Beyond Heartburn: Evaluation and Management of Extraesophageal Manifestations of GERD

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No financial disclosures

Learning Objectives

1. Extraesophageal signs + symptoms linked to Gastroesophageal Reflux Disease (GERD).
2. Is “extraesophageal reflux” (EER) the cause?
3. Current treatment options for extraesophageal manifestations of GERD
4. 2018 Clinical Practice Updates

What is "GERD"?

Gastroesophageal Reflux Disease

Montreal Consensus definition: *a condition which develops when the reflux of gastric content into the esophagus causes troublesome symptoms and/or complications (stricture, Barrett's esophagus). Syndromes include:*

Typical reflux syndrome -- heartburn and/or regurgitation;
may include epigastric pain / sleep disturbance

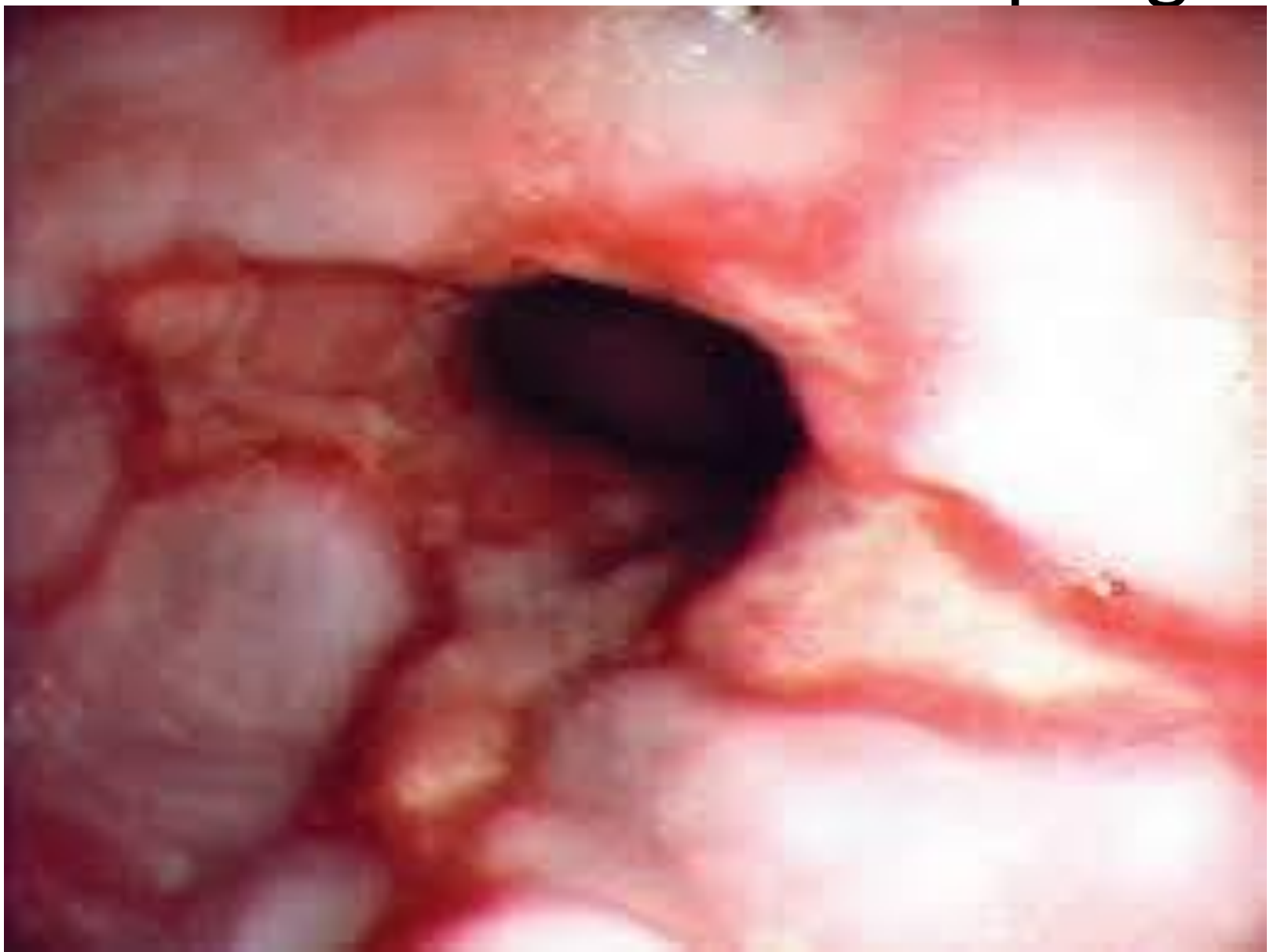
Reflux chest pain -- "non-cardiac chest pain"

Extra-esophageal reflux syndromes (EER, laryngopharyngeal reflux = LPR)

- …. with established association including cough, asthma, laryngitis/voice issues, and dental erosions
- …. without established association including sinusitis, pharyngitis, Idiopathic Pulmonary Fibrosis, recurrent otitis media

Vakil N, van Zanten SV, Kahrilas P, et al.
Am J Gastroenterology 2006

Erosive Esophagitis



It's not "just" heartburn!

GERD Facts

COMMON: 30-40% US weekly; 20% in US have GERD
*7% daily reflux = 275,000 in Phoenix!

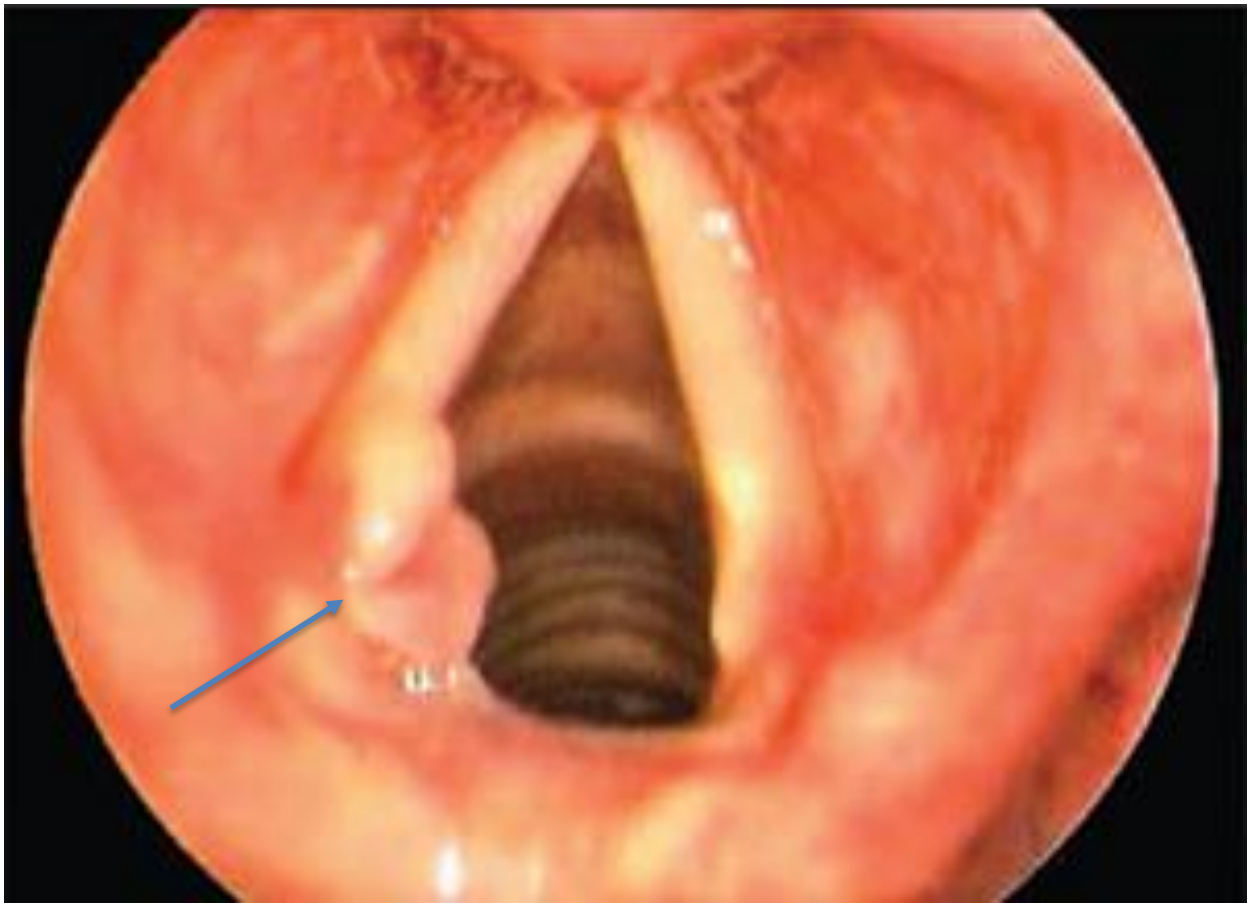
COSTLY: $15 bl/yr for GERD + $50 bl/yr atypical sx and impact on HRQOL

CHRONIC: 75% patients have recurrent symptoms

COMPLEX: Barrett's => esophageal cancer; stricture
→ atypical / extraesophageal symptoms

Francis DO, Rymer JA, Slaughter JC, Am J Gastro (2013)
Katz PO, Gerson LB, Vela MF Am J Gastro (2013)

"Discovery" of EER



Contact ulcer hypothesized to be due to acid reflux

Cherry J; Margulies SI Laryngoscope (1968)

The "Silent Reflux" Craze

1979 Anti-reflux surgery stops aspiration + GERD

1991 Koufman - 225 patients & extensive lit. review

Strongly suggested GERD caused EER.

.....based on small observational/case controlled studies

2002 American Academy Otolaryngology-H&N Surg

Committee on Speech, Voice + Swallowing Disorders

Dx made by - Laryngoscopy findings (RFS > 7)

- Patient's symptoms (RSI > 13)
- Positive pH probe testing

REC: PPI BID x 6 months (+ see GI doc for EGD)

Pellegrini CA, Demeester TR (et al) Surgery (1979)
Koufman JA. Laryngoscopy (1991)
Koufman JA, Aviv JE, Casiano RR (et al) Otolaryngol Head Neck Surg (2002)

Signs & Symptoms blamed on Reflux

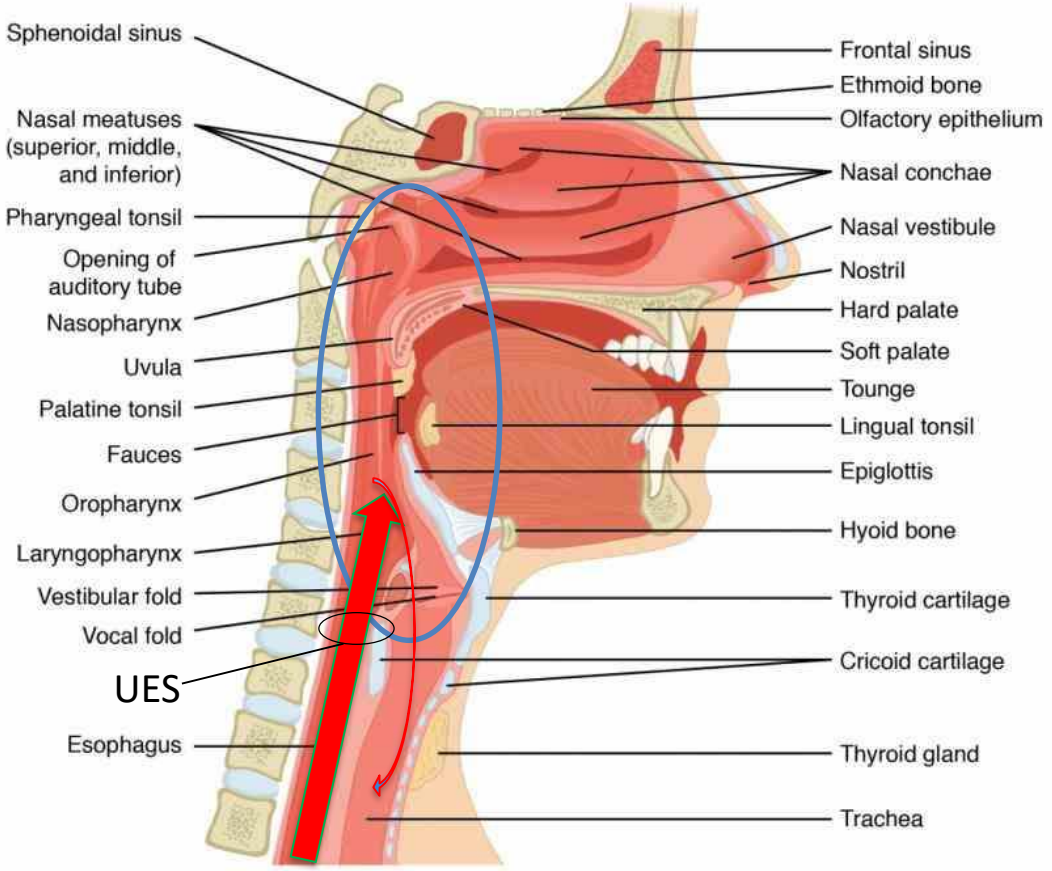
Laryngopharyngeal	Respiratory	Other
Hoarseness	Chronic cough	Dental erosions
Globus sensation	Asthma	Otitis
Sore/burning throat	Pneumonia	Chronic sinusitis
Chronic throat clearing	Pulmonary fibrosis	Post nasal drip
Laryngeal cancer	Lung Tx rejection	
Laryngitis/ulcer/nodules/stenosis		Chest pain

Vaezi MF, Katzka D, Zerbib F Clin Gastroenterol Hepatol (2018)
Katz PO, Gerson LB, Vela MF Am J Gastro (2013)

Proposed Pathophysiology

Direct contact of refluxate (acid) into areas that lack protective defensive mechanisms.

