



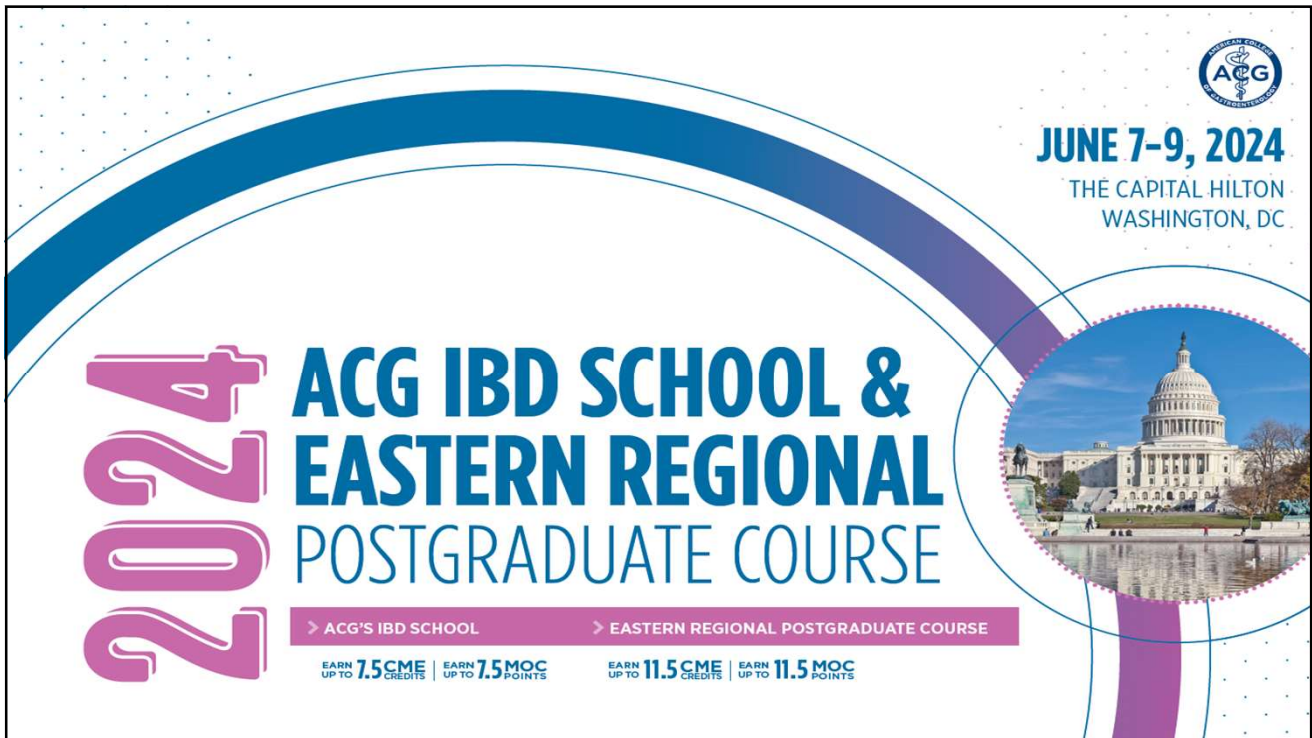
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**GASTRONOMY AND GI:
FROM ACG MAGAZINE**

**THE CULINARY
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COLLECTION VOL. 2**

FROM THE PAGES OF ACG MAGAZINE
Edited by: Christine A. Terrapin, MD,
Alexander Paretian, DO, and Ward Puzisi, MD

**GASTRONOMY AND GI:
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The banner features a central circular image of a fountain at night, surrounded by palm trees and resort buildings. The ACG logo is in the top right corner. A call-to-action button with a right-pointing arrow is located in the bottom right.

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Special Issue:
WELL-BEING

JOY AND WELL-BEING IN THE PRACTICE
OF MEDICINE - THE IMPORTANCE OF THE
HUMAN CONNECTION

ACG MAGAZINE

[BIT.LY/ACG-MAG-WELLBEING](https://bit.ly/acg-mag-wellbeing)

The cover features a blue silhouette of a human figure in a meditative pose, surrounded by vibrant green leaves, pink and yellow butterflies, and colorful hands reaching up from the bottom edge.

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AJG The American Journal of GASTROENTEROLOGY

ACG MONOGRAPH ON MICROBIOME THERAPEUTICS

→ Currently available online and in print

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Unrestricted educational grants to support the monograph have been provided to the ACG Institute for Clinical Research and Education from Nestlé Health Science and Seres Therapeutics and Ferring Pharmaceuticals Inc.

The image shows a promotional graphic for the ACG Monograph on Microbiome Therapeutics. It features a blue background with stylized green and red shapes representing the microbiome. On the right, there is a smaller image of the monograph cover, which includes the AJG logo, the title 'ACG MONOGRAPH ON MICROBIOME THERAPEUTICS', and the ACG Institute logo. The text 'Currently available online and in print' is prominently displayed in the center. At the bottom, it mentions that unrestricted educational grants were provided by Nestlé Health Science, Seres Therapeutics, and Ferring Pharmaceuticals Inc.

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Virtual Grand Rounds universe.gi.org

Participating in the Webinar

All attendees will be muted and will remain in "Listen Only Mode"

Type your questions here so that the moderator can see them. Not all questions will be answered but we will get to as many as possible.

A handout with the slides and room to take notes can be downloaded from your control panel.

Moderator:
Fady Haddad, MD

Exit

The slide is titled 'Participating in the Webinar' and provides instructions for attendees. It features a blue background with yellow text boxes. On the left, there is a portrait of the moderator, Fady Haddad, MD. On the right, there is a vertical control panel with icons for muting, hand raising, help, and downloading. The text boxes explain that all attendees will be muted, questions can be asked but not all will be answered, and a handout with slides and notes can be downloaded from the control panel. The slide also includes the 'Virtual Grand Rounds' logo and the website 'universe.gi.org'.

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ACG Virtual Grand Rounds universe.gi.org

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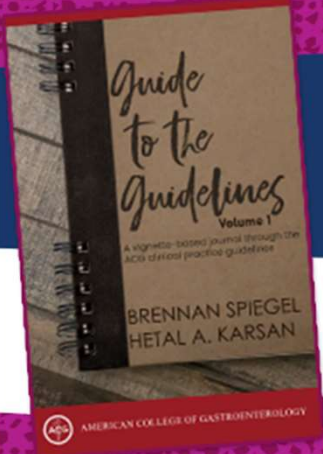

Week 9 – Thursday, February 29, 2024
 Exocrine and Endocrine Complications of Pancreatitis
 Faculty: Jodie A. Barkin, MD, FACP
 Moderator: Tara Keihanian, MD, MPH
At Noon and 8pm Eastern




Week 10 – Thursday, March 7, 2024
 Application of Molecular and Genetic Testing to the Management of Colon Polyps and Cancer
 Faculty: Aasma Shaukat, MD, MPH, FACP
 Moderator: Jannel Lee-Allen, MD
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Disclosures




Dustin A. Carlson, MD, MSCI: Medtronic, Inc: Consultant, Intellectual Property/Patents, Speakers Bureau; Phathom Pharmaceuticals: Consultant.




Fady Haddad, MD: No financial relationships.

**All of the relevant financial relationships listed for these individuals have been mitigated*

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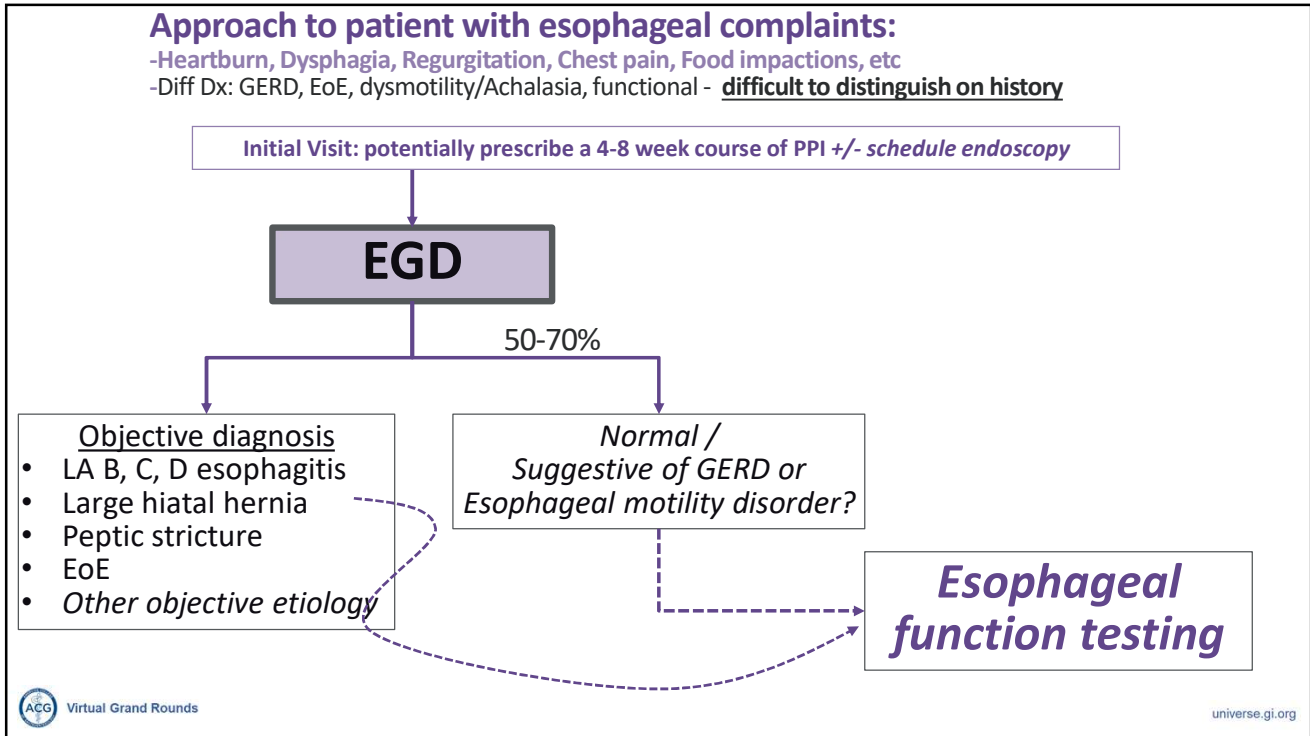


