

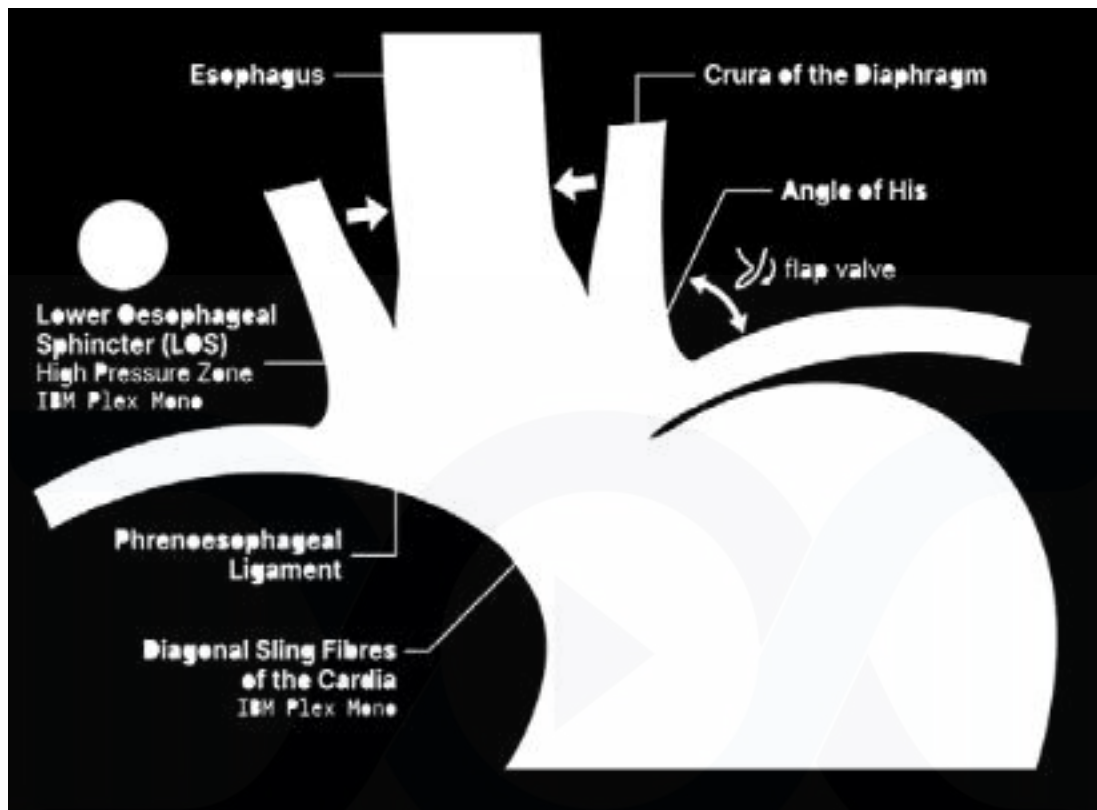


PG Residency Surgical Gastroenterology

Smart Notes. Better Scores.



Endogenous Anti-Reflux Mechanisms



Lower Oesophageal

- Sphincter (LOS) Creates a '**Zone of High Pressure**' via intrinsic distal esophageal muscle; tonically contracted, relaxes ~500ms during swallowing.

Crural Diaphragm

- Anteroposterior diameter decreases during inspiration (increased pressure), mechanically augmenting the sphincter (pinch-cock action).

Sling Fibres of the Cardia

- Diagonal fibres at the cardiac fundus junction (same depth as circular muscles) critical for preventing reflux. Intra-abdominal Pressure. High pressure is transmitted to the GE junction to counteract gastric pressure.

Pathophysiology of the Breach



CORE MECHANISM:

- Reflux occurs when intra-gastric pressure > distal oesophageal high-pressure zone. This imbalance overrides the protective barrier.

HYPOTENSIVE LOS:

- Decreased pressure in normal position or associated with HIATAL HERNIA (GE junction migrates to posterior mediastinum).
- Compromises sphincter function.

SPONTANEOUS RELAXATION:

- Normal LOS pressure but inappropriate relaxation occurs in the absence of peristalsis. Triggered by gastric distention or vagal stimulation.