But subsequent studies failed to demonstrate a clear causal relation-ship with ACID reflux due to mixed results from PPI and pH data.



Koufman JA. Larygnoscope (1991)

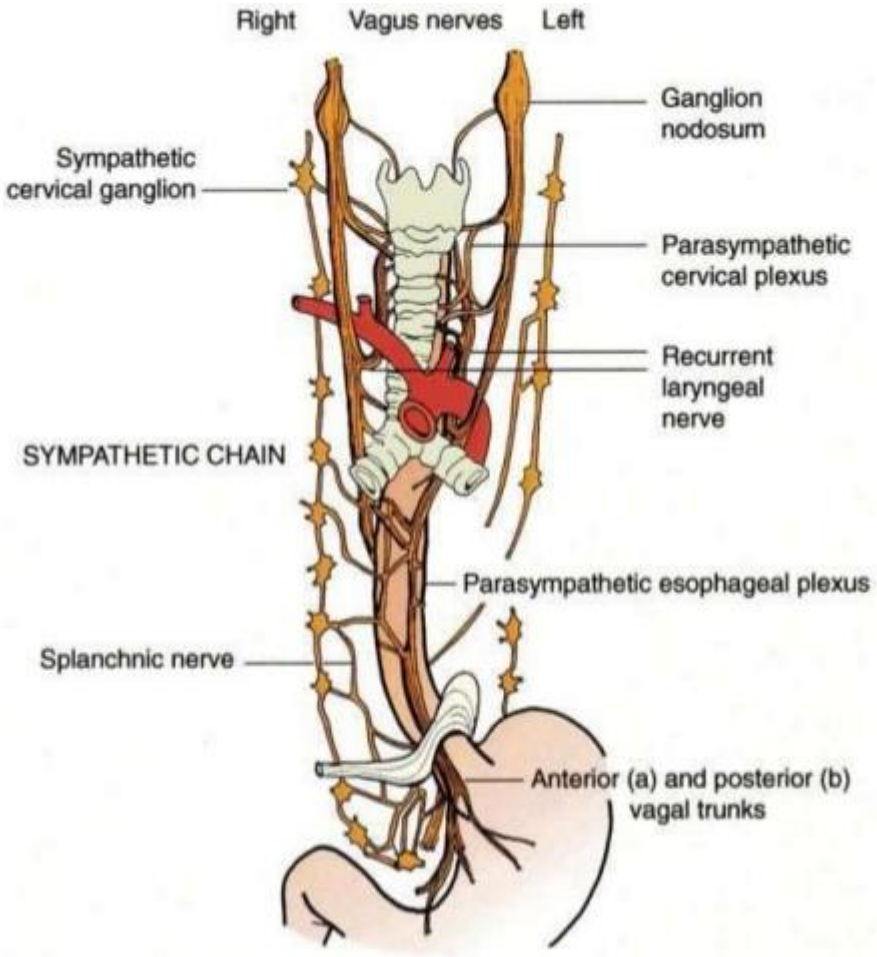
Refluxate Link Challenges

- Refluxate Contents
  - *Acid (pH<4) - how much ?*
  - *Weak Acid (pH 4-6) ?*
  - *Pepsin*
  - *Bile ?*
  - *Liquid and / or Gas forms ?*
- Quantity of refluxate
  - *Frequency / Duration (total time or long episode ?)*
  - *Supine or upright position?*
- Location differences *?*
  - *How/What and When and Where to measure ?*
- Other factors
  - *Esophageal clearance / motility ?*
  - *UES pressures ?*

Cough elicited by:

ESOPHAGEAL DISTENTION

ESOPHAGEAL ACID PERFUSION



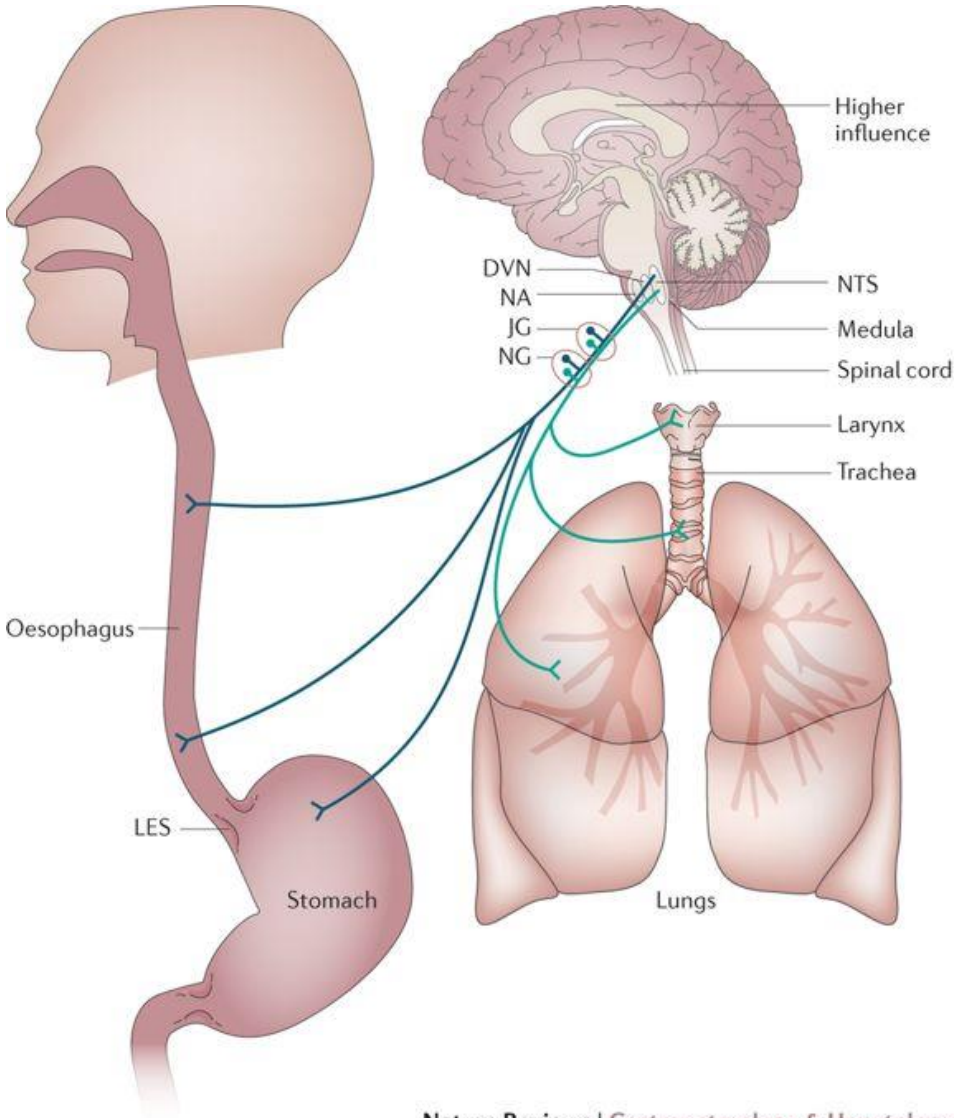
Smith JA, Decalmer S, Kelsall J et al Gastro (2010)

Direct and Central Neuronal Pathways

- Central effect of reflux bolus activates neurons -> bronchial constriction leading to cough; acid infusion in esophagus
- Sensitizes pharyngeal and respiratory afferent pathways.
- Reflux - > Cough = Cough -> Reflux
- Sensory changes; irritable or hypersensitive larynx.

Smith JA, Decalmer S, Kelsall J et al Gastro (2010)

Esophageal-Bronchial Reflex



Houghton LA, Lee AS, Badri H et al
Nat Rev Gastroentol Hepatol (2016)

As of 2018….. there are no criteria (or diagnostic tests) that <u>unequivocally</u> demonstrates a causal link between GERD & EER signs and symptoms.

Extraesophageal Reflux Evaluation

Reflux Symptom Index

Koufman Reflux Symptom Index Quiz (RSI)

Within the last MONTH, how did the following problems affect you?	0 = No Problem					5 = Severe Problem
Hoarseness or a problem with your voice	0	1	2	3	4	5
Clearing your throat	0	1	2	3	4	5
Excess throat mucous or postnasal drip	0	1	2	3	4	5
Difficulty swallowing food, liquids, or pills	0	1	2	3	4	5
Coughing after you ate or after lying down	0	1	2	3	4	5
Breathing difficulties or choking episodes	0	1	2	3	4	5
Troublesome or annoying cough	0	1	2	3	4	5
Sensations of something sticking in your throat or a lump in your throat	0	1	2	3	4	5
Heartburn, chest pain, indigestion, or stomach acid coming up	0	1	2	3	4	5
	Your RSI is					

A score of 15 or more means that you have a 90% chance of having reflux, especially airway reflux.

Validated in patient with symptoms; before/after PPI Tx

Belafsky, PC, Postma GN, Koufman JA et al J Voice (2002)
http://www.voiceinstituteofnewyork.com/

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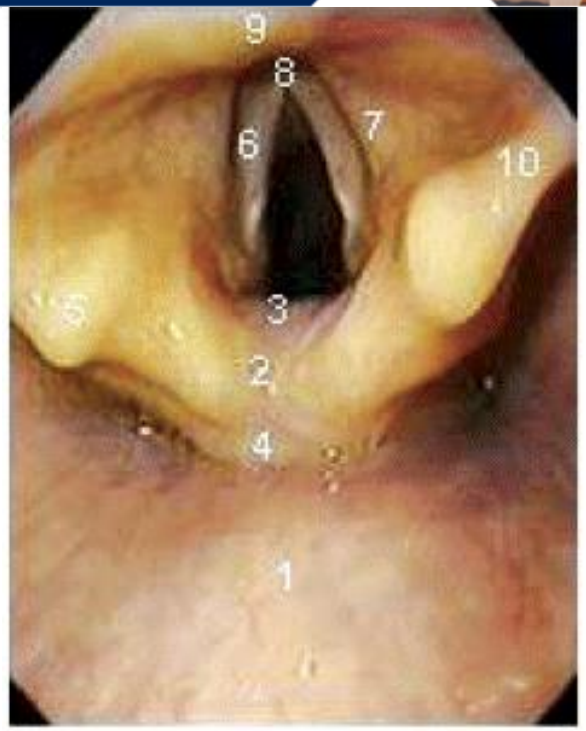
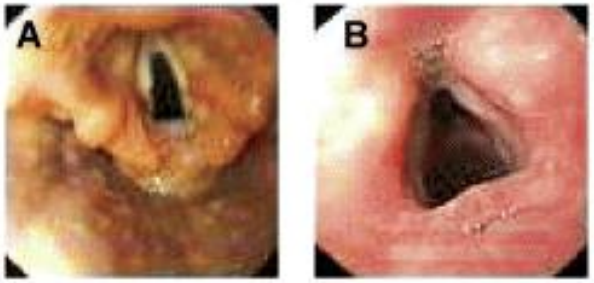
Diagnostic Tests

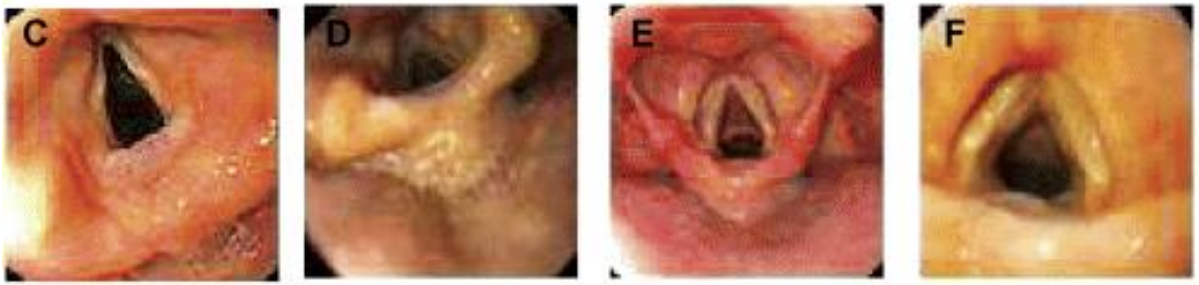
- Laryngoscopy
- Esophagogastroduodenoscopy (EGD)
- Ambulatory pH monitoring (BRAVO)
- Combined pH-impedance monitoring
- Novel tests
  - salivary pepsin
  - mucosal impedance