Interpretation and Therapeutic Implications of Physiologic Testing in the Management of Esophageal Disorders

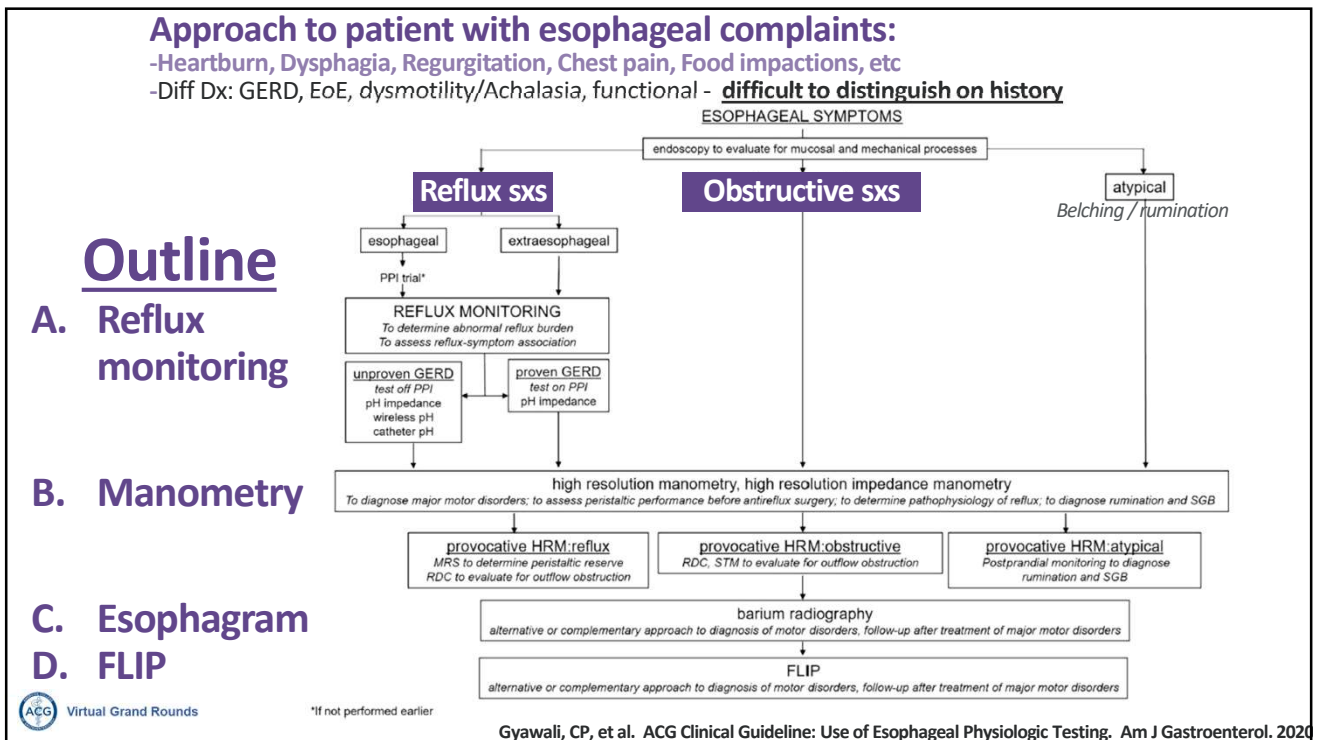


Dustin A. Carlson, MD, MSCI
Assistant Professor of Medicine – Gastroenterology
Northwestern University Feinberg School of Medicine
Director, Esophageal Center of Northwestern Medicine
Director, Motts Tonelli Esophageal Function Lab

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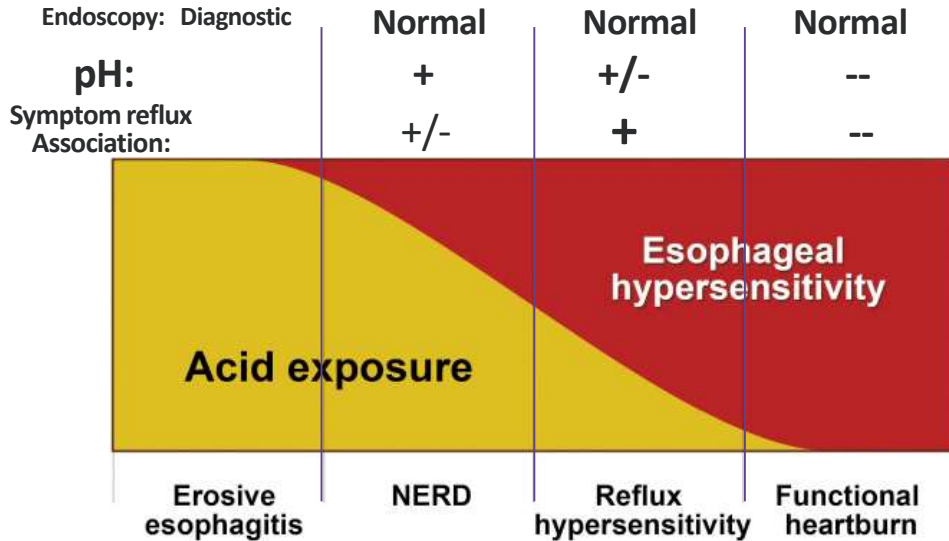


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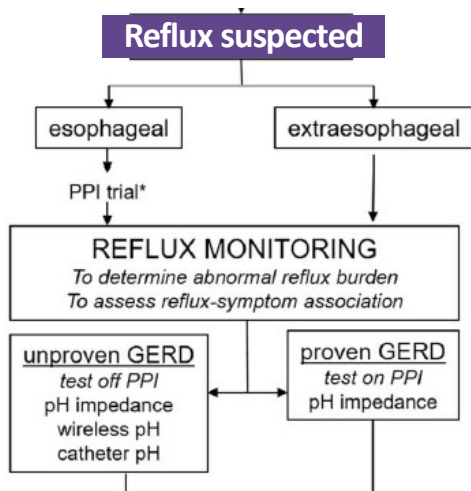
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Ambulatory reflux monitoring: Define *spectrum of 'Reflux' disease states*



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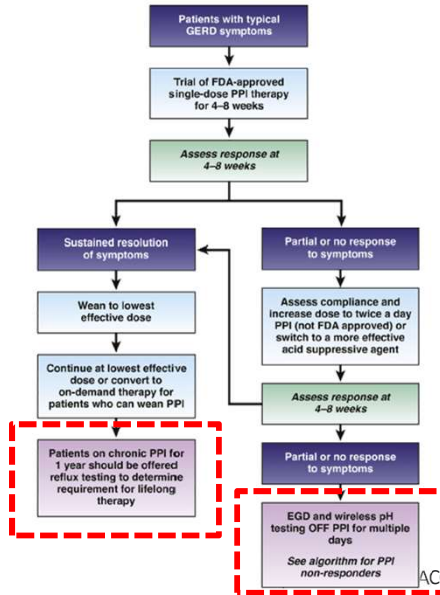
Ambulatory reflux monitoring



- Who?
- Which test?
- On or off PPI?

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Ambulatory reflux monitoring



•Who?

Endoscopy +/- pH testing

Typical GERD symptoms:

1. Lack of sx response to PPI
2. Offer to determine long-term GERD treatment

❖ Prior to consideration of antireflux surgery

ACG Clinical Guideline: Use of Esophageal Physiologic Testing. Am J Gastroenterol. 2020

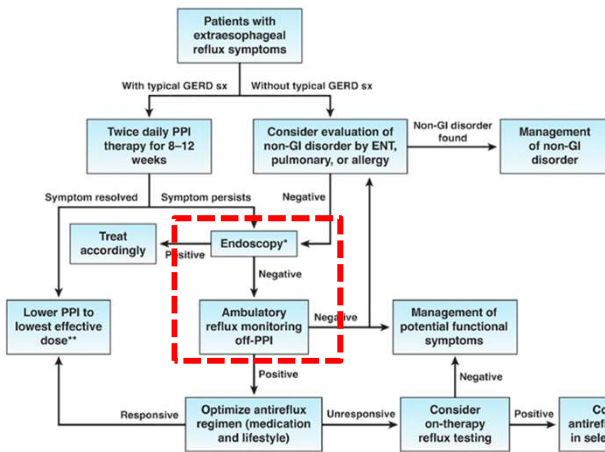
AGA Clinical Practice Update: Yadlapati R, et al. Clin Gastroenterol Hepatol. 2022;20:984-994.e1.

AGA Clinical Practice Update: Chen, J. et al. Clin Gastroenterol Hepatol. 2023; 21(6):1414-1421



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Ambulatory reflux monitoring



•Who?

