NGN NCLEX · PEDIATRIC SERIES · VOL. 14

Pediatric *GERD* + Complications

SYSTEM ▸ GI / Pediatric
PRIORITY ▸ Physiologic Integrity
CJM SKILLS ▸ 1–6 Applied
UPDATED ▸ 2026 Test Plan

Gastroesophageal reflux disease in infants & children — pathophysiology, age-stratified presentations, red flags, complications, and NGN clinical judgment for the 2026 NCLEX test plan.

01 GER vs. GERD — The Critical Distinction

PHYSIOLOGIC / BENIGN

GER — "Happy Spitter"

- **Passive** regurgitation of gastric contents; effortless, no distress.
- Peaks **4 mo**; resolves in **~95% by 12–18 mo** as LES matures.
- Normal growth curve; thriving, feeding well.
- No esophagitis, no respiratory or feeding refusal symptoms.
- **Treatment:** reassurance + positioning + feeding modifications.

PATHOLOGIC · REQUIRES TREATMENT

GERD — Pathologic Reflux

- Reflux **causes troublesome symptoms or complications**.
- Poor weight gain / **failure to thrive**, feeding refusal, irritability.
- Esophagitis, hematemesis, dysphagia, Sandifer posturing.
- Respiratory: cough, wheeze, apnea, recurrent pneumonia.
- **Treatment:** stepwise — lifestyle → pharmacologic → surgical.

02 Pathophysiology & High-Risk Populations

Why infants reflux — the developmental "perfect storm"

Immature lower esophageal sphincter (LES) tone allows transient relaxations; **short intra-abdominal esophagus** reduces the anti-reflux barrier; **obtuse angle of His** (vs. acute in adults); **predominantly liquid diet**; and **supine positioning** all favor gastric content reflux into the esophagus.

In GERD, reflux is prolonged enough to overwhelm esophageal clearance & mucosal defenses → **acid-pepsin injury** to esophageal epithelium, pharynx, and (via micro-aspiration) the airway.

High-Risk Populations

NEURO IMPAIRMENT
CP, severe developmental delay — ↓LES tone, prolonged supine, ↑ intra-abdominal pressure

PREMATURITY
Immature LES + frequent feeds; ↑ apnea risk

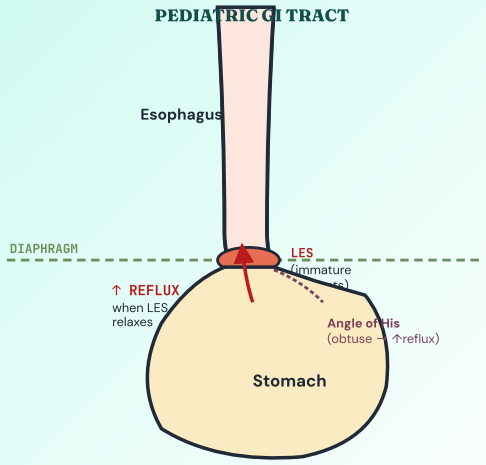
OBESITY
↑ intra-abdominal pressure, hiatal hernia risk

ESOPHAGEAL ATRESIA / TEF
Post-repair dysmotility & reflux are nearly universal

CYSTIC FIBROSIS
Cough, ↑ abd pressure, delayed gastric emptying

HIATAL HERNIA
Structural loss of anti-reflux barrier

Anti-Reflux Anatomy



Short intra-abdominal esophagus + low LES tone + obtuse angle of His = anatomic predisposition to reflux in infants.

03 Age-Stratified Clinical Presentation

Infant — 0–12 mo

TYPICAL (ESOPHAGEAL)
- Frequent post-prandial vomiting / forceful spit-up
- Arching, crying, back-pulling during/after feeds
- Feeding refusal, prolonged feeds, poor weight gain
- Hematemesis (coffee-ground emesis = bleeding)

ATYPICAL (RESPIRATORY)
- Chronic cough, wheeze, recurrent pneumonia
- Apnea, brief resolved unexplained events (BRUE)
- Stridor / hoarseness from laryngeal irritation

Toddler / Preschool — 1–5 yr

TYPICAL (ESOPHAGEAL)
- Regurgitation, intermittent vomiting
- Halitosis, food refusal, picky eating
- Abdominal/chest discomfort (may say "tummy hurts")
- Sandifer syndrome (dystonic neck/back posturing)

ATYPICAL (RESPIRATORY / ENT)
- Chronic cough, recurrent otitis, sinusitis
- Dental enamel erosions on posterior teeth
- Reactive airway / asthma exacerbation

School-age / Adolescent — 6–18 yr

TYPICAL (ADULT-LIKE)
- Heartburn, epigastric/chest pain, acid taste
- Dysphagia, odynophagia (think esophagitis/stricture)
- Nighttime cough, sleep disturbance
- Belching, regurgitation, water brash

RED-FLAG PATTERN
- Weight loss, anemia, hematemesis
- Persistent vomiting → suspect stricture or eosinophilic esophagitis
- Obesity is a key modifiable risk factor