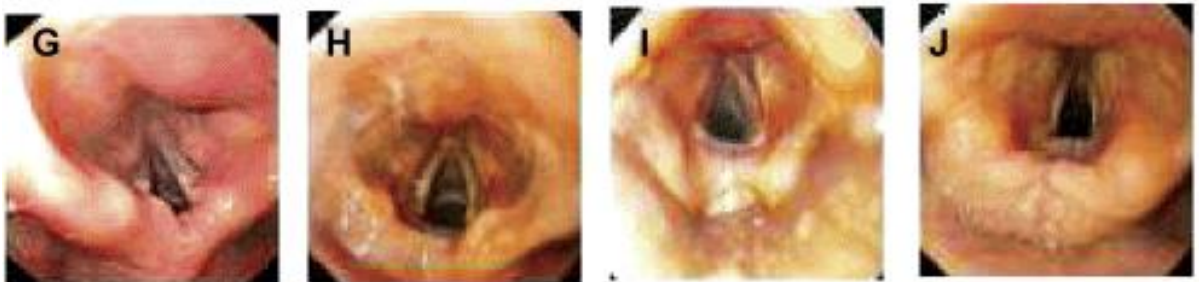
Findings at Laryngoscopy



1. Posterior pharyngeal wall
2. Interarytenoid bar
3. Posterior commissure
4. Posterior cricoid wall
5. Arytenoid complex
6. True vocal folds
7. False vocal folds
8. Anterior commissure
9. Epiglottis
10. Aryepiglottic fold







Vavricka, SR, Storck CA, Wildi SM
Am J Gastro (2007) 102:716-722

Reflux Finding Score (RFS)

mucosal injury at laryngoscopy

1. Subglottic edema	0 = absent 2 = present	2. Ventricular Obliteration	2 = partial 4 = complete
3. Erythema/hyperemia	2 = arytenoids only 4 = diffuse	4. Vocal fold edema	1 = mild 2 = moderate 3 = severe 4 = polypoid
5. Diffuse laryngeal edema	1 = mild 2 = moderate 3 = severe 4 = obstructing	6. Granuloma/granulation tissue	0 = absent 2 = present
7. Posterior commissure hypertrophy	1 = mild 2 = moderate 3 = severe 4 = obstructing	8. Thick endolaryngeal mucus	0 = absent 2 = present

RSF > 7 = Laryngeal Pharyngeal Reflux (LPR)

Belafsky, PC, Postma GN, Koufman JA et al
Laryngoscope (2001)

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Findings at Laryngoscopy

Early studies – uncontrolled in pts w/ GERD + LPR

Suggested that REFLUX was the cause of Laryngeal stenosis (78%), Laryngeal cancer (71%), Laryngitis (60%), Globus sensation (58%), and Cough (52%)

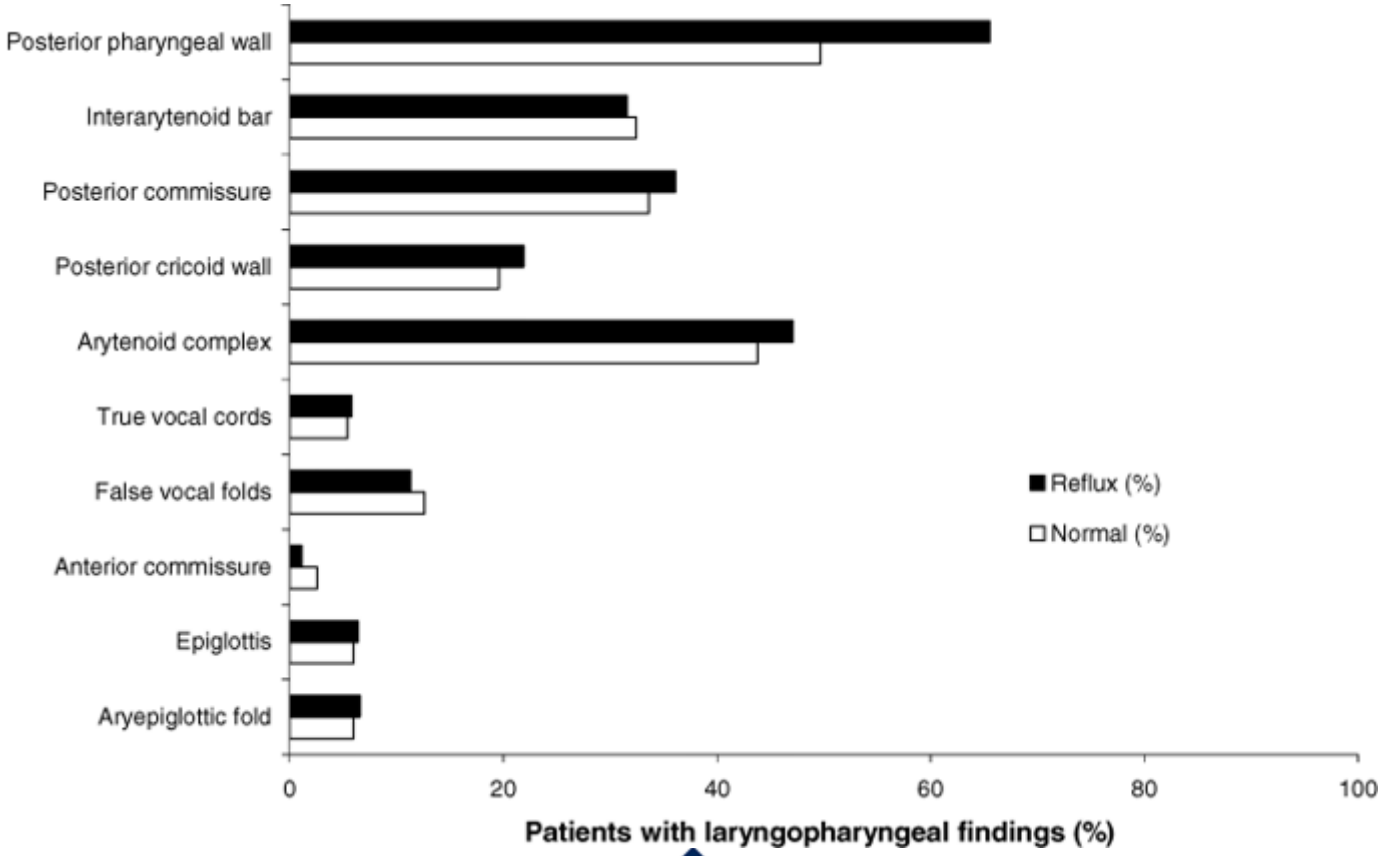
But…

In asymptomatic (normal) patients, up to 86% had one of the "LPR" laryngoscopic findings.

Studies mixed intra-/ interobserver reproducibility

Koufman JA. Laryngoscopy (1991)
Hicks, DM, Ours TM, Abelson TI et al. J Voice (2002)
Vaezi MF, Hicks DM, Abelson TI et al
Clin Gastroenterol Hepatol (2003)

Limited Value of Laryngopharyngeal Lesions + GERD/Erosive Esophagitis



Vavricka, SR, Storck CA, Wildi SM Am J Gastro (2007)

Laryngoscopic Findings Summary

Including the Reflux Finding Score (RFS):

- Does not correlate well with traditional pH tests
- Does not distinguish normal from pts w/disease
- Does not predict response to PPI therapy compared to placebo.

*poor predictive value in determination of cause


仁壽殿

Upper endoscopy (EGD)

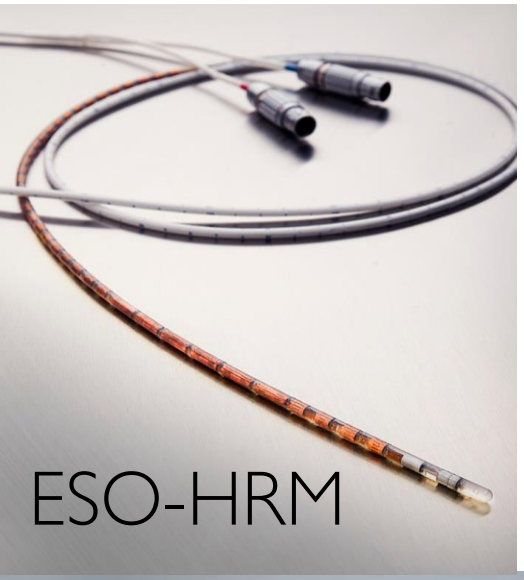
- Erosive esophagitis (EE) can be found in up to 40% of patients with asthma
- EE can be found in 20% patient with primary extraesophageal symptoms / silent reflux

> However, minority of patients with EE have extraesophageal reflux / LPR symptoms

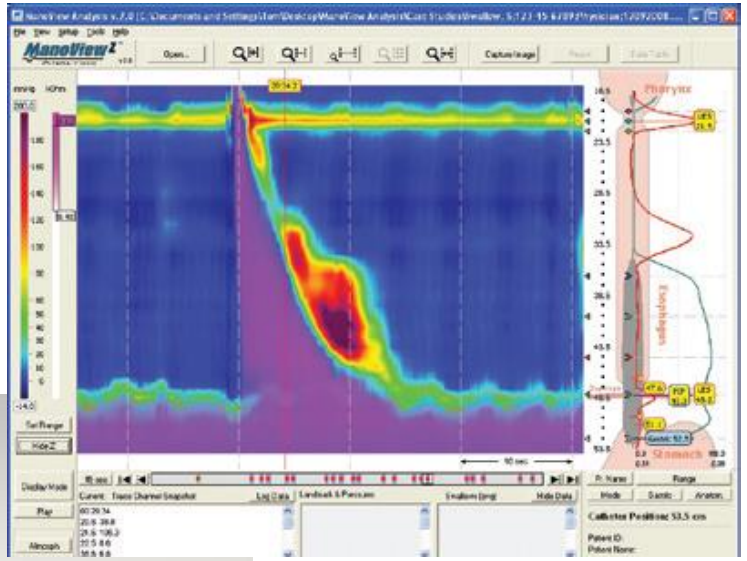
*poor predictive value in determination of cause

(EGD valuable for evaluation of Barrett's esophagus, dysphagia, hernia size/type)

Ambulatory pH-Z Testing & Manometry



ESO-HRM



HRM ESO

Bravo

pH

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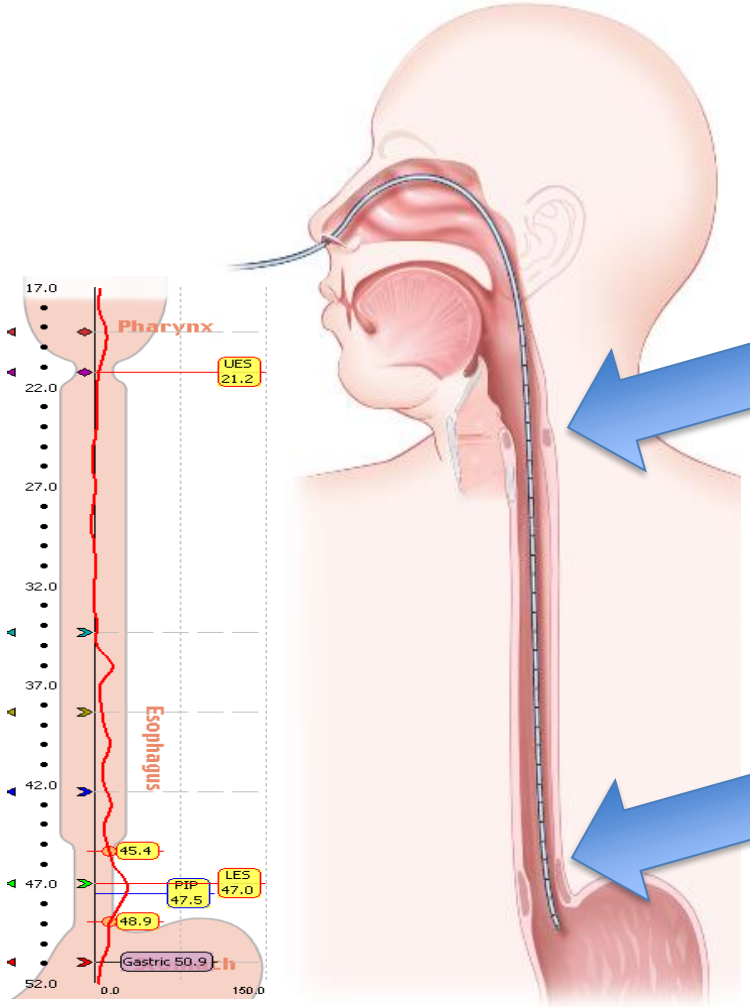
Anatomy of Upper GI Tract