Endoscopy +/- pH testing

Typical GERD symptoms:

1. Lack of sx response to PPI
2. Offer to determine long-term GERD treatment

❖ Prior to consideration of antireflux surgery

Extra-Esophageal symptoms:

1. Up front testing
 - If no typical GER symptoms
2. Lack of PPI response
 - If coexisting typical symptoms

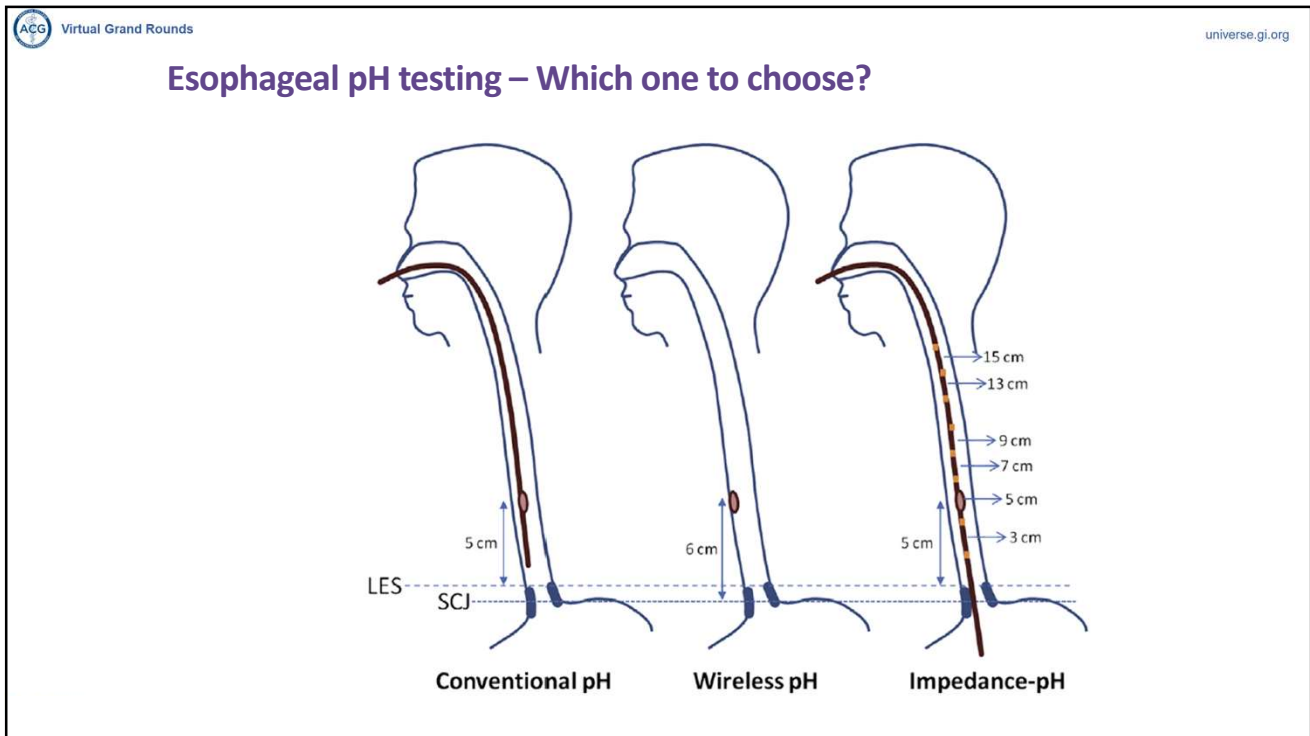
Gyawali, CP, et al. ACG Clinical Guideline: Use of Esophageal Physiologic Testing. Am J Gastroenterol. 2020

AGA Clinical Practice Update: Yadlapati R, et al. Clin Gastroenterol Hepatol. 2022;20:984-994.e1.

AGA Clinical Practice Update: Chen, J. et al. Clin Gastroenterol Hepatol. 2023; 21(6):1414-1421



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Esophageal pH testing – Which one to choose?
Balance Pros/Cons of tests

	Wireless pH	pH-impedance
Patient tolerability	++	
Duration of monitoring	++++	
No sedation required		++
Dual channel capabilities		++++
More <i>physiologic</i> (real-life)	++	
Ease of interpretation	++++	

❖ Consider patient preference

❖ Consider clinical scenario:

	Is there <u>any</u> abnormal acid exposure?	Is there excess reflux burden despite acid suppression?
Pre-test likelihood of GERD	Low / "unproven"	High / "proven"
PPI?	OFF PPI	ON PPI

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Esophageal pH testing – Which one to choose? Consider Clinical scenario

	Unproven GERD	Proven GERD
Pre-test likelihood of GERD?	Low	High
	EGD without LA B, C or D esophagitis, Barrett's, or peptic stricture	EGD +LA B, C, or D esophagitis, Barrett's, or peptic stricture
	Atypical symptoms	Previous +pH test
	Prior to anti-reflux surgery	
	Symptoms on PPI	
	Symptoms after anti-reflux surgery	