PHYSIOLOGICAL VS. PATHOLOGICAL:

- Reflux is normal for belching/bloating relief; becomes pathological based on TOTAL ACID EXPOSURE, symptom severity, and MUCOSAL DAMAGE (e.g., esophagitis, Barrett's).



Surgery

Clinical Case

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Clinical Presentation Profile

Typical Symptoms



IBM Plex Mono (80%)

Heartburn:

Epigastric/retrosternal caustic sensation.

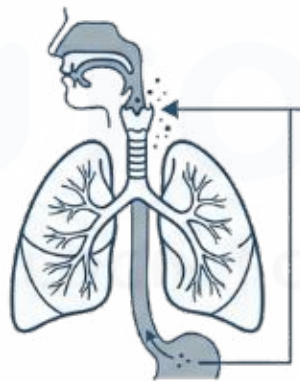


IBM Plex Mono (54%)

Regurgitation: Return of digested food (distinct from undigested regurgitation in achalasia).

Water Brash: Sour taste from acid/bile reflux into oropharynx.

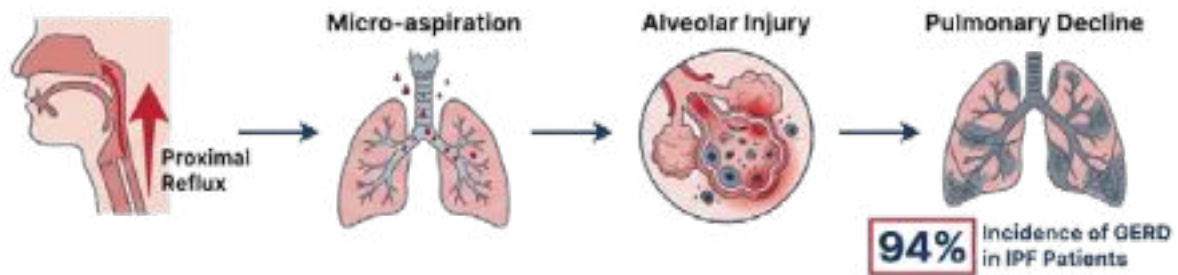
Atypical (Extra-oesophageal)



Caused by micro-aspiration (laryngeal/respiratory injury) or vagal nerve reflex (bronchospasm).

CRITICAL: Must rule out primary laryngeal, bronchial, or pulmonary causes before attributing extra-oesophageal symptoms to GERD.

The Pulmonary Link: Asthma & Fibrosis



Asthma & IPF Context

- **Asthma:** Anti-reflux surgery is more effective than medical therapy for pulmonary complications (90% symptom improvement in children; 70% in adults).
- **Idiopathic Pulmonary Fibrosis (IPF):** High morbidity; mechanism involves proximal oesophageal reflux causing micro-aspiration and ongoing alveolar injury.

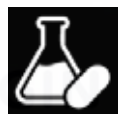
Treatment & Surgical Role

- **Treatment Evidence:** PPIs slow decline but do not stop non-acid reflux aspiration.
- **Surgical Role:** Laparoscopic anti-reflux surgery provides a mechanical barrier to mitigate progression (Wrap-IPF trial).

Management: Chemical vs. Mechanical

PPI Therapy (Chemical)

Neutralizes Acid



Fundoplication (Mechanical)