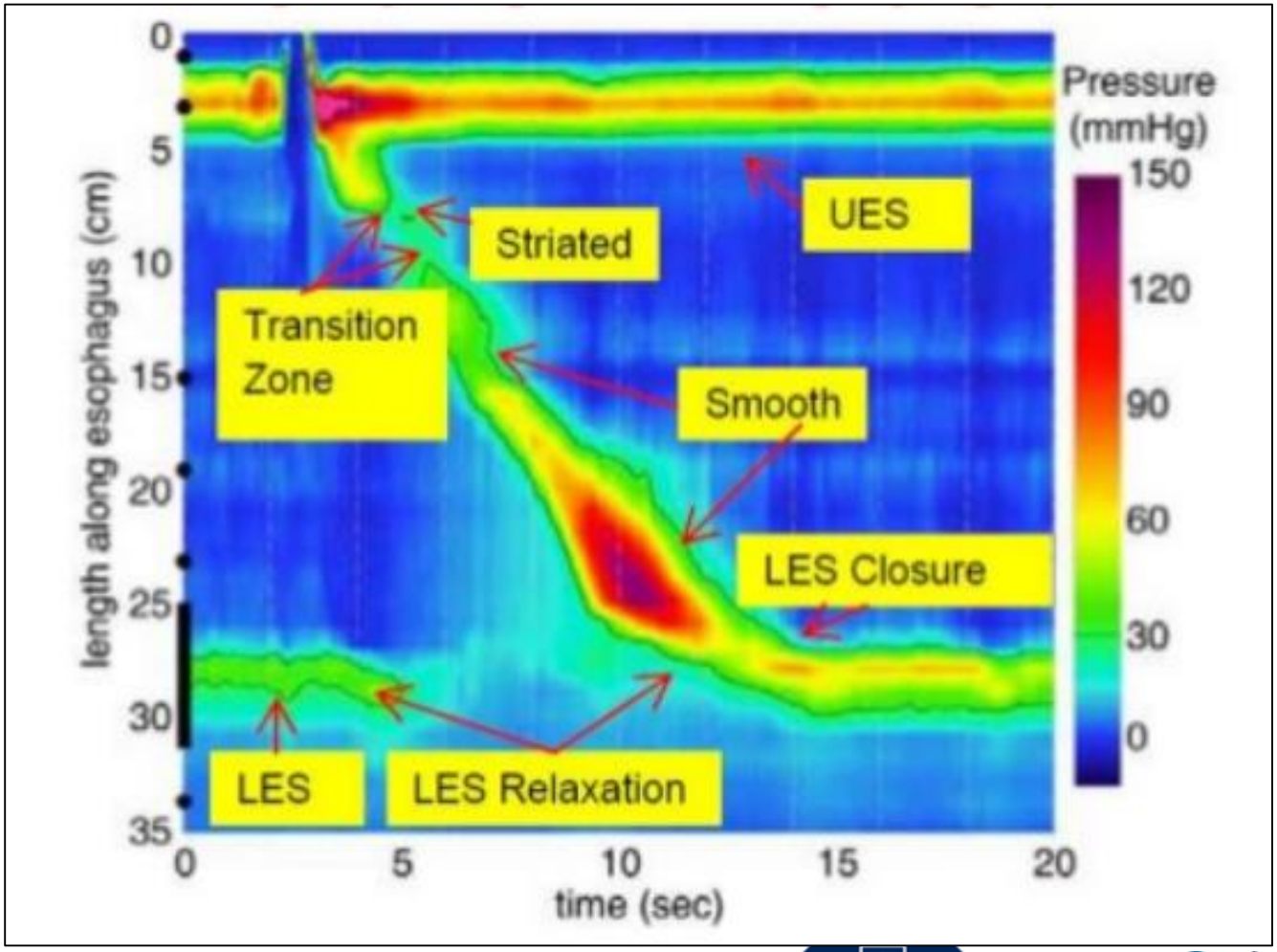
Upper Esophageal Sphincter

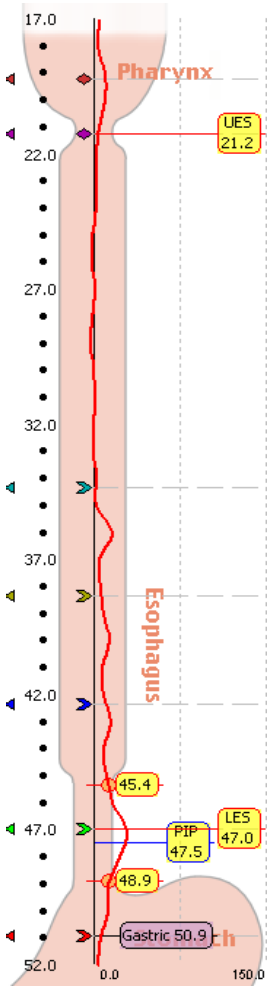
- 3 cm long
- Resting Pressure – 34 – 104 mm Hg

Lower Esophageal Sphincter

- Located in distal 3-5 cm of esophagus
- Resting pressure – 13 – 43 mmHg
- Serves to reduce gastric reflux and regurgitation

Normal Swallow





pH-Impedance Testing with Symptom Correlation

- pH -- Transnasal Catheter vs BRAVO capsule
  - ON PPI to confirm acid control
  - OFF PPI to confirm GERD
- Impedance testing
- Symptom Correlation

Catheter pH Testing with IMPEDANCE ("Z")

Digitrapper pH-Z
Ambulatory 24-Hour pH & Impedance Recorder

Digitrapper pH-Z AccuView pH-Z

Please reference the provided User Manuals for the Digitrapper pH-Z and AccuView software for a more detailed explanation of operation.

QUICK GUIDE

RECORDING

START PROCEDURE

1. Remove the recorder from the carrying case. (see Below)
2. Place two new AA (Alkaline Only) batteries in the battery compartment and place the recorder back into the carrying case.
3. Press any button to turn the recorder on.
4. Insert a catheter into the appropriately labeled connector, ensuring it locks in place.
5. Set catheter type, study duration, and other parameters in the "Settings" menu.
6. Start a new study by selecting "Start Study" from the Main Menu and follow the on-screen messages to confirm starting a new study.
7. Prior to calibration, place sensor(s) in pH buffer solution or saline for a minimum of 10 minutes.
8. Follow on screen instructions for calibration, refer to the User Manual for more detailed instructions.
9. Use the pH readings on the "Ready for Intubation" screen to aid in intubation.

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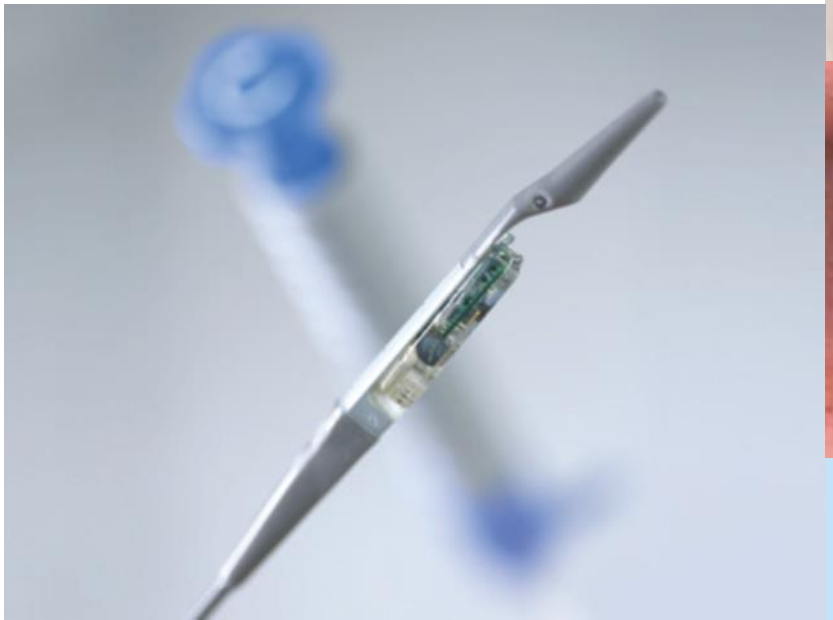
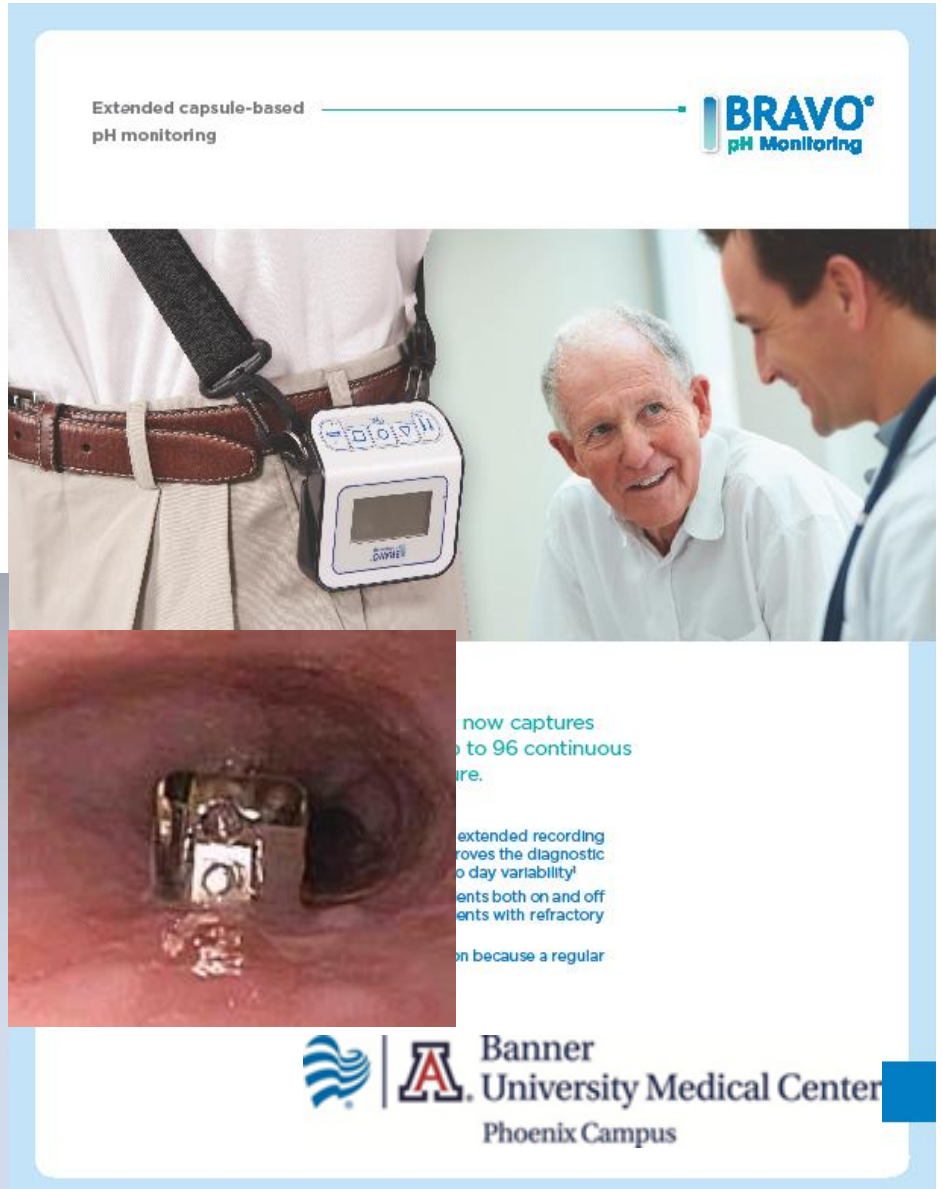
Bravo 48-96 hour Wireless pH Testing





What is IMPEDANCE ("Z") ?