↓

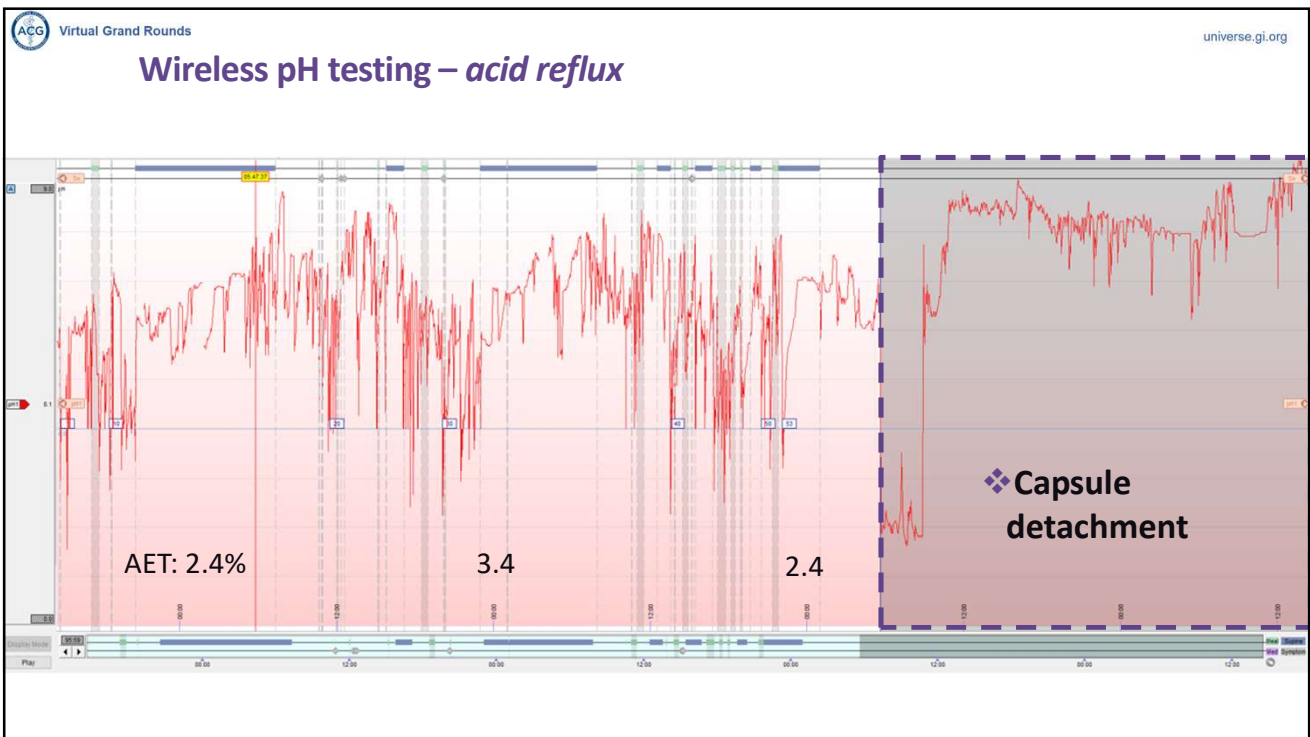
**pH-test
OFF PPI**

↓

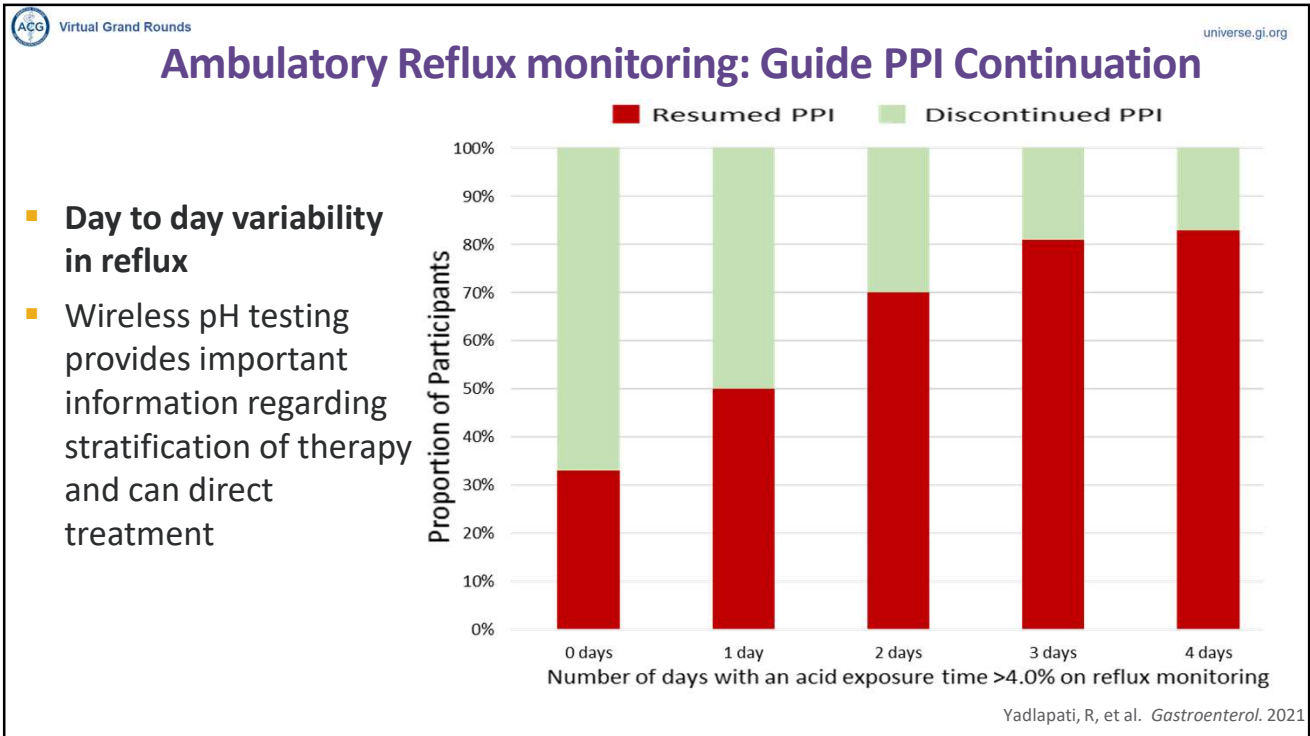
**pH-impedance
ON PPI
(high dose)**

Gyawali, CP, et al., ... The Lyon Consensus 2.0. Gut. 2023

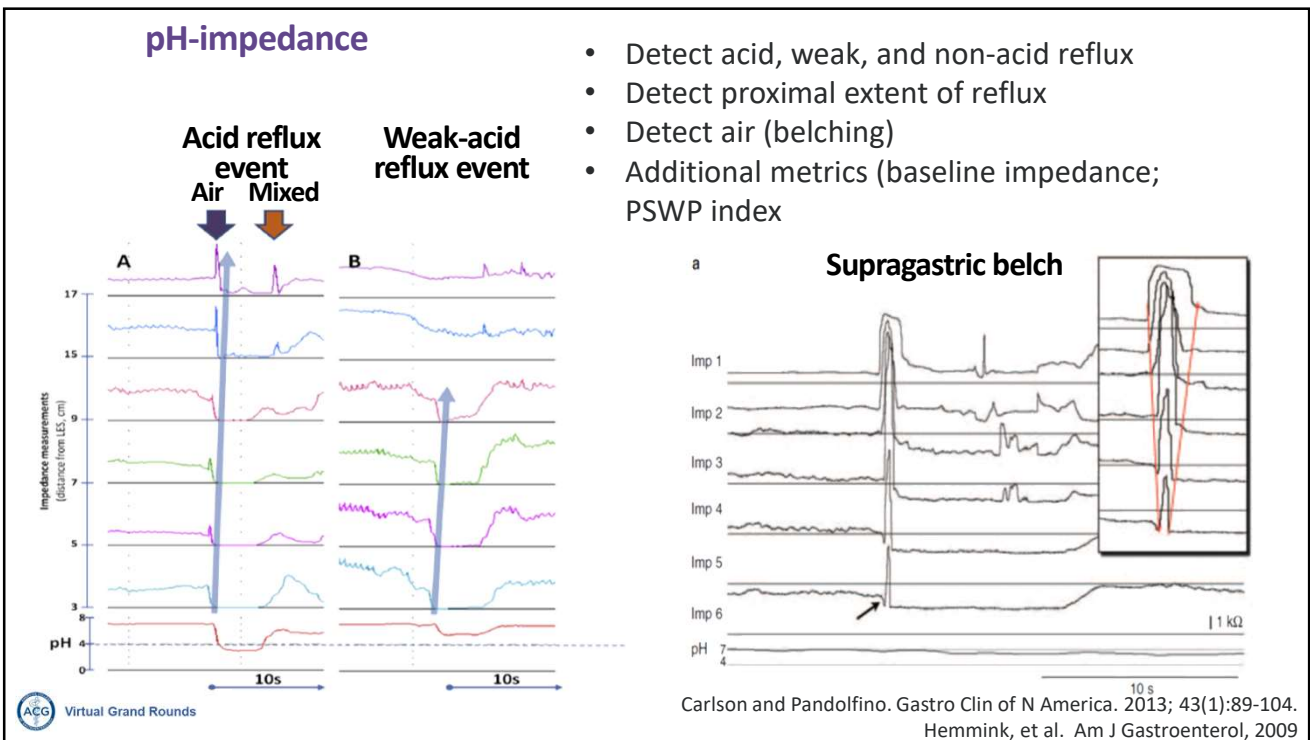
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Esophageal pH testing - interpretation

Acid exposure time

- Pathologic: >6%
- Normal <4%
- "Borderline": 4-6%

Reflux episodes:

- Pathologic: >80
- Normal <40
- "Borderline": 40-80

Symptom-Reflux association (SRA)

- Symptom index (SI) > 50 and
- Symptom associated probability (SAP) >95

Gyawali, CP, et al., ... The Lyon Consensus. Gut. 2018

25

Define the disease state/reflux phenotype

Beyond GERD = yes vs no: A spectrum of reflux severity

1. Stop PPI

2. HRM if rumination or esophageal motor disorder suspected

3. Cognitive behavioral therapy, gut directed hypnotherapy, or neuromodulators

1. Optimize PPI to control symptoms

2. Aggressive lifestyle modifications/weight management

3. Cognitive behavioral therapy, gut directed hypnotherapy, or neuromodulators as indicated

1. Optimize PPI to control symptoms

2. Aggressive lifestyle modifications/weight management

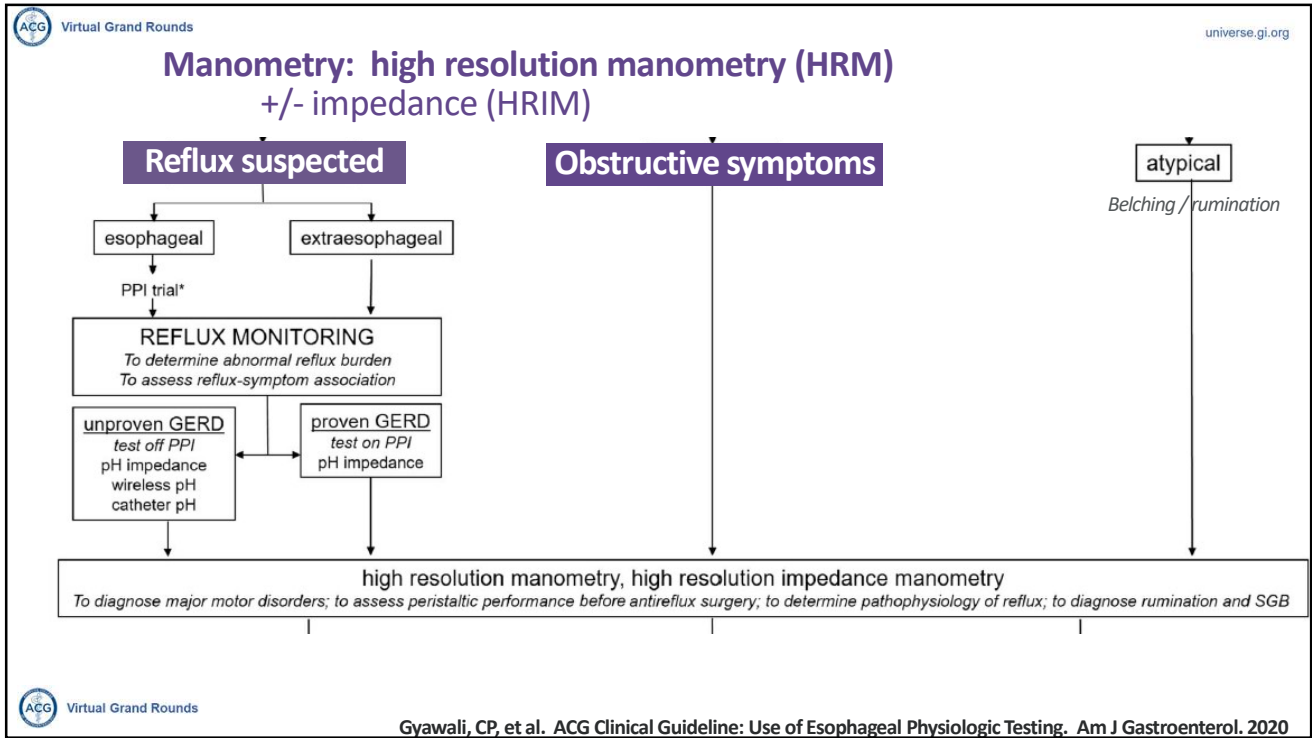
3. Cognitive behavioral therapy, gut directed hypnotherapy, or neuromodulators as indicated