Restores Barrier



Status - Acid Reflux:  Effective
Status - Non-Acid/Bile:  Ineffective

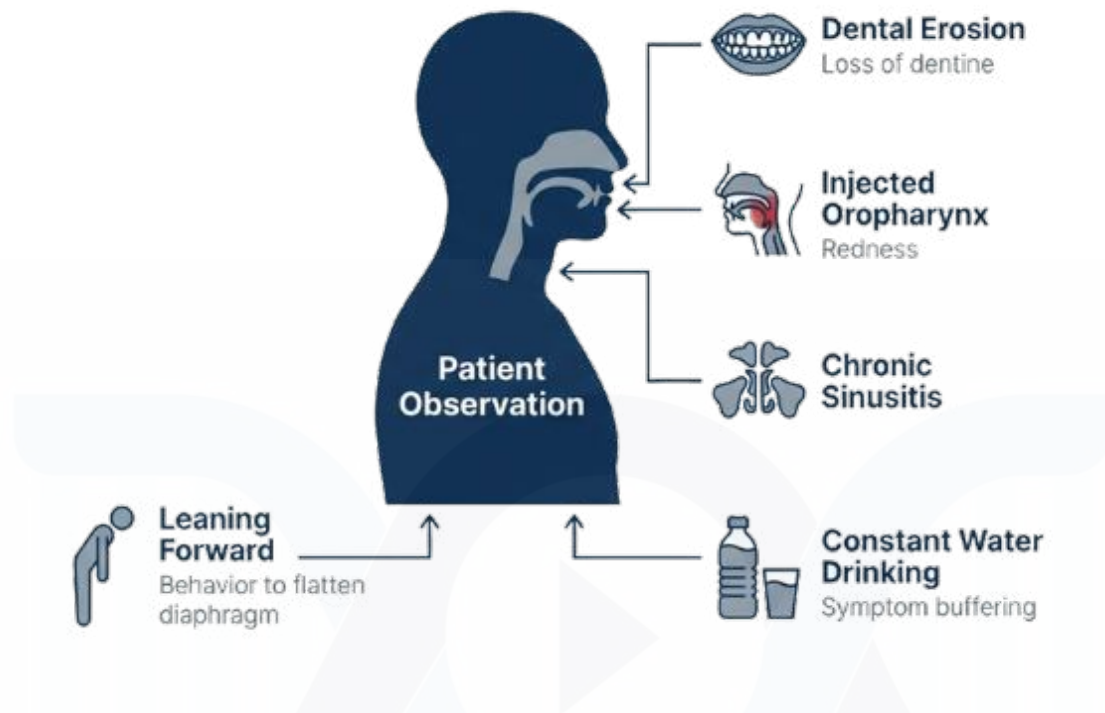
Mechanism: Changes chemistry, not physics

Status - Acid Reflux: Effective 
Status - Non-Acid/Bile: Effective 

Mechanism: Stops micro-aspiration of bile salts & pepsin.

Key Insight: Anti-reflux surgery offers ~ 70% likelihood of improvement for extra-oesophageal symptoms by preventing non-acid injury that PPIs cannot address.

Physical Examination & Pre-Op Considerations



Red Flags & Warning Triangle



Dysphagia requires mandatory evaluation
(Structure check).



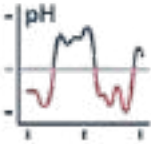
Rule out Malignancy
(Check for supraclavicular lymphadenopathy).



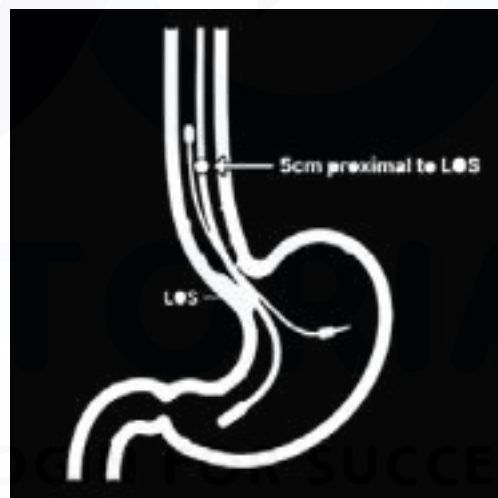
Rule out Musculoskeletal Pain (Tietze syndrome).



The Mandatory Pre-Op Workup

 Ambulatory pH & Impedance The Quantifier Gold Standard. Quantifies acid exposure.	 Oesophageal Manometry The Mechanic Assesses motility and sphincter function.
 Oesophagoscopy (OGD) The Visual Evaluates mucosa and valve grade.	 Barium Oesophagogram The Map Detailed anatomical mapping.

Gold Standard: Ambulatory pH & Impedance



The DeMeester Score

DeMeester Components:

- | | |
|--|---------------|
| • pH < 4 exposure (Upright, Supine, Total) | IBM Plex Mono |
| • Episode frequency | IBM Plex Mono |
| • Episode duration (>5 mins) | IBM Plex Mono |

Threshold: Score > 14.72 = GERD.