Resistance to conductivity on 2 points of catheter:

- liquid rich in ions causes drop in impedance

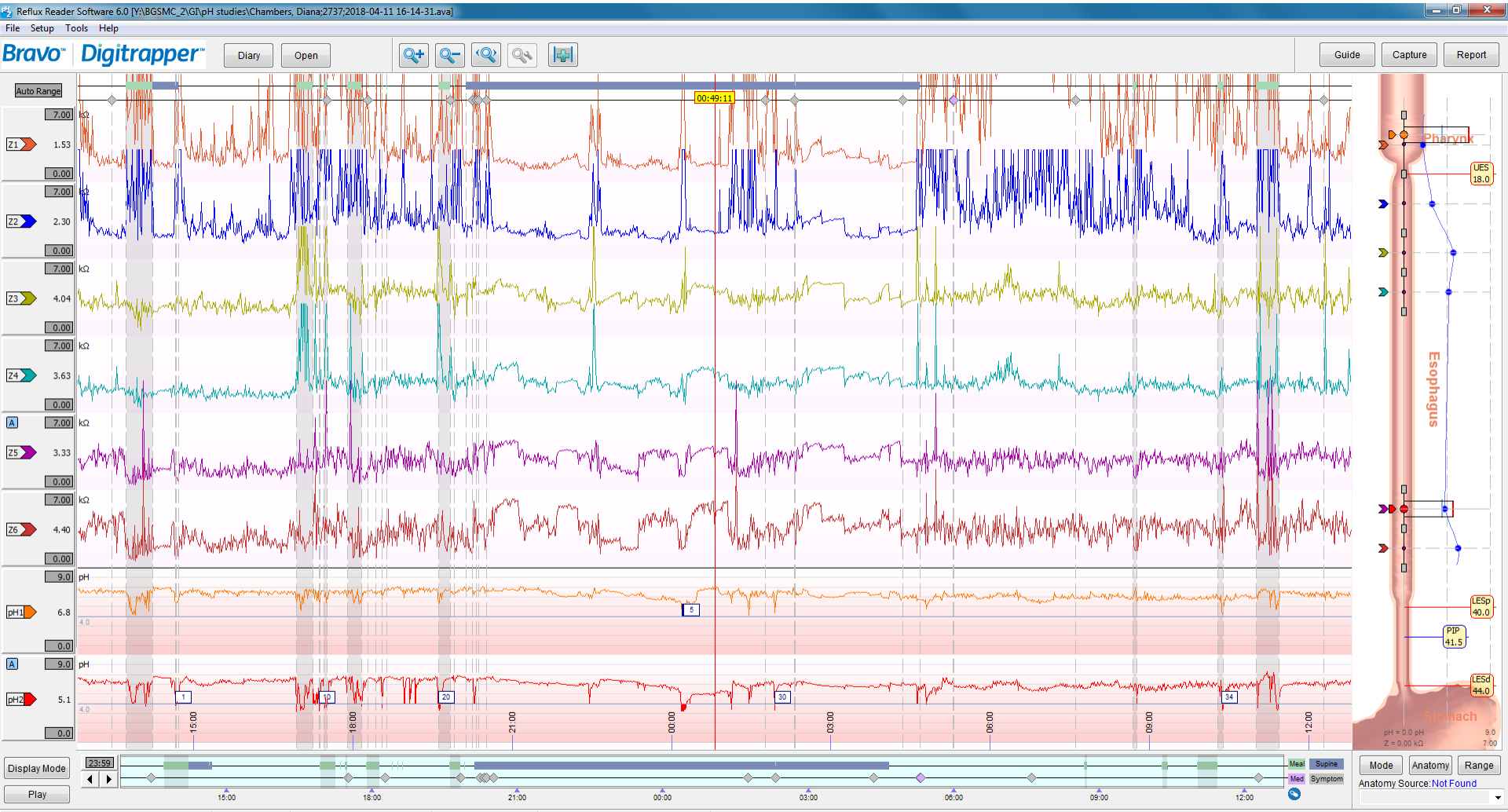
Can determine direction of liquid in each event

– from mouth to stomach (normal) or refluxing.

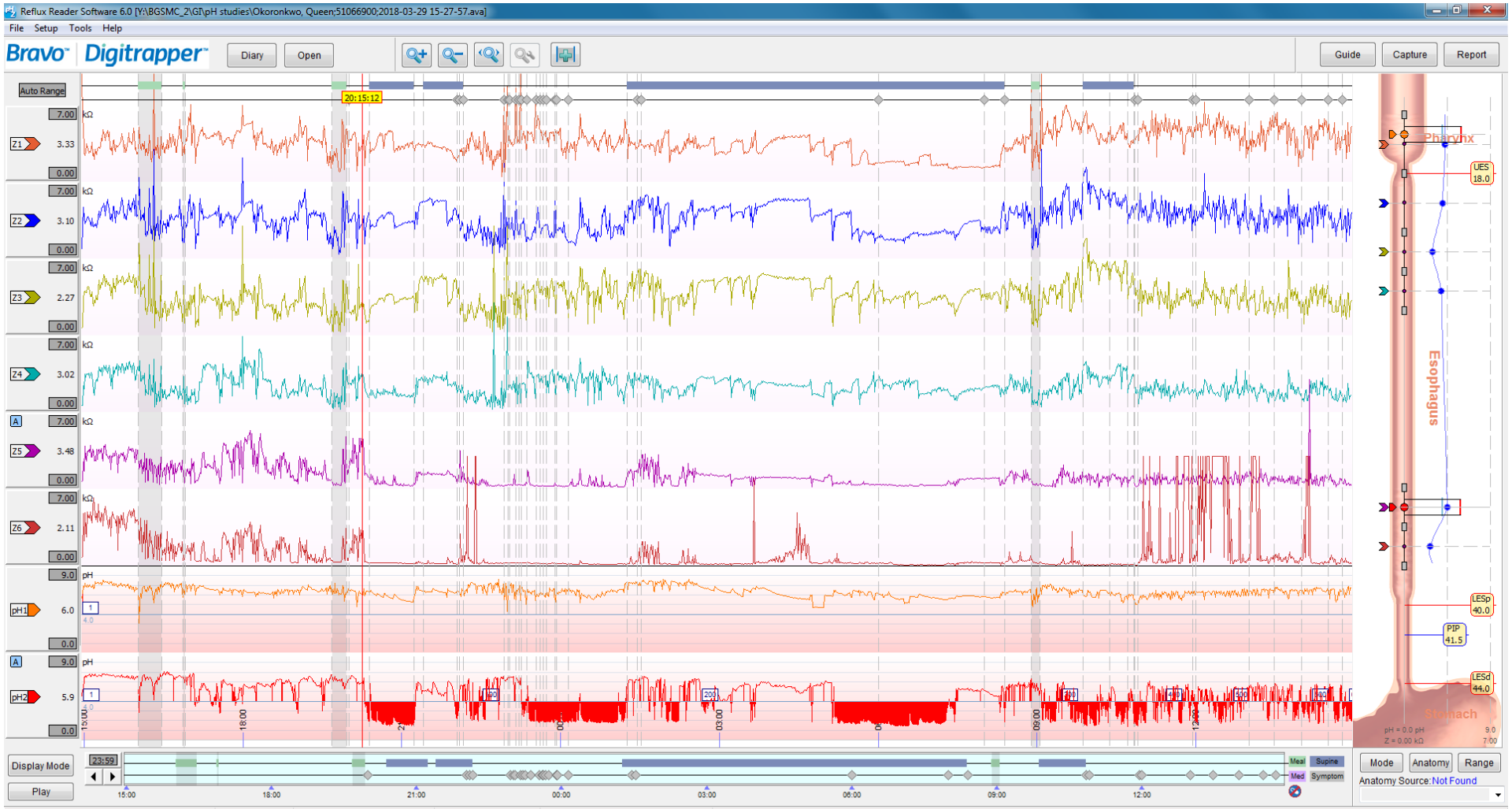
Normal numbers established distally; not for LPR….

Assess # acid, weak acid, and non-acid reflux events

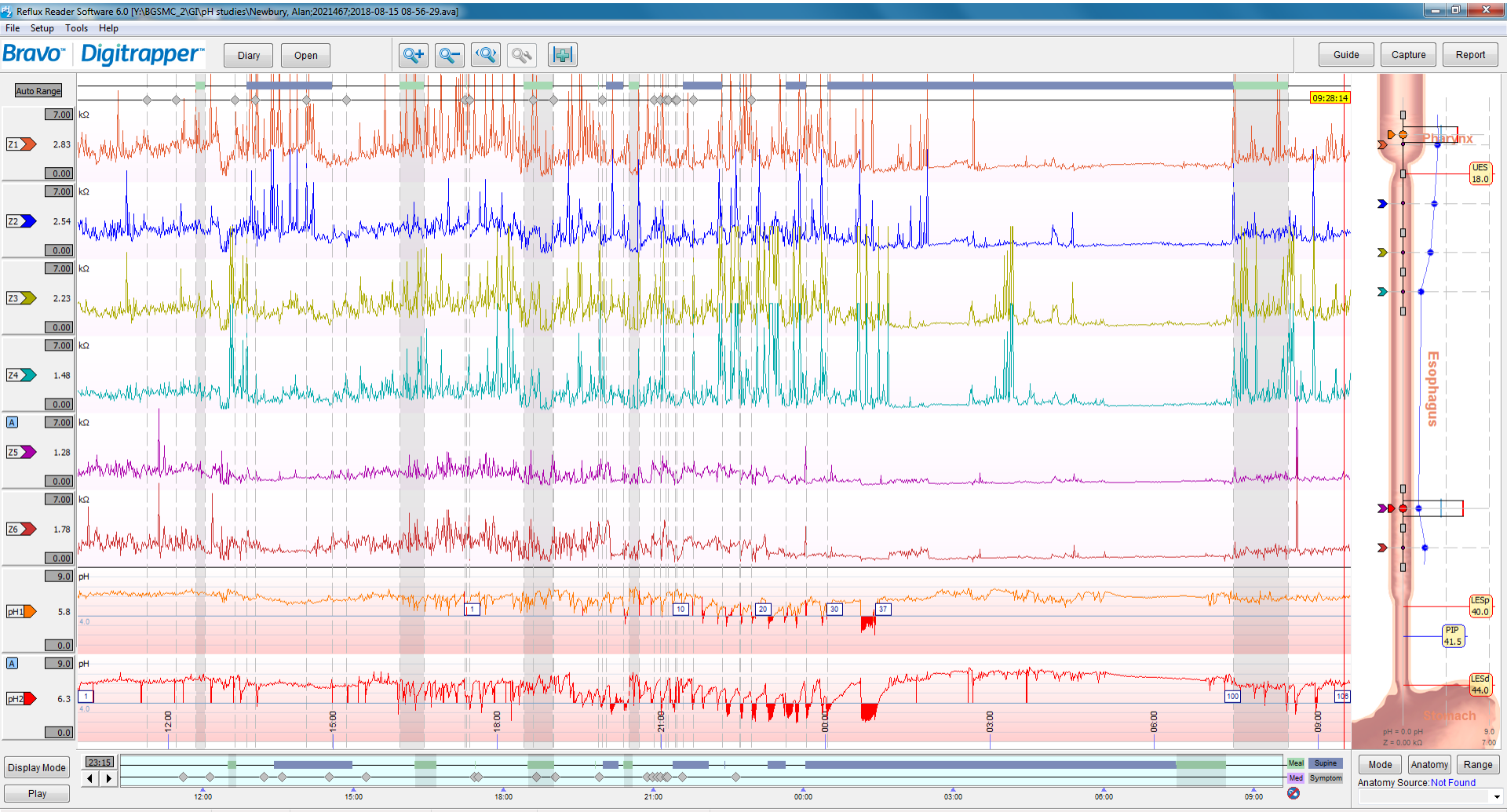
Normal pH-Z


Reflux Reader Software 6.0 [Y:\BGSMC_2\GI\pH studies\Chambers, Diana;2737;2018-04-11 16-14-31.ava]
File Setup Tools Help
Bravo Digitrapper
Diary
Open
Guide
Capture
Report
Auto Range
00:49:11
Z1 1.53
Z2 2.30
Z3 4.04
Z4 3.63
Z5 3.33
Z6 4.40
pH1 6.8
pH2 5.1
Pharynx
UES 18.0
Esophagus
LESp 40.0
PIP 41.5
LESd 44.0
Stomach
15:00
18:00
21:00
00:00
03:00
06:00
09:00
12:00
Display Mode
Play
Mode
Anatomy
Range
Anatomy Source: Not Found
Patient Name: Chambers, Diana
ID: 2737
Study Start Date: 04/10/2018
Study Duration: 23:59:59
Protocol: @Catheter, Dual pH 19cm spac
1:35 AM