Mild → **Severe**

- LA C/D; LSBE
- Bipositional reflux
- AET >12%; DM score >50
- Large HH

Yadlapati R, et al. Clin Gastroenterol Hepatol. 2022;20:984-994.e1

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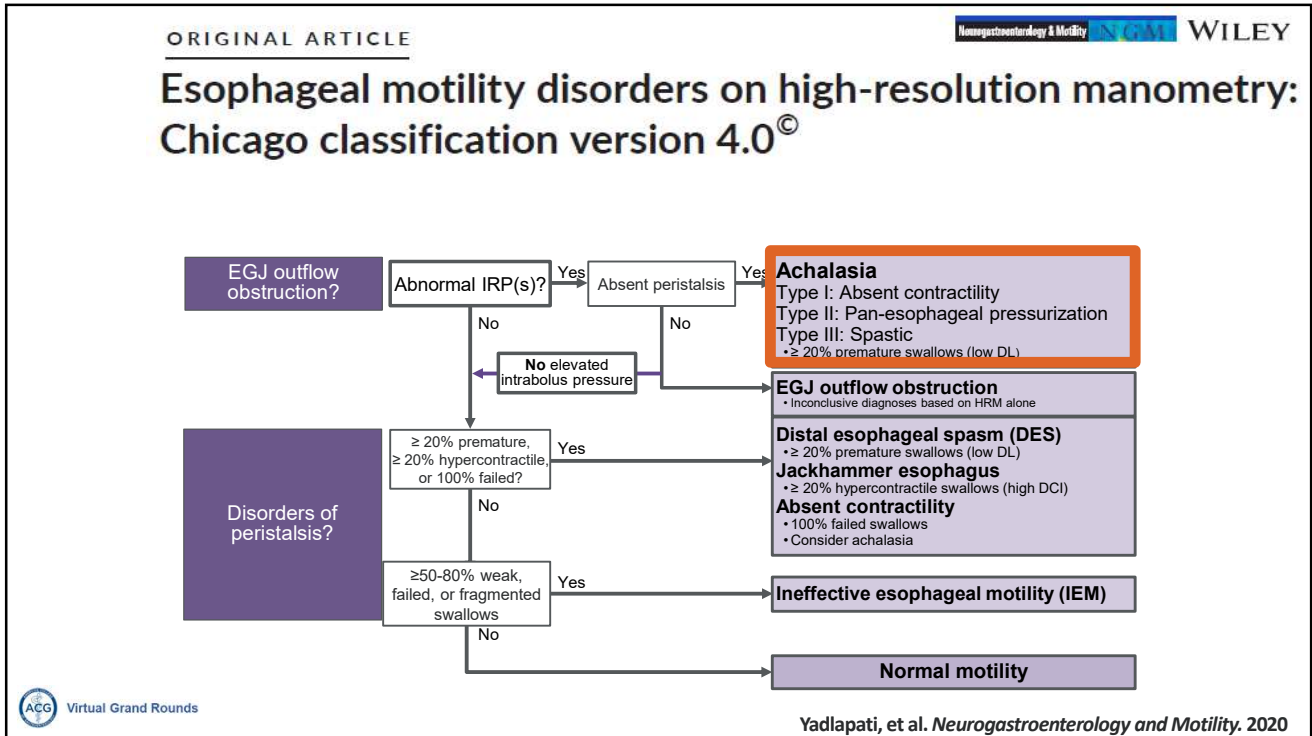
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HRM/EPT interpretation caveats

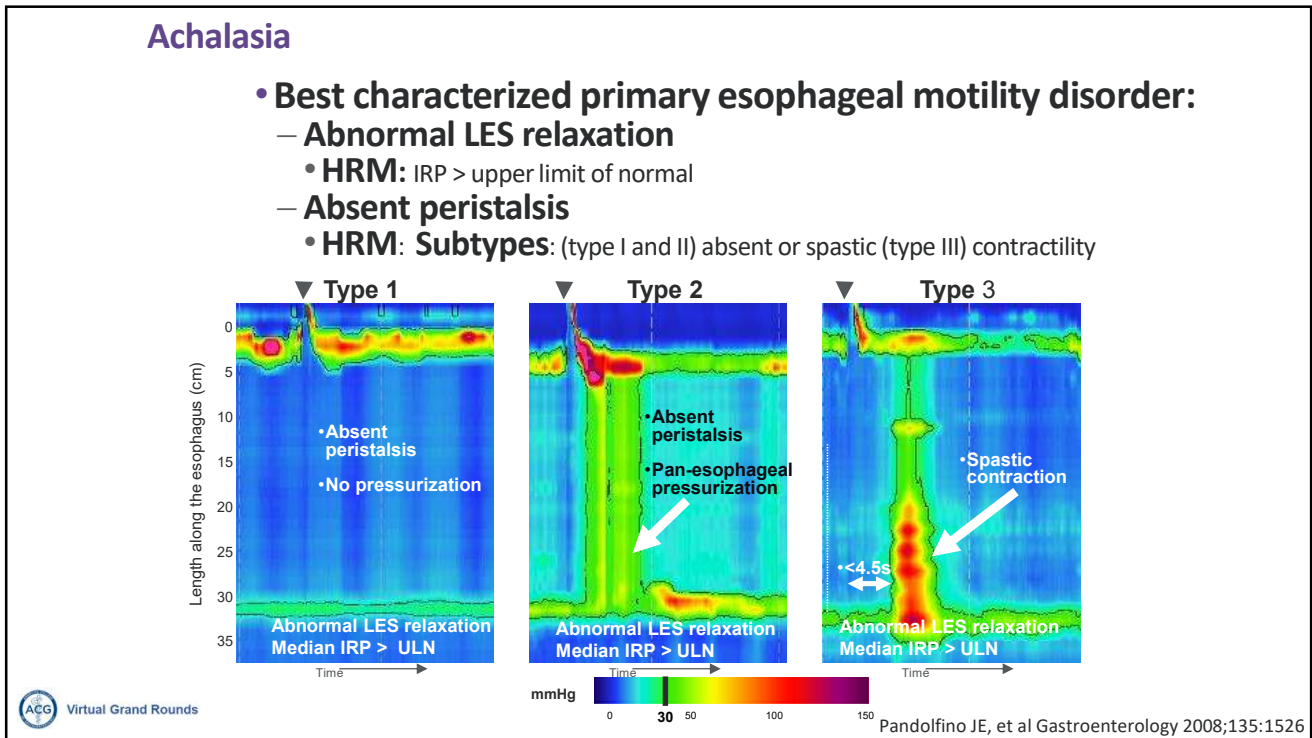
- **Affect manometric pressure:**
 - Patient position (supine vs seated)
 - Bolus size
 - Bolus consistency
 - HRM assembly
 - Application of normal/abnormal values based on testing with similar brand assemblies
- **“Secondary” / “Reactive” motility findings**
 - E.g. pseudoachalasia
 - Mechanical obstruction
 - History of previous foregut surgery
 - Reflux esophagitis
- **Chicago Classification protocol**
 - 5ml Liquid swallows
 - 10x (supine)
 - 5x (upright)
 - Multiple rapid swallows
 - 5x2ml liquid q2-3sec
 - **Optional:**
 - Rapid drink challenge (200ml liquid)
 - Solid meal
- ❖ **Chicago Classification**
 - ❖ Intended for diagnosis of primary motor disorders
 - Interpret HRM in context of clinical history and endoscopy findings

Herregods, TV, et al. *Neurogastroenterology and Motility*. 2015; 27(2): 175-87
Yadlapati, et al. *Neurogastroenterology and Motility*. 2020

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Achalasia

• Established, effective treatments

– Subtype implications

Percent with 'good' treatment outcome

	N, (Tx type)	Type I	Type II	Type III
Pandolfino 2008 ¹	99 (PD, LHM, Botox)	56% (n=21)	96% (n=49)	29% (n=29)
Salvador 2010 ²	246 (LHM)	85% (n=96)	95% (n=127)	69% (n=23)
Pratap 2011 ³	51 (PD)	63% (n=24)	90% (n=24)	33% (n=3)
Rohof 2013 ⁴	176 (RCT: PD vs LHM)	86% (PD) 81% (LHM) (n=44)	100% (PD) 95% (LHM) (n=114)	40% (PD) 86% (LHM) (n=18)

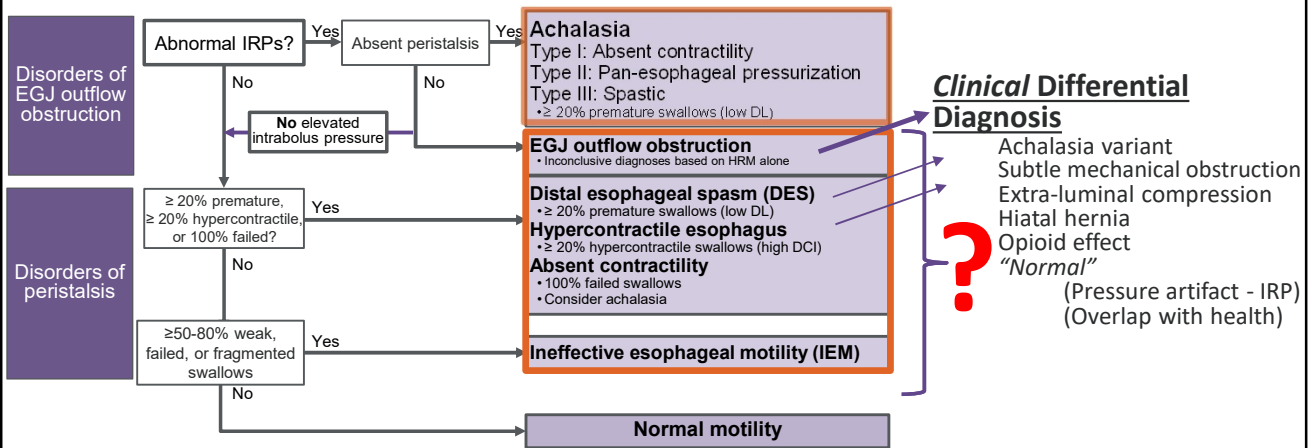
• Type III (spastic):
• Myotomy preferred treatment

- 1) Pandolfino JE, et al Gastroenterology 2008;135:1526
- 2) Salvador R, et al J Gastrointest Surg 2010;14:1635
- 3) Pratap N, et al Neurogastroenterol Mot 2011;17:205
- 4) Rohof W, et al Gastroenterology; 2013; 144(4)

ORIGINAL ARTICLE

Neurogastroenterology & Motility | NGM | WILEY

Esophageal motility disorders on high-resolution manometry: Chicago classification version 4.0[©]



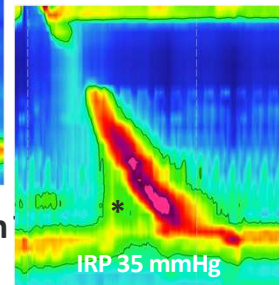
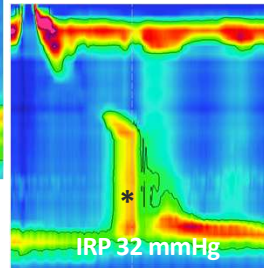
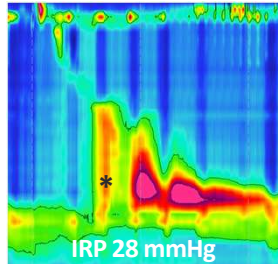
Clinically heterogeneous HRM pattern

• **HRM = EGJOO:**

– **Criteria:** Elevated IRP (supine and upright); +peristalsis; ↑IBP*; +dysphagia/chest pain

• **Differential Diagnosis**

- Achalasia variant
 - Early/“Evolving” achalasia
- Subtle mechanical obstruction
- Extra-luminal compression
- Hiatal hernia
- Opioid effect
- Normal motility
 - Pressure artifact
 - Vascular or anatomic

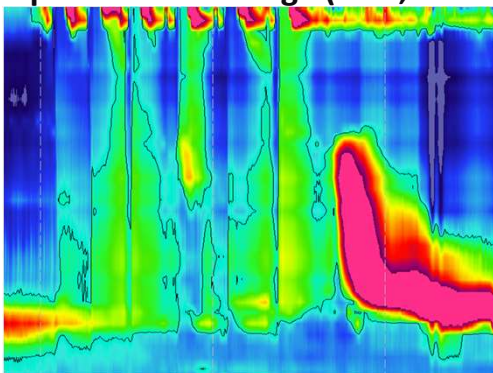


• **“EGJOO” on HRM = Clinically inconclusive finding (complement with**

Complementary evaluation: symptoms, EGD, +...