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Impedance Monitoring:

Measures electrical resistance to detect non-acid reflux (differentiating liquid vs. gas) and direction (antegrade vs. retrograde).

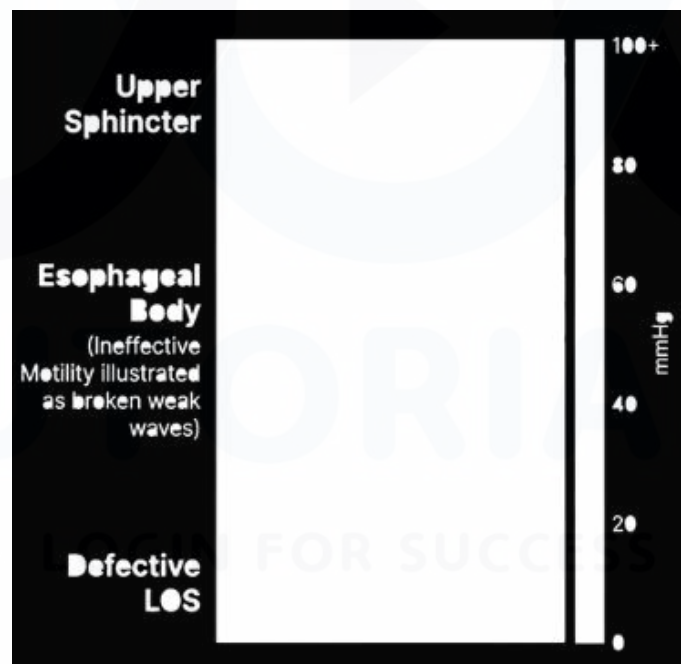


Symptom Index: Symptom within 2 minutes of reflux = likely cause-and-effect.



Key Insight: Acid exposure time is the best predictor of treatment response.

Oesophageal Manometry



- **Function:** Identifies defective LOS and ineffective motility (present in 25-48% of GERO patients).
- **Process:** High-resolution catheter (sensors at 2cm intervals), ~15 mins, ten swallows.
- **Critical Exclusion:** Essential to exclude Achalasia (contraindication for standard anti-reflux surgery).
- **Surgical Planning:** Ineffective motility findings may necessitate partial fundoplication to reduce risk of post-op dysphagia.



Imaging: OGD and Barium Swallow

Oesophagoscopy (OGD) -The Los Angeles Classification

Grade A/B →	Mild/Unreliable (Requires pH test)	IBM Plex Mono
Grade C/D →	Severe/Pathognomonic (No pH test needed)	IBM Plex Mono

• **Additional OGD Check:**



Valve grade (retroflexion),



Hiatal hernia size,



Barrett's oesophagus

Barium Oesophagogram -The Checklist



- **Objective:** Detailed anatomical evaluation (hernia characteristics).
- **Critical Rule Out:**
 - Diverticulosis
 - Tumors
 - Achalasia

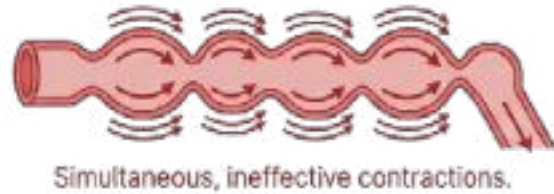
Note: Preferred over CT for GERO symptoms.

Diffuse Esophageal Spasm (DES)

Normal Esophagus



DES: Corkscrew Esophagus



Pathophysiology

- Muscular hypertrophy of distal 2/3 esophagus.
- Vagal degeneration.

Presentation

- Chest pain mimicking angina (radiates to jaw/arms).
- Dysphagia (paradoxical to liquids/cold).
- Regurgitation of saliva/contents (not acid).

Manometry Criteria



IRP < 15 mmHg (Normal LOS relaxation).