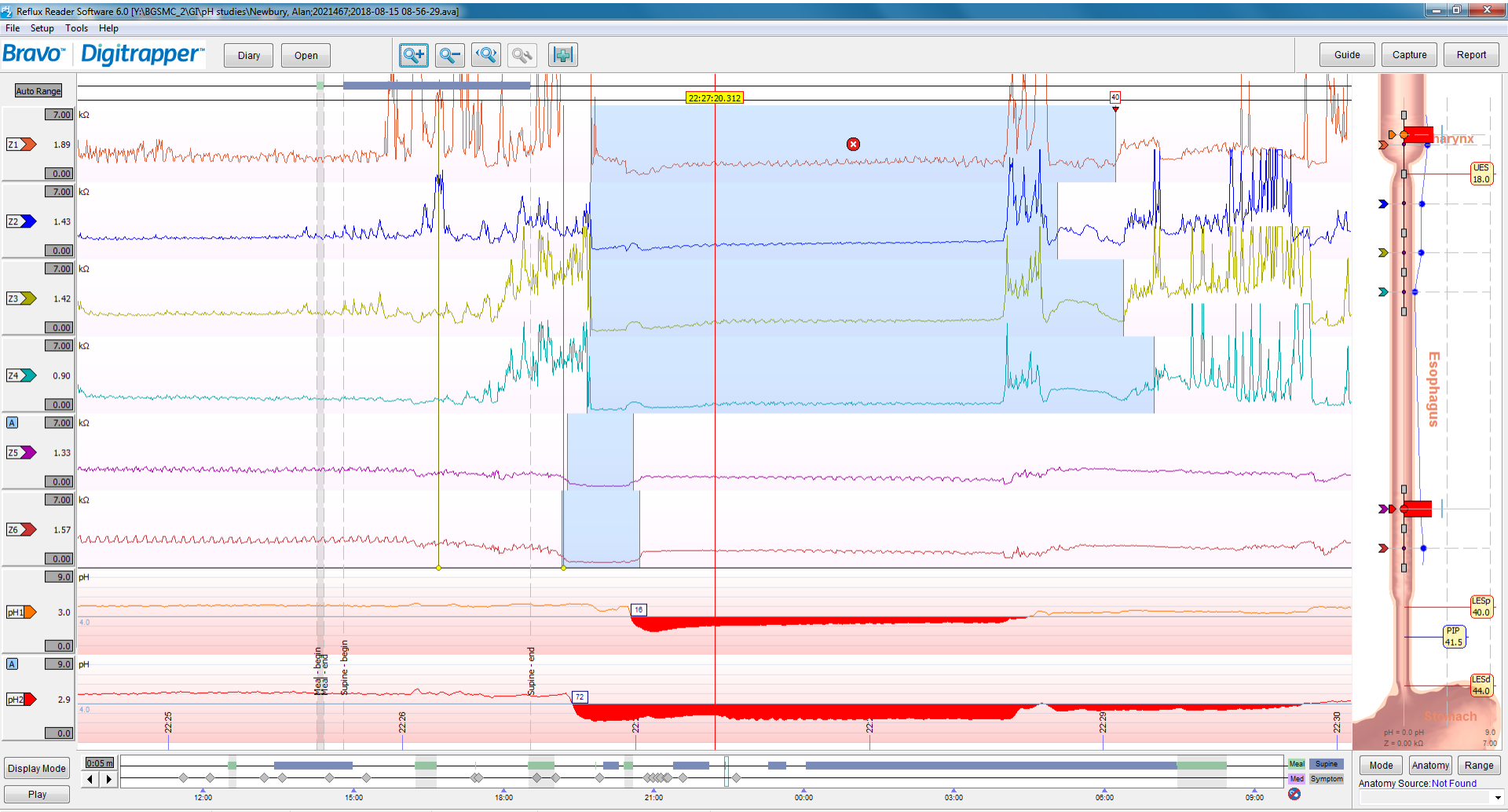
+ pH testing (distal only)



Distal and Proximal Reflux



Proximal pH-Z Event



Limitations of pH-Z studies

Abnormal distal esophageal pH does not predict response EER symptoms to PPI therapy

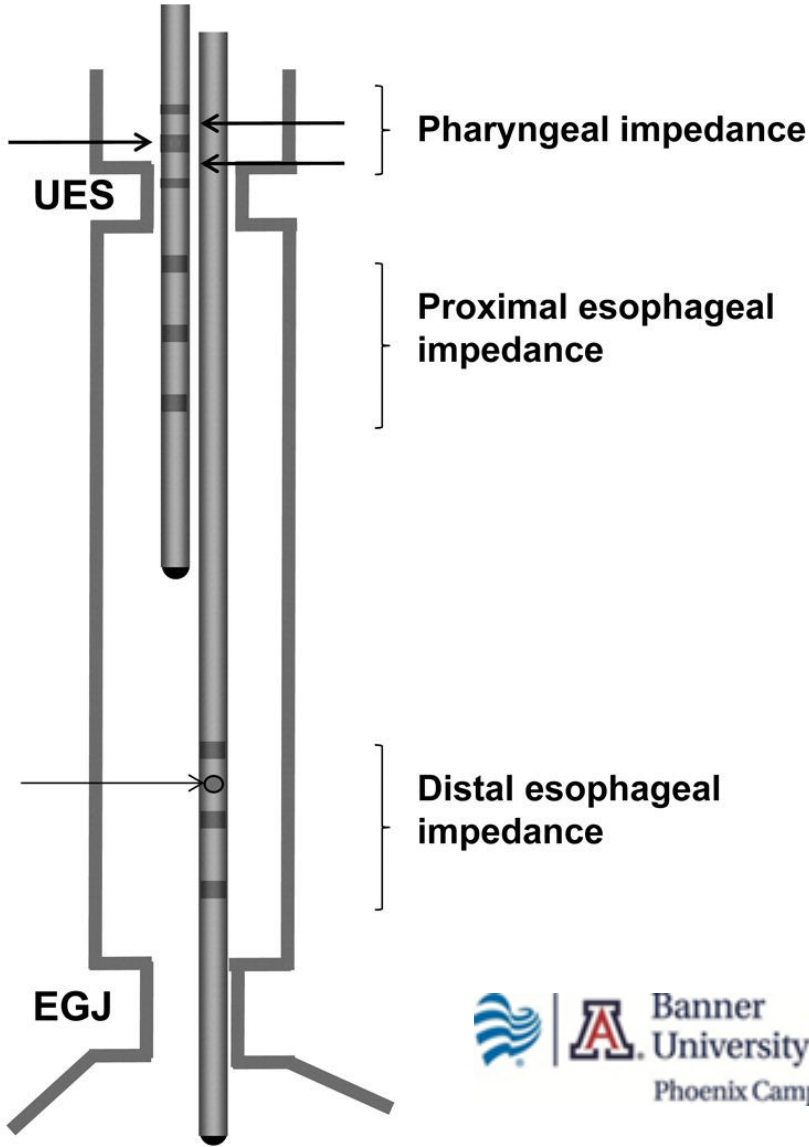
Even with dual probe catheters, fully off PPI's:

- Technical difficulties of proper placement
  - oropharynx (Restech Dx-pH device) vs. dual cath
- Swallow artifacts (> 90% drop in pH due to swallows)
- Lack of agreement of normal proximal values

Bifurcated esophageal and pharyngeal pH-impedance catheter on / off PPI

Results Not Reproducible

Results Reproducible



Zerbib F, Roman S, Des Varannes SB et al
Clin Gastroenterol Hepatol (2013)

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Restech vs. MII/pH

Study evaluated 22 patients Restech results and response to PPI's.

- 9 patients had + Restech results, all 9 responded to PPI = PPV 100%
- 13 patients had – Restech results, 4 responded to PPI; 9 non-respond suggesting a NPV 69%.

Simultaneous Oropharyngeal (Restech) and MII/pH testing

- 515 reflux episodes on MII/pH
- 180 in hypopharynx / 41% no change pH (non-acid refluxate)
- Restech only noted 39 acid events
  - 17 events were swallows according to MII (43.6%)
  - 15 events were not associated with impedance or pH change

ONLY 7 episodes detected with both techniques (1.3% capture rate)

*Restech cannot be recommended as validated tool for EER/LPR

Vailaiti C, Mazzoleni G, Bondi S et al J Voice (2012)
Ummarino D, Vandermeulen L, Roosens B et al Laryngoscope (2012)

Patient Symptoms Association with Reflux

Marking of event times / symptoms on device:

- Meal times excluded (increase acid secretion)
- Awake & Sleeping (supine) have specific norms
- Specific symptoms compared to reflux events:
    * SI = symptom index (>50% events noted)
    * SAP = symptom associated probability
        > 95% +ve association (Fisher Exact Test)

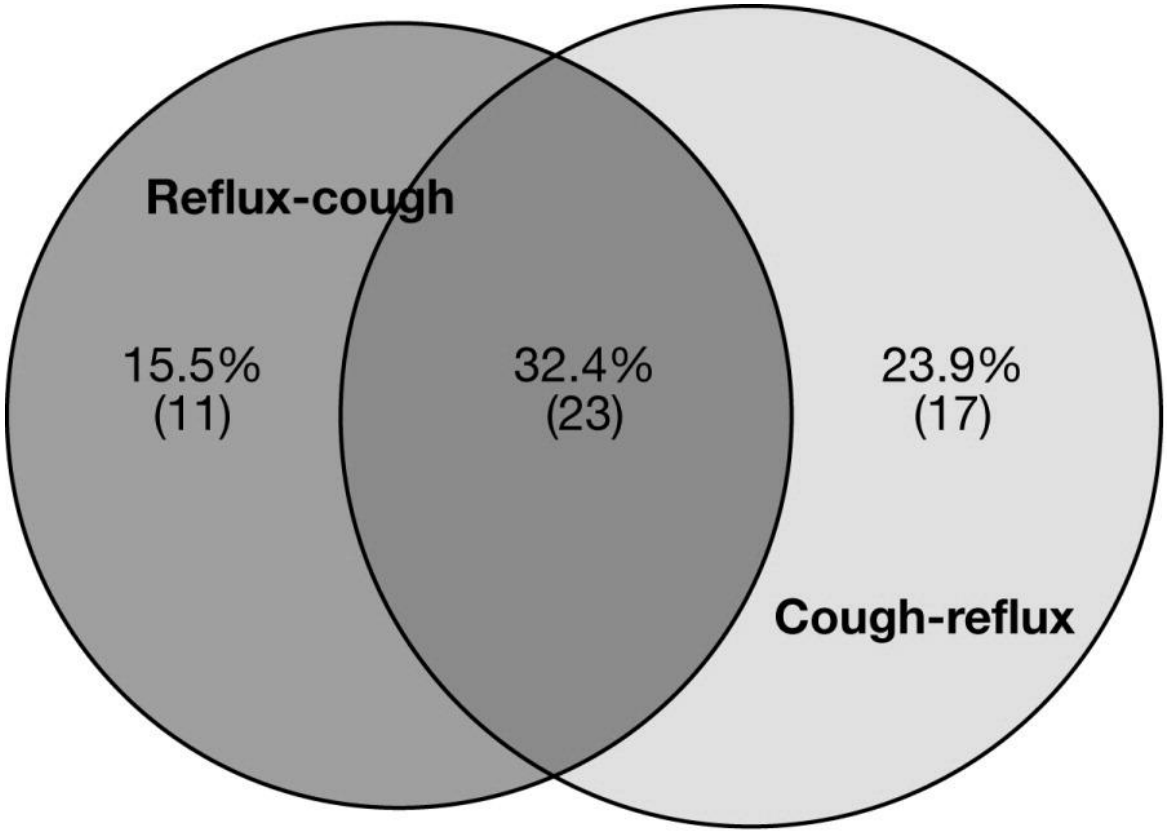
Event Monitoring Challenges

Simultaneous Cough and Reflux Recording…..

- Up to 90% cough events are not adequately reported by the patient via event recorder.
- Reflux->Cough // Cough->Reflux similar #'s.

Most laryngeal symptoms are not sudden onset, such as the symptom of heartburn.

Smith JA, Decalmer S, Kelsall J et al Gastro (2010)



Smith JA, Decalmer S, Kelsall J et al Gastro (2010)

Summary pH-Z testing in patients with EER Symptoms

- Dual channel pH-impedance is the best tool
  - Use BRAVO if patient cannot tolerate catheter
- Off PPI therapy (5-10 days)
- Consider positive study if there is:
  - Increased distal esophageal acid exposure
  - Increased proximal acid exposure (2-3%?)
- Possibly positive if:
  - + Symptom Associated Probability w/nl acid exposure
  - Proximal impedance events – may be important

Salivary Pepsin

For GERD: Sensitivity 79%; Specificity 65%

PPV = 78%; NPV = 81%

- but wide variations in values time of day

For LPR: Sensitivity 78%; Specificity 53% =predict high RFS + severity laryngeal irritation

However, study 50 children: 42% had abnl pepsin but no correlation with EER sx and pH-Z tests.