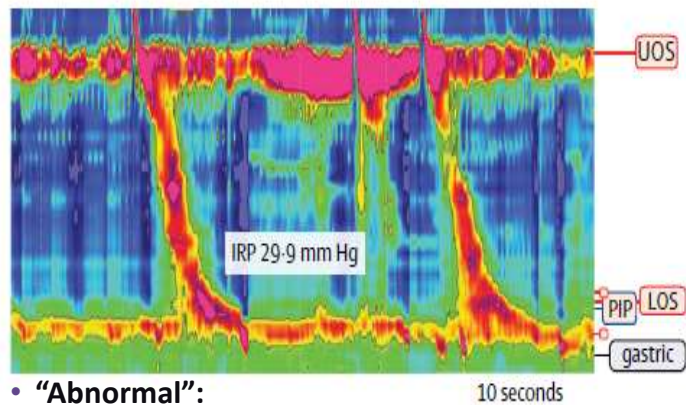
Provocative HRM maneuvers

• **Rapid drink challenge (RDC; 200cc)**



- **“Abnormal”:**
- RDC-IRP > 12mmHg
 - +panesophageal pressurization

• **Standardized Test meal**

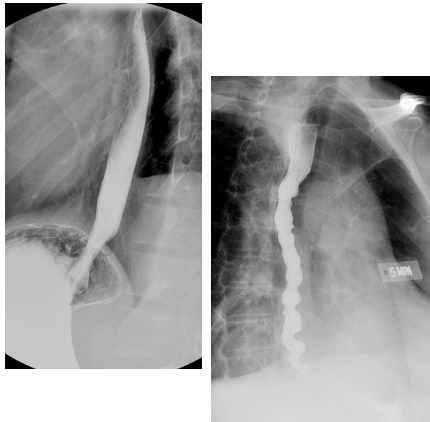


- **“Abnormal”:**
- STM-IRP > 25mmHg

Ang, D, ... Fox, M. Lancet Gastroenterol Hepatol 2017; 2: 654–61
 Sanagapalli, S, et al, Am J Gastroenterol 2021; 116: 280-288
 Krause, A, et al. Neurogastroenterol Motil. 2020; e14000

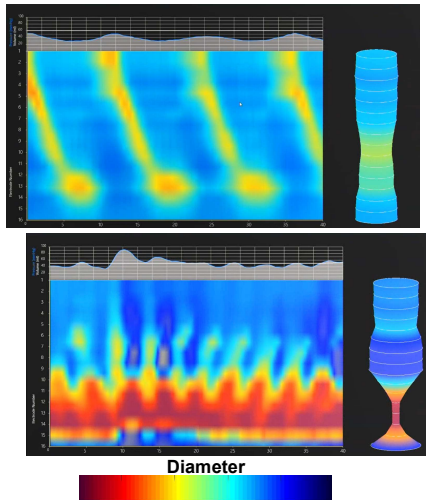
Complementary evaluation: symptoms, EGD, +... *Beyond HRIM*

- Esophagram
 - Timed barium esophagram
 - Barium tablet

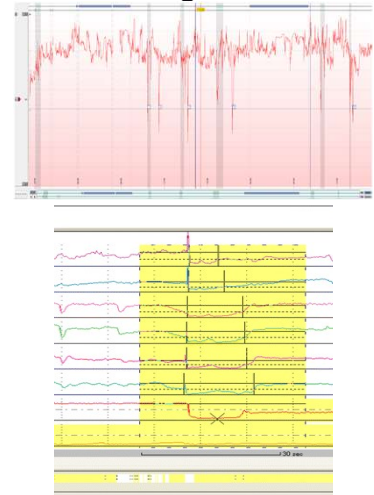


ACG Virtual Grand Rounds

- Functional lumen imaging probe (FLIP)



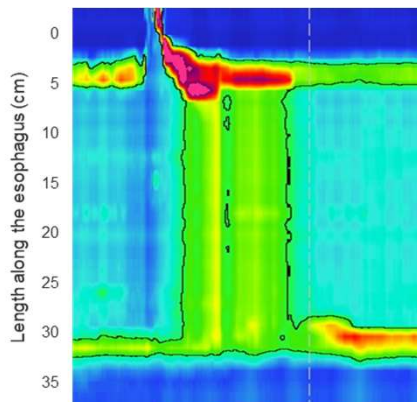
- Ambulatory reflux (pH) monitoring



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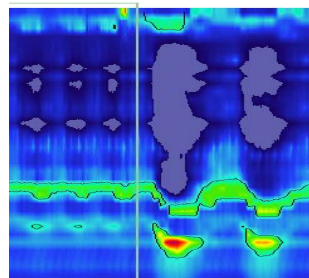
Role of HRM in GERD: *Evaluate for alternate or contributing conditions*

❖ Rule out Achalasia

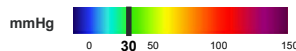
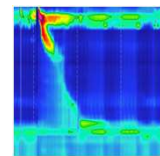
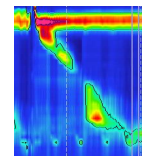
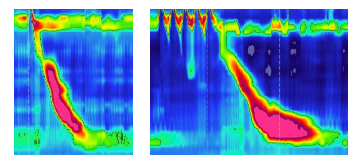


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- Define anti-reflux barrier



- Define peristaltic function

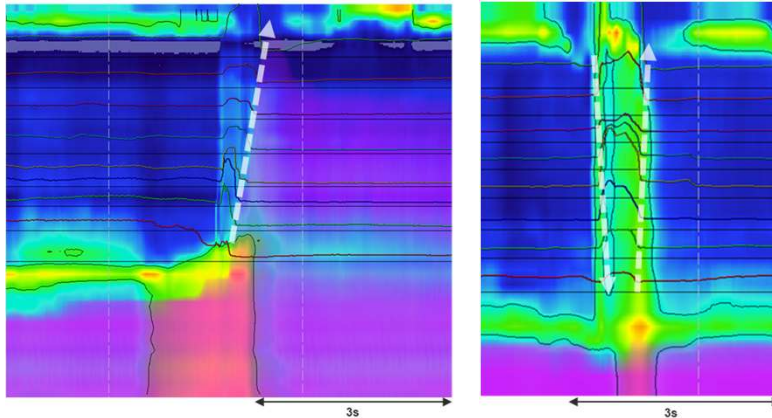


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Role of HR/M in GERD: Evaluate for alternate or contributing conditions

• ‘Post-prandial’ HRIM:

observed HRIM x30-60 min following symptom-provoking meal
Rumination **Supragastric belch**



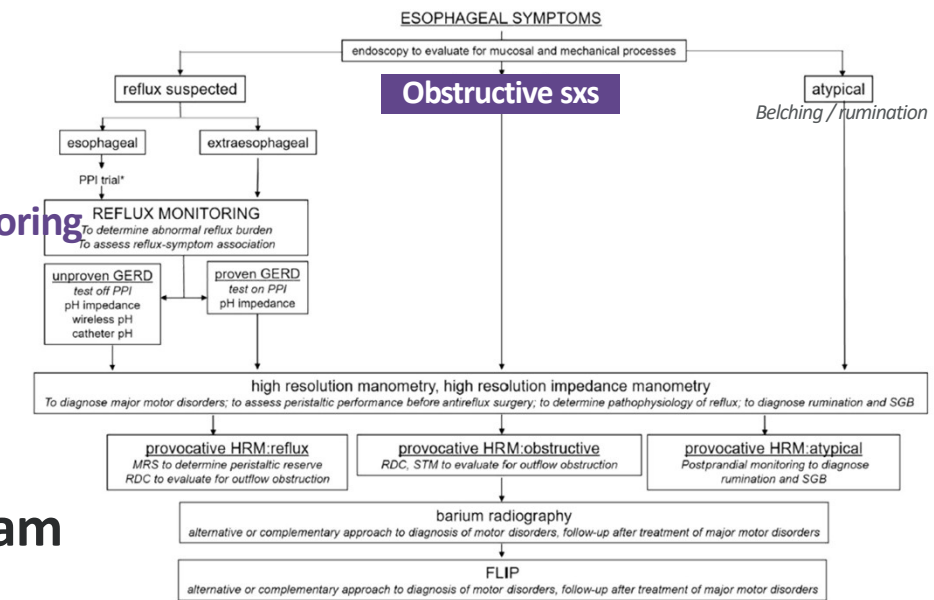
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❖ Treatment with behavioral therapies

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Barium radiology / esophagram

