hour pH-impedance on medication
d) Gastric emptying testing
e) Bravo pH monitoring on medication

**Correct answer is - b**