*Role salivary pepsin remains to be established

Sarita Yuksel E, Hong SK, Strugala V et al Laryngoscope (2012)
Yadlapati R, Adkins C Jaiyeola DM et al
Clin Gastroenterol Hepatol (2016)
Dy F, Amirualt J, Mitchell RD, et al J Pediatr (2016)

Mucosal Impedance

- Probe placed during EGD (catheter or balloon-based) can measure changes in mucosal current conduction to assess mucosal integrity (i.e.injury)
- Well described GERD and Eosinophilic Esophagitis
- Recent study described MI can also predict EER patients and pathologic reflux

*Further studies are needed

Kavitt RT, Lal P, Yuksel ES et al J Voice (2017)

Testing Summary

No single diagnostic test is able to unequivocally confirm reflux as cause of EER signs + symptoms

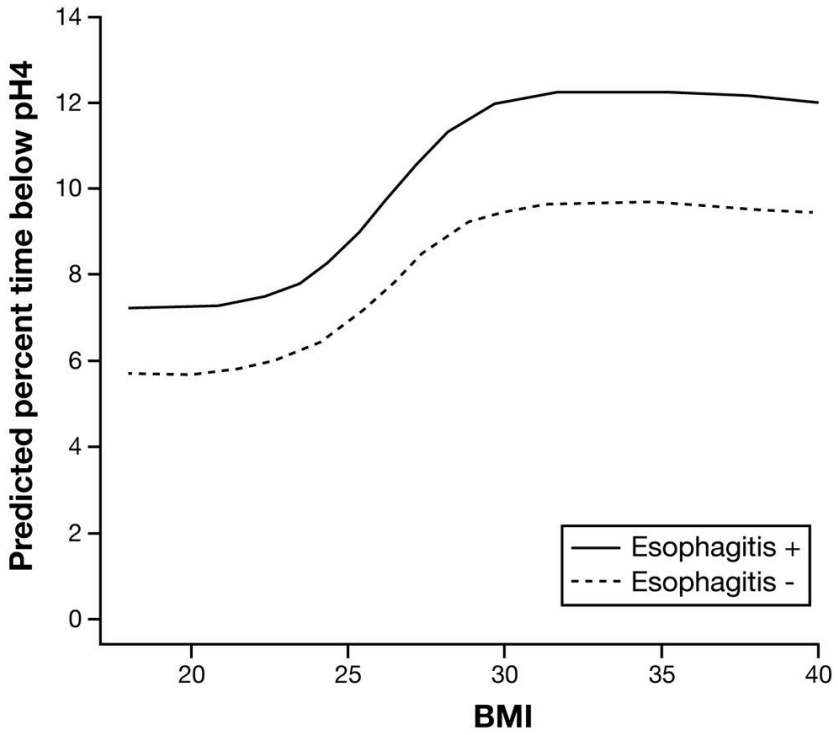
…..there may be value in combining several diagnostic test results with clinical presentation to identify a subset of patients where reflux could be causal of EER signs + symptoms

Treatment

- Lifestyle Modifications
- Medical Therapy
  - H2 blockers
  - Alginates
  - PPI
  - Prokinetic
  - Baclofen
  - Neuromodulating agents
- Endoscopic Antireflux Procedures
- Surgery

Lifestyle Modifications

REDUCE WEIGHT !



NON-LINEAR RELATIONSHIP BETWEEN GERD AND ACID EXPOSURE IN THE EXTRAESOPHAGEAL MANIFESTATIONS OF RELFUX

Aslam M, Slaughter JC, Goutte M et al
Clin Gastroenterol Hepatol (2012)
Fraser-Moodie CA, Norton B, Gornell C et al
Scan J Gastroenterol (1999)

Lifestyle Modifications

With supine regurgitation / nocturnal reflux:

- Elevate head of bed
- Avoid eating late (> 4 hours before bedtime)

Remove offending food items

- "Trigger" foods
- Acid/spicy foods, soda, caffeine, alcohol, smoking

Avoid reflux-promoting meds

Kaltenbach T, Crockett S, Gerson LB Arch Inter Med (2006)

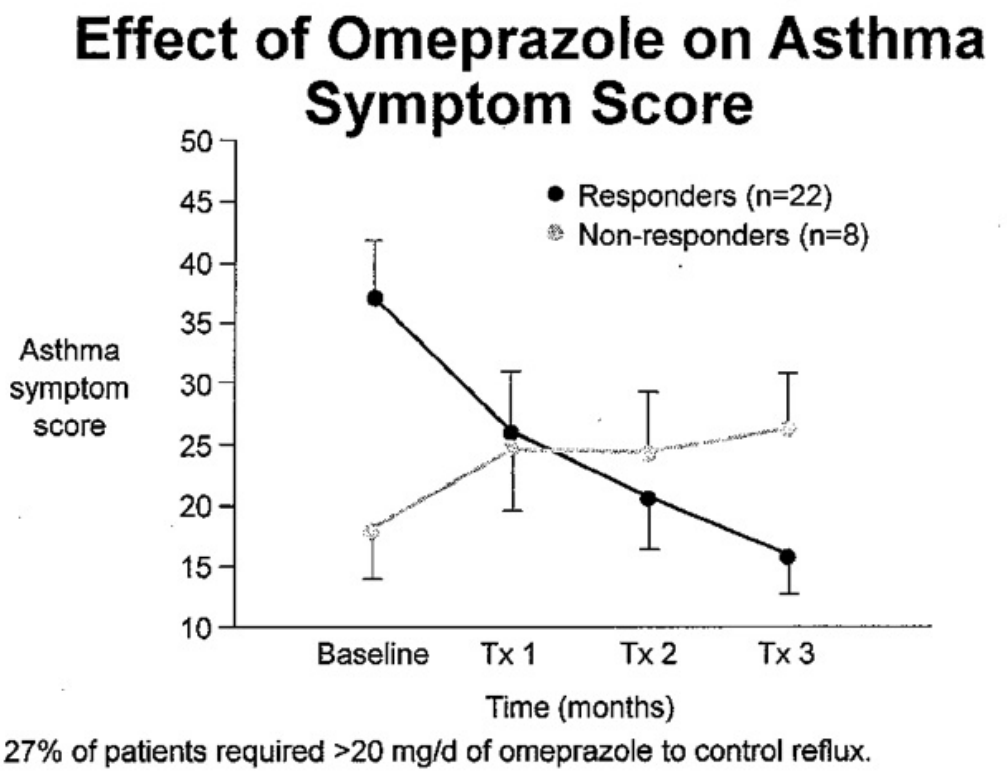
Medical Therapy

Acid Suppression

- Antacids and Alginic Acid* – temporary relief
- H2RAs BID dosing heal esophagitis (EE) - 50%
  - Pre-PPI studies with conflicting results (in asthma)
- Proton Pump Inhibitors (PPI) are superior to H2RAs, sucralfate, & placebo in healing EE and relief of heartburn. Standard of care for GERD

PPIs in Asthma

Early enthusiasm – small, open label studies with variable end points



27% of patients required >20 mg/d of omeprazole to control reflux.

Harding SM et al Am J Med (1996)

PPIs in Asthma

412 RAD pts randomized to PPI BID vs. placebo found no difference between groups at 24 wks.

Suggestion a subgroup patients with both nocturnal respiratory and reflux symptoms may benefit from PPI therapy.

Mastronarde JG, Anthonisen NR, Castro M et al N Engl J Med (2009)

PPI for Laryngeal Symptoms

Early open label enthusiasm (47-90% improved)

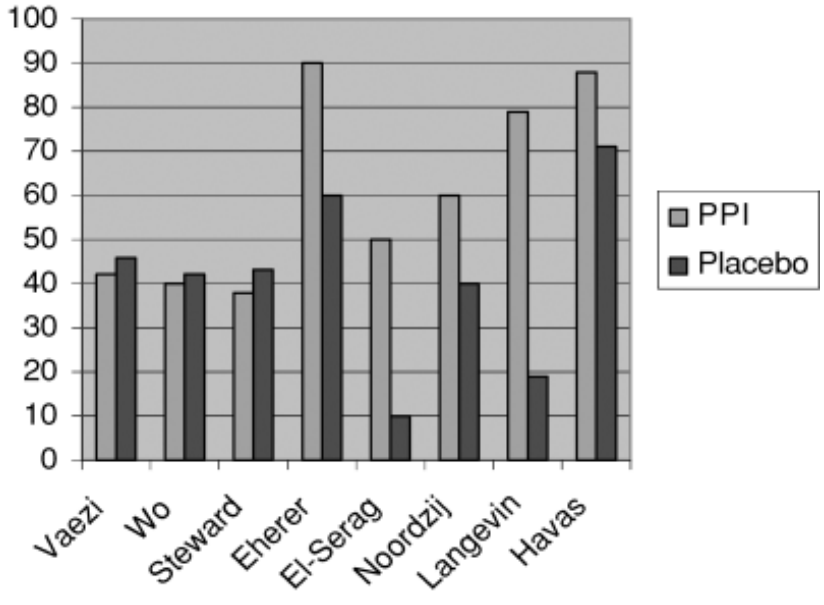
Teta-analyses also demonstrate no change

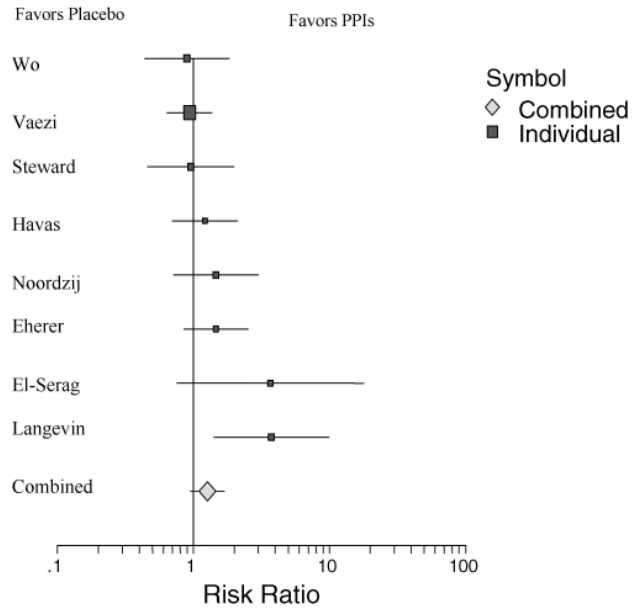
There may be a subgroup that benefit (GERD Sx)

Vaezi MF, Richet JE, Stasney CR et al Laryngoscope (2006)
Liu C, Wang H, Liu K Braz J Med Biol Res (2016)

PPI for Laryngitis

Early open label enthusiasm (47-90% improved with PPI therapy)





3 additional meta-analyses also failed to demonstrate benefit.

Vaezi MF, Richet JE, Stasney CR et al Laryngoscope (2006)
Liu C, Wang H, Liu K Braz J Med Biol Res (2016)
Qadeer, MA, Phillips CO, Lopez AR et al Am J Gastro (2006)

Summary PPI and EER

Those with suspected extraesophageal reflux who also have typical GERD symptoms may be the subset to respond to PPI therapy.

Lack of benefit of PPI BID for 1-2 months trial & without regurgitation to suggest nonacid reflux, GERD can be excluded, and a search for other causes pursued.

Other Agents for EER

Promotility Agents – enhance clearance

Baclofen – inhibits LESRS

Aligninates – forms pH-neutral raft

** More data needed to make recommendation*

Glicksman JT, Mick PT, Fung K et al Laryngoscope (2014)

McGlashan JA, Johnstone LM, Sykes J et al
Eur Arch Otorhinolaryng (2009)

Surgery

Surgical data for EER symptoms are uncontrolled retrospective, + small sample size (50-78% impr)

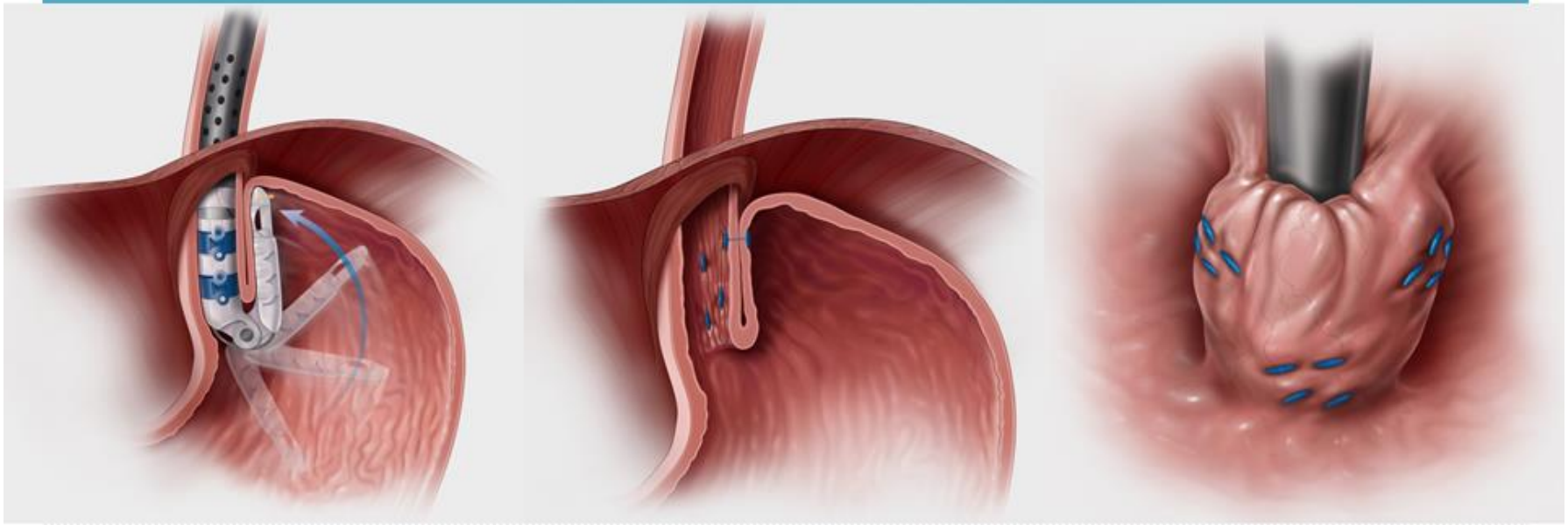
Best predictor is prior response to PPI therapy.