- Outline**
- A. Reflux monitoring
 - B. Manometry
 - C. Esophagram
 - D. FLIP



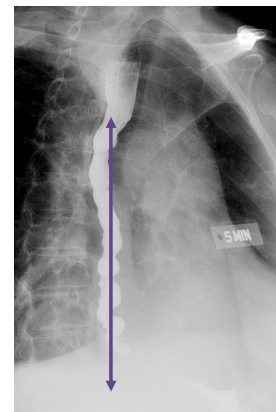
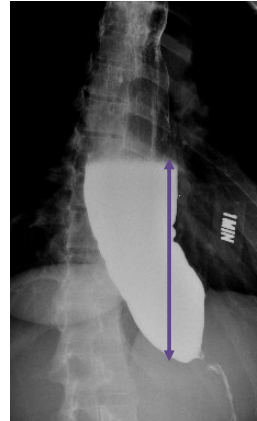
*If not performed earlier

Gyawali, CP, et al. ACG Clinical Guideline: Use of Esophageal Physiologic Testing. Am J Gastroenterol. 2020

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Barium radiology / esophagram

- Timed barium esophagram (TBE)
 - Standardized to quantify esophageal retention
 - 200ml thin barium in upright position
 - AP images at 1, 2, 5 minutes
 - “Abnormal”:
 - 5 minute column height >5cm
 - 5 minute column height >2cm
 - 1 minute column height >5cm
 - 1 minute column height >0cm
- Barium tablet 12-13mm
 - “Abnormal” = failure to pass
- Visualize Anatomy
- Monitor treatment effects (after achalasia treatment)



Functional lumen imaging probe (FLIP)

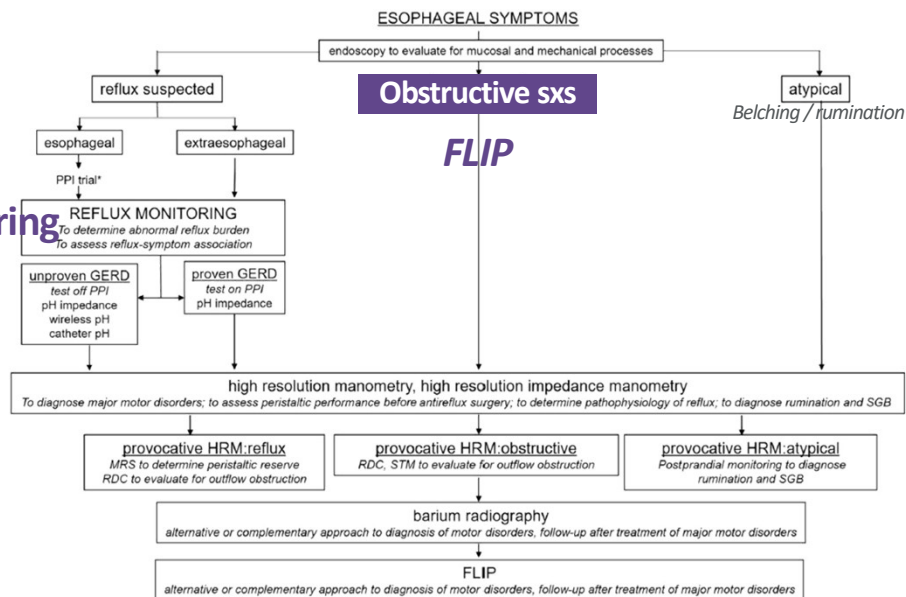
Outline

A. Reflux monitoring

B. Manometry

C. Esophagram

D. FLIP



*If not performed earlier

Functional lumen imaging probe (FLIP)

❖ During sedated endoscopy

The diagram illustrates the FLIP probe, which is 16cm long. It shows a real-time image of the esophagus with a color-coded diameter scale (5-30 mm) and a corresponding motility heatmap. The heatmap shows diagonal bands of color representing peristaltic contractions. A box labeled 'EGJ' indicates the esophago-gastric junction. A legend lists the following parameters: Distensibility, EGJ opening, Contractile response to distension, and Esophageal motility.

❖ Distensibility
❖ EGJ opening
❖ Contractile response to distension
❖ Esophageal motility

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FLIP Panometry: EGJ distensibility and opening

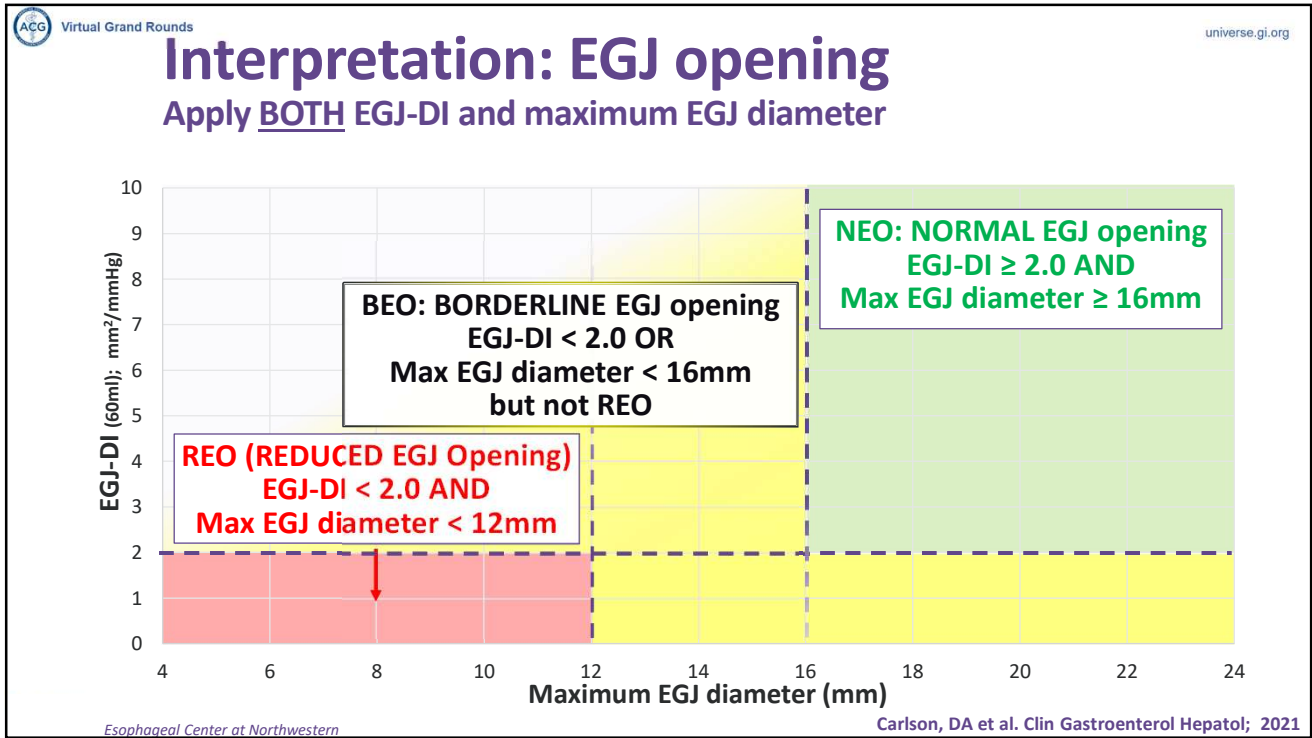
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- **EGJ-Distensibility Index (DI):**
 - = $CSA_{EGJ} / \text{intra-balloon pressure}$
 - 60ml fill volume
- **Maximum EGJ diameter**
 - 60-70 ml fill volume

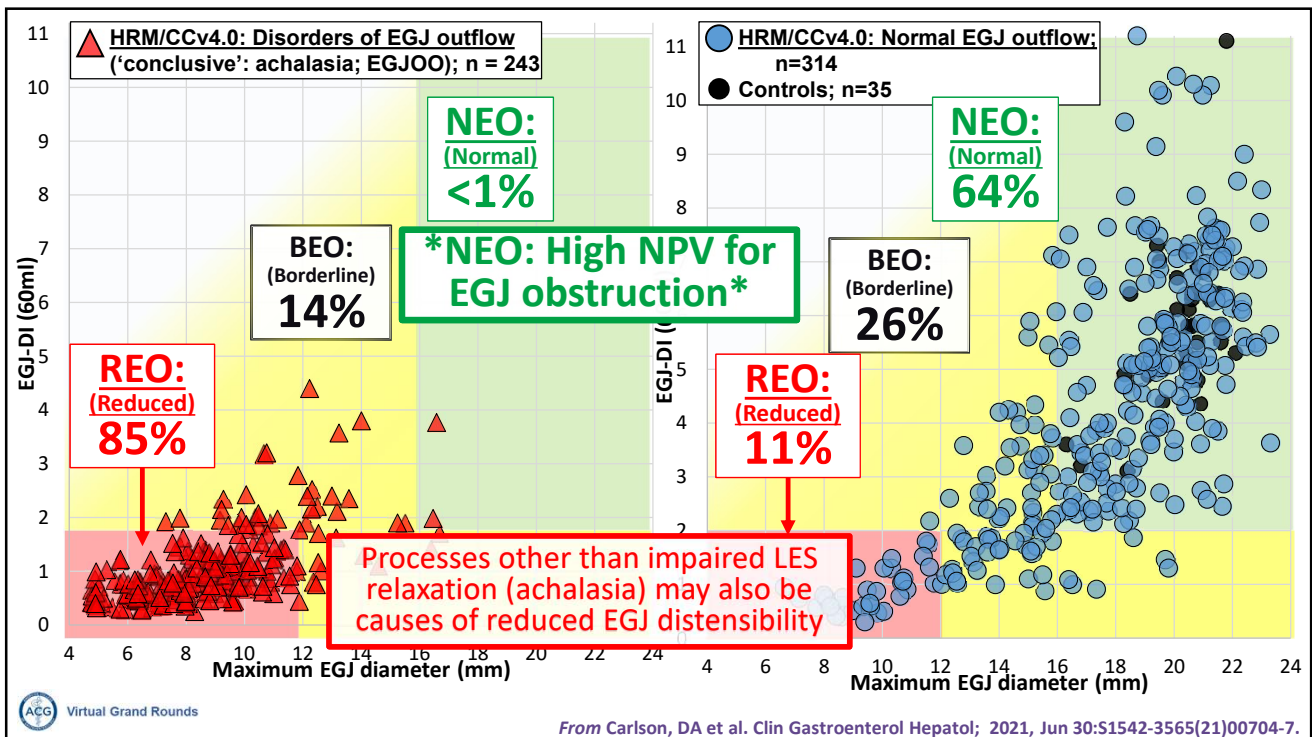
The slide compares two scenarios: 'Antegrade contractions present' (Normal EGJ opening) and 'Antegrade contractions absent' (Reduced EGJ opening). The normal scenario shows a wide, multi-colored EGJ opening with three asterisks indicating normal motility. The reduced scenario shows a narrow, blue EGJ opening with three asterisks indicating absent motility. A color scale at the bottom indicates diameter in mm (5-30).

