INFANTILE GASTROESOPHAGEAL REFLUX (GER & GERD)

1. Definitions & Terminology

- **GER (Gastroesophageal Reflux):** Passage of gastric contents into the esophagus +/- regurgitation/ vomiting. This is a **normal, physiologic** process.
- **GERD (Gastroesophageal Reflux Disease):** GER becomes pathological when it causes **troublesome symptoms** (like FTT, irritability) or **physical complications** (esophagitis, strictures).
- **Secondary GERD:** Reflux caused by another underlying condition (e.g., Neurologic impairment, Cystic Fibrosis, Esophageal atresia, Malrotation, Hiatal hernia, Prematurity, TEF).
- **Regurgitation ("Spitting up"):** **Effortless** movement of stomach contents into mouth.
- **Vomiting:** **Forceful** expulsion.

2. Epidemiology & Natural History

GER is extremely common in healthy infants and generally resolves on its own as anatomy matures and the child spends more time upright.

MEMORY AID: THE RULE OF FRACTIONS FOR GER TIMELINE

- **< 3 months: 1/2** of infants vomit at least once daily.
- **4 months (PEAK): 2/3** of infants.
- **12 months (RESOLUTION):** Drops to only **5%**.

3. Pathophysiology

GER results mainly from **transient relaxation of the Lower Esophageal Sphincter (LES)**.

- **Anatomy in infants:** LES is very short (< 1 cm) compared to adults (3-6 cm). It is located more superiorly, subjecting it to negative intrathoracic pressure during inspiration. Over the first year, it lengthens and moves inferiorly.
- **Triggers for LES relaxation:** Gastric distention (large volume feeds), delayed gastric emptying.
- **Defense mechanisms:** Esophageal clearance and mucosal secretions help prevent esophagitis.
- **Neurologically impaired kids:** Decreased basal LES tone contributes heavily to severe GER.

4. Clinical Presentation

Classic "Happy Spitter" (Simple GER)

- Starts soon after birth.
- Non-bilious, mostly non-projectile.
- Occurs after feeding (milk/food content).
- Small amounts.
- **Absence of:** Fever, diarrhea, jaundice, poor weight gain.

Pathologic GERD

- **Irritability & excessive crying** (signs of esophagitis).
- **Failure to Thrive (FTT)**.
- Does not improve over time.
- Vomitus might be bloody (hematemesis).
- Associated with respiratory or GI complications.

5. Complications & Special Syndromes

- **GI Complications:** Reflux esophagitis, Esophageal strictures (5%), Barrett esophagus (Rare in pediatrics: 0.25% of endoscopies, but 1-3% progress to adenocarcinoma). **Symptom frequency does NOT predict esophagitis severity.**
- **Respiratory Complications:** Pneumonia (aspiration), Asthma, Upper airway symptoms.
  - *Does GERD cause asthma?* Yes (micro-aspiration, vagal-mediated bronchospasm).
  - *Does asthma cause GERD?* Yes (high negative intrathoracic pressure relaxes LES, drugs, increased abdominal pressure).
- **ALTE (Apparent Life-Threatening Event):** Rarely caused by GERD, but must be on the differential.
- **Dental Erosion:** Chronic acid exposure wears down enamel.
- **Sandifer Syndrome:** A specific presentation of GERD characterized by **opisthotonic posturing** (arching of the back/neck). Often misdiagnosed as seizures. Responds to acid suppression.

6. Diagnosis & Investigations

History and physical exam alone are usually sufficient to diagnose benign GER. **Investigations are reserved for complications or to rule out other causes.**

Test	Primary Use & MCQ Board Clues
pH Probe (24-hr)	Records number & duration of acid episodes. >12 episodes/24h = risk of esophagitis. **Reflux Index:** % of time pH < 4.0. **Cannot detect non-acid reflux. A normal study does NOT rule out GER.**
MII (Impedance + pH)	**Superior to pH probe alone.** Detects acid, weak acids, AND **non-acid reflux**.
Upper GI Series (Barium)	**NOT for diagnosing GERD.** Used purely to **rule out anatomic abnormalities** (Malrotation, Pyloric Stenosis, Strictures) or motility issues (Achalasia).
Endoscopy with Biopsy	Directly visualizes mucosa. Gold standard for diagnosing **Esophagitis, Peptic Ulcer, or Crohn's**.
Nuclear Scintigraphy	Isotope-labeled formula tracks feeding for 1 hour. Diagnostic if **material is seen in the lung (aspiration)**. Assesses gastric emptying.
Esophageal Manometry	Assesses LES pressures and peristalsis. Diagnoses **Achalasia**. Cannot diagnose GERD or predict therapy success.

7. Treatment Ladder

Management progresses from conservative to medical to surgical depending on severity.

Step 1: Conservative / Lifestyle

- Elevation of the head of the bed.
- **Avoid prone sleeping** (due to SIDS risk), despite it sometimes reducing reflux.
- Thickening of formula (1-2 tbsp rice cereal per ounce) or use of AR (Anti-Reflux) formula.
- Avoid overfeeding (reduce volumes, increase frequency).
- **Trial of hypoallergenic formula (CMPA - Cow's Milk Protein Allergy) for 2 weeks** if allergy is suspected.

Step 2: Pharmacologic (For Esophagitis or Conservative Failure)

- **PPIs (Proton Pump Inhibitors):** Omeprazole, Lansoprazole, Pantoprazole. (Most effective for mucosal healing).
- **H2 Blockers:** Ranitidine, Famotidine, Nizatidine.
- **Prokinetics:** Metoclopramide, Erythromycin. **(Debated/Questionable use due to side effects).**

Step 3: Surgical

- **Nissen Fundoplication:** Wrapping the stomach fundus around the lower esophagus.
- Reserved for **neurologically impaired patients** or severe GERD complications refractory to all medical management.

- Post-operative pneumonia risk is the same as gastrojejunal feeding.