Laryngeal symptoms unresponsive to PPI Tx do not respond to fundoplication (10% vs 7% -1 yr)

-> Select patients may benefit with hiatus hernia, +pH-Z, and problems with regurgitation

Swoger J, Ponsky, Hicks DM et al Clin Gastroenterol Hepatol (2006)

TIF Procedure Overview



Step 1
The EsophyX® device is inserted into the esophagus through the mouth and is positioned at the junction of the stomach and esophagus. A small hiatal hernia is reduced by engaging suction (invaginator) and positioning the esophagus below the diaphragm.

Step 2
A full thickness tissue fold at the gastroesophageal junction is retracted, wrapped and anchored using SerosaFuse® implantable fasteners—equivalent to 3.0 sutures—which are delivered across the tissue to complete the plication.

Step 3
The valve is extended and multiple fasteners (12-20) are delivered with a single device insertion. The TIF procedure reconstructs the primary components of the antireflux barrier, creating a tight 3-5 cm valve enveloping the distal esophagus below the diaphragm.

Guidelines

2008 GI guidelines diverged from ENT's due to:

- Lack of clear understanding of causation
- Uncertain diagnostic criteria (What is LPR?)
  - variable data measured and variable response to Tx
  - variable data / results of pH studies
  - LPR laryngeal changes found in 80% asymptomatic pts
  - Well done studies are lacking.
- High placebo response with PPI studies
- Other effects of PPI therapy

Kahrilas PJ, Shaheen NJ, Vaezi MF (et al) Gastro (2008)

Clinical Practice Guideline: Hoarseness (Dysphonia) – 2018

American Academy of Otolaryngology – Head and Neck Surgery Foundation (Expert multidisciplinary panel)

ETIOLOGIES

Stachler RJ; Francis, DO; Seth R. Schwartz SR, et al
Otolaryngol Head Neck Surg (2018)

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Table 6. Etiologies of Dysphonia and Examples from Each Category.[a]

Etiologic Category	Examples
Surgery	Thyroidectomy or parathyroidectomy
	Anterior spine surgery
	Thoracic and cardiac surgery
	Neurosurgery and skull base surgery
Inflammatory	Tobacco use
	Polypoid corditis
	Allergy
Autoimmune	Granulomatosis with polyangiitis
	Sarcoidosis
	Amyloidosis
	Rheumatoid arthritis
Infectious	Viral upper respiratory infection
	Bacterial infection
	Laryngeal candidiasis
Neurologic	Laryngeal dystonia (eg, spasmodic dysphonia)
	Vocal fold paralysis
	Essential tremor
	Parkinson disease
Endocrinologic	Hypothyroidism
	Diabetes
	Menopause
	Androgen supplementation
Neoplastic	Laryngeal squamous cell carcinoma
	Recurrent respiratory papillomatosis
	Metastatic disease
	Other neoplasms (eg, chondromas, lymphoma)
Congenital	Laryngeal web
	Vocal fold cyst
	Laryngeal cleft
Traumatic	Laryngeal fracture
	Posterior glottic stenosis
	Intubation injury
Behavioral	Vocal fold nodules
	Vocal fold cyst
	Vocal fold polyp
	Vocal fold vascular lesion
Musculoskeletal	Muscle tension dysphonia
	Cervicalgia
Gastrointestinal	Reflux

[a]Not a comprehensive list of etiologic examples.

Clinical Practice Guideline: Hoarseness (Dysphonia) – 2018

HISTORY TAKING

Stachler RJ; Francis, DO; Seth R. Schwartz SR, et al Otolaryngol Head Neck Surg (2018)

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Table 5. Examples of Pertinent Questions in the Assessment of a Patient with Dysphonia.[301,459,460,a]

Voice-specific questions	Was the onset of your hoarseness abrupt or slowly progressive?
	Does your voice ever return to normal, or is the hoarseness constant?
	Did your voice change at the time or persist after an upper respiratory tract infection?
	Do you have pain, or is there effort when talking?
	Does your voice deteriorate or fatigue with use?What is different about the sound of your voice?
	Do you have a difficult time getting loud or projecting?
	Have you noticed changes in your pitch or range?
	Do you run out of air when talking?
	Does your voice crack or break?
	Were you intubated prior to dysphonia onset?
	Did you have brain, spine, neck, or chest surgery prior to dysphonia onset?
	Did you recently take inhaled medications, antibiotics, or steroids?
	Do you need the voice for your occupation? Do you have significant daily voice use requirements?
	Do you smoke (tobacco, vape, or use recreational drugs)?
	Does your throat feel dry?
	Have you undergone radiation therapy to the head and neck region?
	Do you have any neurologic or arthritic problems?
	Did you have prior trauma (physical, emotional, or psychological) preceding the voice change?
Symptoms	Globus pharyngeus (persisting sensation of lump in throat)
	Dysphagia
	Sore throat
	Chronic throat clearing
	Cough
	Odynophagia (pain with swallowing)
	Nasal drainage
	Postnasal drainage
	Acid reflux
	Regurgitation
	Heartburn
	Hemoptysis
	Nonanginal chest pain
	Waterbrash (sudden appearance of salty liquid in the mouth)
	Halitosis ("bad breath")
	Weight loss
	Night sweats
	Fever (>101.5°F)
	Otalgia (ear pain)
	Dyspnea (difficulty breathing)
Medical history relevant to dysphonia	Occupation and/or avocation requiring extensive voice use (eg, teacher, singer)
	Absenteeism from occupation due to dysphonia
	Prior episodes of hoarseness
	Relationship of instrumentation (eg, intubation) to onset of dysphonia
	Relationship of prior surgery to neck or chest to onset of dysphonia
	Cognitive impairment (requirement for proxy historian)
	Anxiety, depression, stress
Acute conditions	Infection of the throat and/or larynx: viral, bacterial, fungal
	Foreign body in larynx, trachea, or esophagus
	Neck or laryngeal trauma
Chronic conditions	Stroke
	Diabetes
	Parkinson's disease
	Parkinson-plus syndromes (eg, progressive supranuclear palsy)
	Myasthenia gravis
	Multiple sclerosis
	Amyotrophic lateral sclerosis
	Essential tremor
	Testosterone deficiency
	Allergic rhinitis
	Chronic rhinitis
	Hypertension (because of certain medications used for this condition)
	Schizophrenia (because of antipsychotics used for mental health problems)
	Osteoporosis (because of certain medications used for this condition)
	Asthma (because of use of inhaled steroids or effect on respiratory function)
	Chronic obstructive pulmonary disease (because of use of inhaled steroids or effect on respiratory function)
	Aneurysm of thoracic aorta (rare cause)
	Laryngeal cancer
	Lung cancer (or metastasis to the lung)
	Thyroid cancer
	Hypothyroidism and other endocrinopathies
	Vocal fold nodules
	Vocal fold paralysis
	Vocal abuse
	Infective laryngitis
	Chemical laryngitis
	Chronic tobacco use
	Sjögren's syndrome
	Alcohol (moderate to heavy use or abuse)
	Menopause

[a]These are sample considerations, and the list is not comprehensive of all pertinent parameters that may need to be assessed.

Clinical Practice Guideline: Hoarseness (Dysphonia) - 2018

Table 7. Medications That May Cause Dysphonia.[a]

Medication	Mechanism of Impact on Voice
Coumadin, thrombolytics, phosphodiesterase-5 inhibitors	Vocal fold hematoma[461-463]
Bisphosphonates	Chemical laryngitis[464]
Angiotensin-converting enzyme inhibitors	Cough[465]
Antihistamines, diuretics, anticholinergics	Drying effect on mucosa[78, 80,345]
Danocrine, testosterone	Sex hormone production/utilization; alteration[466,467]
Antipsychotics, atypical antipsychotics	Laryngeal dystonia[468,469]
Inhaled steroids	Dose dependent mucosal irritation[261,263,470]; fungal laryngitis[264,265]

[a]This is not intended to be an exhaustive list of all medication that could cause dysphonia.

Stachler RJ; Francis, DO; Seth R. Schwartz SR, et al
Otolaryngol Head Neck Surg (2018) 158, S1-S42.

Clinical Practice Guideline: Hoarseness (Dysphonia) – 2018

EVIDENCE-BASED STATEMENTS

Table 4. Summary of Evidence-Based Statements.

Statement	Action	Strength
1. Identification of abnormal voice	Clinicians should identify dysphonia in a patient with altered voice quality, pitch, loudness, or vocal effort that impairs communication or reduces QOL.	Recommendation
2. Identifying underlying cause of dysphonia	Clinicians should assess the patient with dysphonia by history and physical examination for underlying causes of dysphonia and factors that modify management.	Recommendation
3. Escalation of care	Clinicians should assess the patient with dysphonia by history and physical examination to identify factors where expedited laryngeal evaluation is indicated. These include but are not limited to recent surgical procedures involving the head, neck, or chest; recent endotracheal intubation; presence of concomitant neck mass; respiratory distress or stridor; history of tobacco abuse; and whether the patient is a professional voice user.	Strong recommendation
4a. Laryngoscopy and dysphonia	Clinicians may perform diagnostic laryngoscopy at any time in a patient with dysphonia.	Option
4b. Need for laryngoscopy in persistent dysphonia	Clinicians should perform laryngoscopy, or refer to a clinician who can perform laryngoscopy, when dysphonia fails to resolve or improve within 4 weeks or irrespective of duration if a serious underlying cause is suspected.	Recommendation
5. Imaging	Clinicians should *not* obtain computed tomography (CT) or magnetic resonance imaging (MRI) for patients with a primary voice complaint prior to visualization of the larynx.	Recommendation against
6. Antireflux medication and dysphonia	Clinicians should *not* prescribe antireflux medications to treat isolated dysphonia based on symptoms alone attributed to suspected gastroesophageal reflux disease (GERD) or laryngopharyngeal reflux (LPR), without visualization of the larynx.	Recommendation against
7. Corticosteroid therapy	Clinicians should *not* routinely prescribe corticosteroids for patients with dysphonia prior to visualization of the larynx.	Recommendation against
8. Antimicrobial therapy	Clinicians should *not* routinely prescribe antibiotics to treat dysphonia.	Strong recommendation against
9a. Laryngoscopy prior to voice therapy	Clinicians should perform diagnostic laryngoscopy, or refer to a clinician who can perform diagnostic laryngoscopy, before prescribing voice therapy and document/communicate the results to the speech-language pathologist (SLP).	Recommendation
9b. Advocating for voice therapy	Clinicians should advocate voice therapy for patients with dysphonia from a cause amenable to voice therapy.	Strong recommendation
10. Surgery	Clinicians should advocate for surgery as a therapeutic option for patients with dysphonia with conditions amenable to surgical intervention, such as suspected malignancy, symptomatic benign vocal fold lesions that do not respond to conservative management, or glottic insufficiency.	Recommendation
11. Botulinum toxin	Clinicians should offer, or refer to a clinician who can offer, botulinum toxin injections for the treatment of dysphonia caused by spasmodic dysphonia and other types of laryngeal dystonia.	Recommendation
12. Education/prevention	Clinicians should inform patients with dysphonia about control/preventive measures.	Recommendation
13. Outcomes	Clinicians should document resolution, improvement, or worsened symptoms of dysphonia or change in QOL among patients with dysphonia after treatment or observation.	Recommendation

Stachler RJ; Francis, DO; Seth R. Schwartz SR, et al *Otolaryngol Head Neck Surg* (2018) 158, S1-S42.

GI: Extraesophageal GERD 2018 Clinical Practice Update

Best Practice Advice:

1. Role GI doc …. to evaluate for GI causes.
2. Evaluation by ENT, pulm, and/or allergy are essential, often should be the initial visits due to the multifactorial and many non-GI causes of symptoms.
3. Empiric therapy with aggressive PPI x 6-8wks can help w/ ? is reflux + EER
4. No single test exists to definitively identify reflux as etiology for possible EER.
5. Constellation pt's presentation, dx test, and response to therapy should be employed in determination if reflux is possible etiology of EER symptoms.
6. Lack of response to PPI + nl pH off PPI (or nl impedance on PPI) significantly reduced the likelihood that reflux in a contributing etiology to EER symptoms
7. Surgical fundoplication is discourage in pt's w/EER Sx and no response to PPI
8. Fundoplication reserved for those with hiatus hernia, +pH, and continued Sx

Vaezi MF, Katzka, D, Zerbib Clin Gastroenterol Hepatol (2018)

Summary

- Reflux may be culprit in a subgroup of EER pts.
- In many patients, cause is multifactorial and →evaluation by ENT, allergy, and pulmonary
- Role of diagnostic testing:
  - Establish presence and severity of reflux
  - Assess likelihood link to patient's symptoms
- If no response to PPI therapy, investigate alternative causes.