Esophageal Center at Northwestern

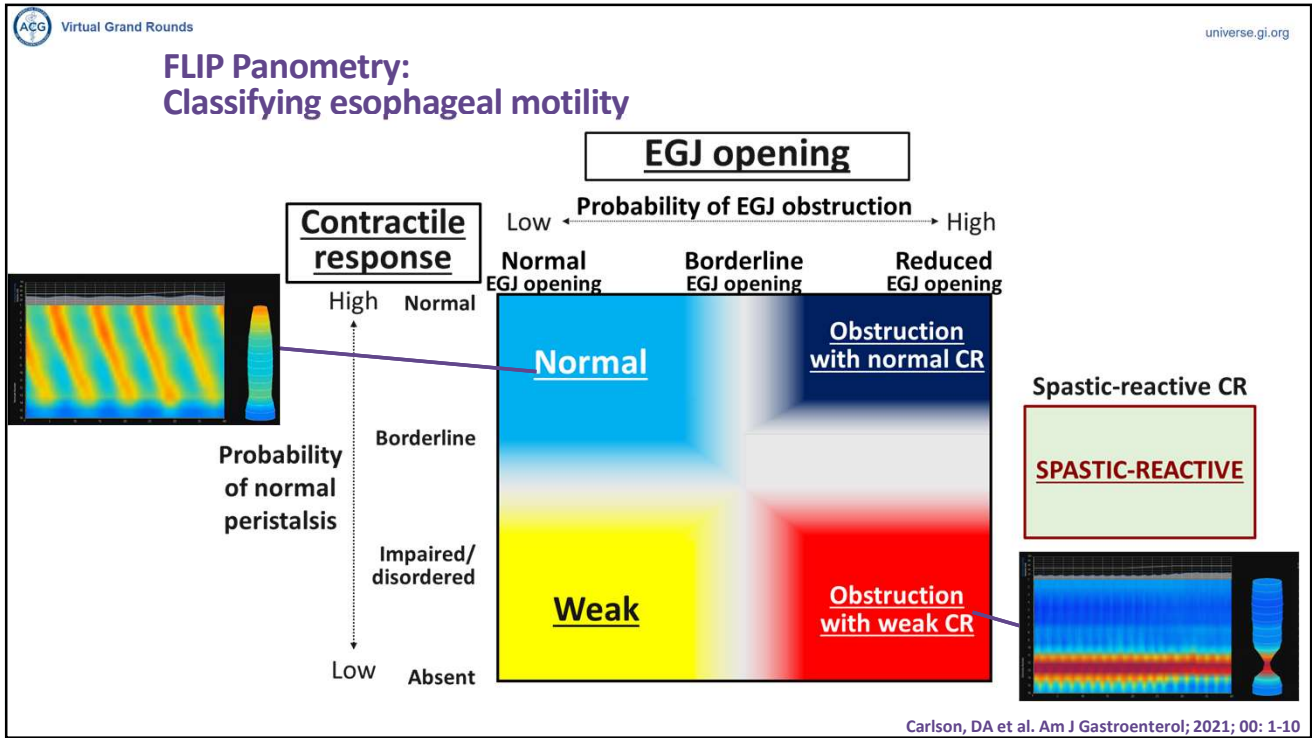
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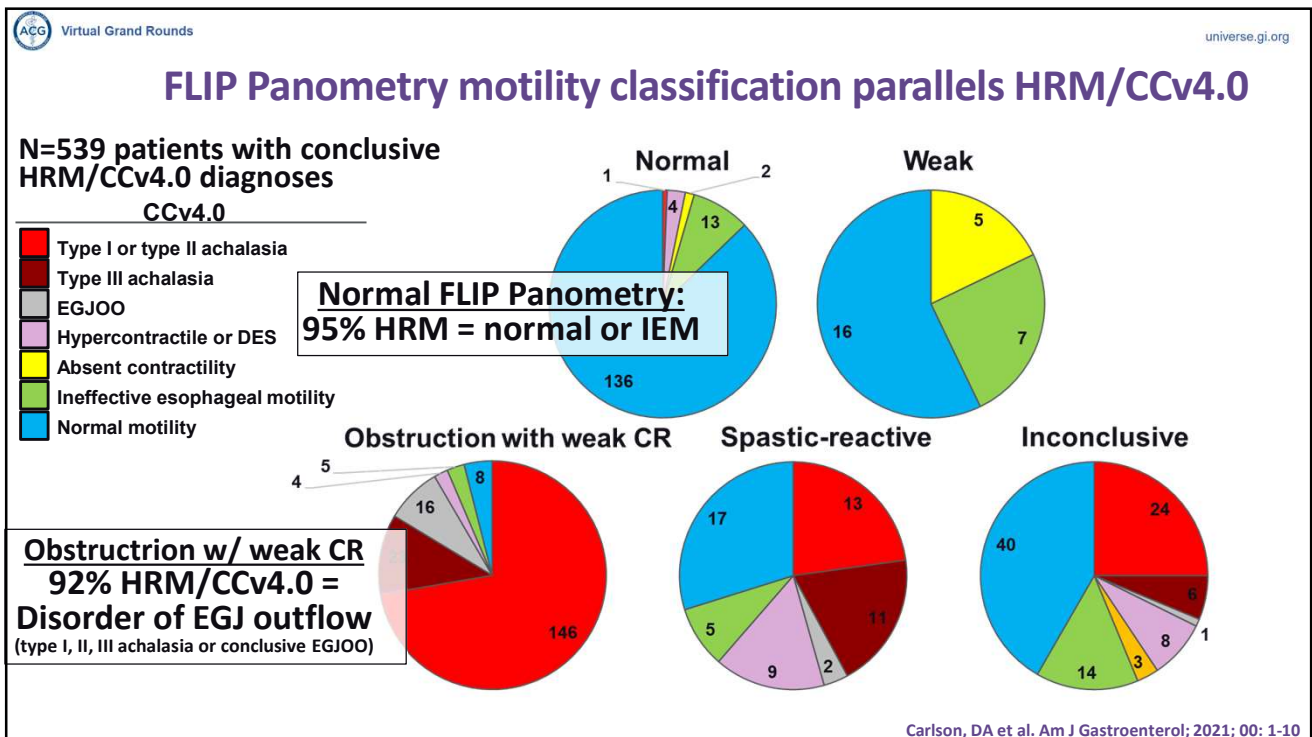
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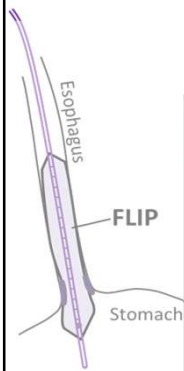


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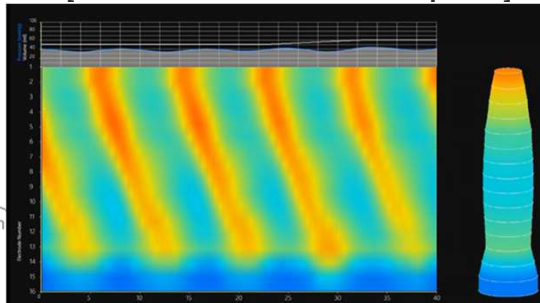


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FLIP Panometry: Evaluating esophageal motility



Patient with normal esophageal motility (HRM)
Antegrade contractions present
 [+RACs: normal contractile response]



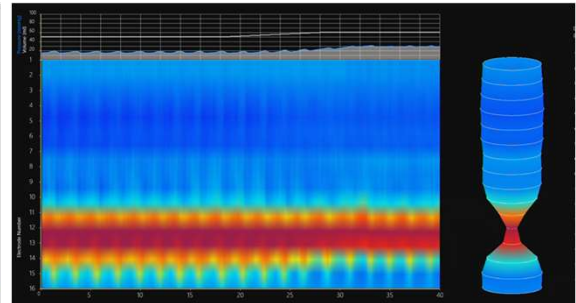
NORMAL EGJ opening

- EGJ-distensibility index (DI) ≥ 2.0 mm²/mmHg
- AND** Maximum EGJ diameter ≥ 16 mm

NORMAL FLIP:

- Major motility disorder essentially **ruled out**

Patient with achalasia (HRM – type II)
Absent contractile response



REDUCED EGJ opening

- EGJ-distensibility index (DI) < 2.0 mm²/mmHg
- AND** Maximum EGJ diameter < 12 mm

Obstruction w/ weak contractile response:

- Suspected achalasia (correlate w/ EGD +/- TBE)
- Obtain HRM if discordance with endoscopic appearance or TBE

Interpretation and Therapeutic Implications of Physiologic Testing in the Management of Esophageal Disorders


Summary and Conclusions

- Overlap in symptomatic presentation of esophageal disorders (including functional)
 - Can use a patient (history) tailored diagnostic approach to define the clinical diagnosis
- Esophageal function testing facilitates defining an objective clinical diagnosis, ideally to direct targeted and tailored treatment
 - No one test is perfect (nor is one metric or one threshold):
 - ❖ Clinical diagnosis generally requires cumulative application of global clinical picture and test results

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Thank You

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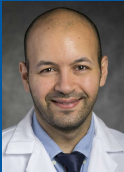
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Questions



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