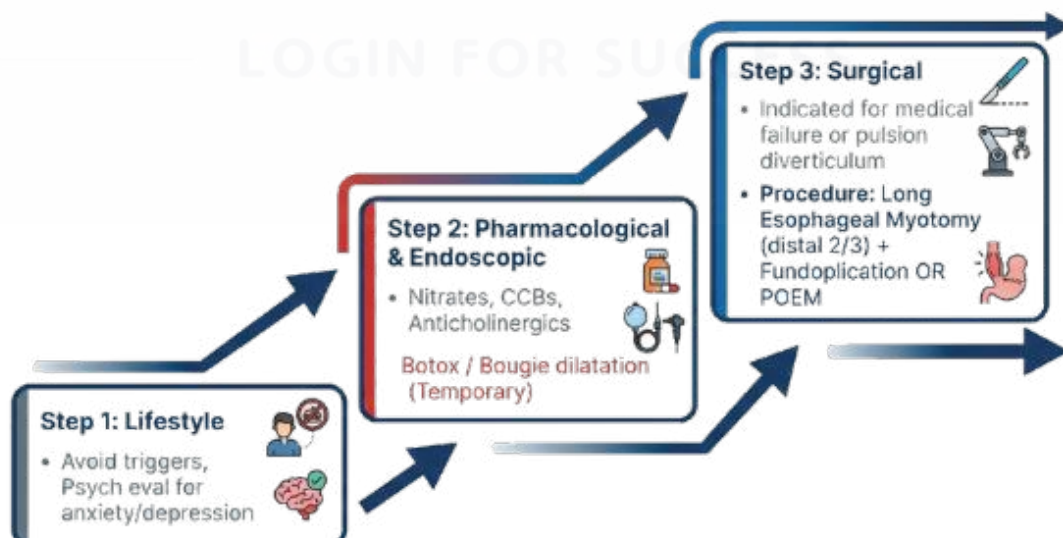


Premature contractions in 20% swallows.

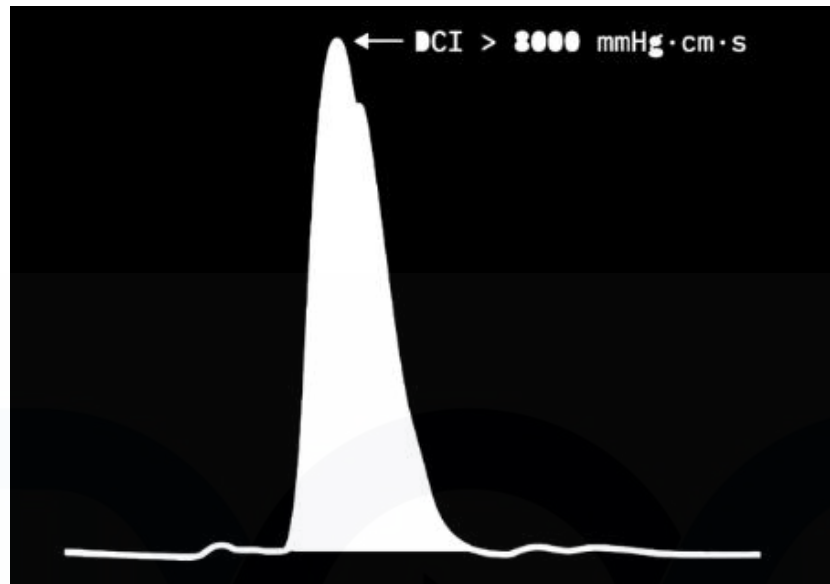


DCI > 450 mmHg·cm·s.

Management of DES



Jackhammer (Nutcracker) Esophagus



Definition

- Hypermotility disorder characterized by excessive contractility; the most common and painful motility disorder.

Criteria

- Two successive swallows with DCI > 8000.

Key Distinction

- LES relaxation is typically normal (unlike Achalasia). Regurgitation is uncommon.

Management

- Avoid caffeine/temp triggers. POEM is the ideal surgical procedure if refractory to medical therapy.



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Hypertensive Lower Esophageal Sphincter



Concept

"Achalasia in evolution" or
EGJ Outflow Tract
Obstruction.

Manometry

Integrated Relaxation
Pressure
(IRP) > 15 mmHg (failed
relaxation) but often
preserved peristalsis in the
body.



Treatment Hierarchy



Temporary

Botox or Hydrostatic balloon
dilatation.



Surgical

Laparoscopic Heller Myotomy
(augmented with Dor/Toupet
fundoplication).

Surgical Note

Partial fundoplication is preferred if
peristalsis is impaired to prevent
post-op dysphagia.



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