04 Red Flags — "Not Just Reflux" — Escalate Immediately

These findings demand urgent evaluation — vomiting ≠ reflux until proven otherwise

BILIOUS EMESIS
Green vomit → think malrotation / volvulus → surgical emergency

PROJECTILE VOMITING
3–6 wk old, hungry after vomiting → pyloric stenosis

HEMATEMESIS / MELENA
Esophagitis, stress ulcer, varices — never normal

WEIGHT LOSS / FTT
Crossing percentiles down → pathologic, not GER

ONSET > 6 MO OR < 1 WK
Atypical timing — pursue alternate dx

FEVER / LETHARGY
Sepsis, UTI, meningitis, ↑ICP can present as vomiting

BULGING FONTANEL / HA
Increased ICP (mass, hydrocephalus, shaken baby)

APNEA / CYANOSIS / BRUE
Aspiration vs. central etiology — admit & monitor

05 · Complications of Pediatric GERD

HIGH-YIELD NGN

01 / ESOPHAGEAL

Erosive Esophagitis

Acid-pepsin injury → linear erosions, ulceration. **S/Sx:** retrosternal pain, odynophagia, hematemesis, anemia.

NGN CUE ▸ coffee-ground emesis + ↓Hgb = bleeding esophagitis.

02 / ESOPHAGEAL

Esophageal Stricture

Chronic inflammation → fibrosis/narrowing. **S/Sx:** progressive dysphagia, food impaction, slow feeds.

NGN CUE ▸ "Food gets stuck" + GERD hx → endoscopy + dilation.

03 / ESOPHAGEAL

Barrett's Esophagus

Squamous → columnar metaplasia from chronic acid exposure. **Rare in peds**, but adolescents with chronic GERD + obesity at risk; ↑ adenocarcinoma risk lifetime.

NGN CUE ▸ long-standing GERD warrants surveillance EGD in adolescents.

04 / RESPIRATORY

Aspiration Pneumonia

Micro/macro-aspiration of gastric contents. **S/Sx:** recurrent right-sided pneumonia, chronic cough, ↑WBC, infiltrates on CXR.

NGN CUE ▸ recurrent pneumonia same lobe → swallow study + pH probe.

05 / RESPIRATORY

Reactive Airway / Asthma

Vagal reflex + micro-aspiration → bronchospasm. **S/Sx:** nocturnal cough, wheeze poorly responsive to bronchodilators alone.

NGN CUE ▸ refractory pediatric asthma — screen for GERD.

06 / RESPIRATORY

Apnea / BRUE

Laryngeal chemoreflex from acid → apnea, bradycardia, cyanosis — especially preterm infants. Can mimic ALTE/BRUE.

NGN CUE ▸ apnea + reflux hx → cardiorespiratory monitor + workup.

07 / NUTRITIONAL

Failure to Thrive (FTT)

Caloric loss from vomiting + feeding refusal from pain → weight crossing >2 percentile lines down. Most common GERD complication in infants.

NGN CUE ▸ growth curve drop is the RECOGNIZE-CUE sign — plot it.

08 / HEMATOLOGIC

Iron-Deficiency Anemia

Chronic occult blood loss from esophagitis → microcytic, hypochromic anemia, fatigue, pallor, ↓ Hgb/ferritin.

NGN CUE ▸ unexplained microcytic anemia + GERD → guaiac stool + EGD.

09 / OTHER

Dental & ENT Erosion

Acid → enamel erosion (posterior/lingual surfaces), chronic laryngitis, hoarseness, recurrent otitis media, chronic sinusitis.

NGN CUE ▸ dental erosion pattern is a silent marker of nocturnal reflux.

S

Sandifer Syndrome — Don't Mistake It for a Seizure

Paroxysmal **dystonic posturing** of head, neck & trunk (torticollis-like arching, head tilt) triggered by reflux episodes — typically during/after feeds. Frequently **misdiagnosed as seizures** or infantile spasms. Key distinguishers: **preserved consciousness, normal EEG, relief with anti-reflux therapy**. NGN action: treat the reflux, posturing resolves.

06 Diagnostic Workup

CLINICAL

History & Physical

Most pediatric GERD is diagnosed **clinically**. Detailed feeding hx, growth curve, red-flag screen.

GOLD STD

24-hr pH-MII Probe

Quantifies acid + non-acid reflux events; correlates with symptoms. Gold standard for refractory cases.

IMAGING

Upper GI Series

NOT diagnostic for GERD — **rules out anatomic causes** (malrotation, pyloric stenosis, hiatal hernia).

ENDOSCOPY

EGD + Biopsy

For suspected esophagitis, stricture, eosinophilic esophagitis, Barrett's, or treatment failure.

07 Management Ladder — Step Up, Step Down

1 Conservative (First Line)

FEEDING
- **Smaller, more frequent** feeds (avoid overfeeding)
- Thicken formula with rice cereal (1 tsp/oz) — > 1 mo old
- Trial of **hydrolyzed/amino-acid formula 2–4 wk** (rule out CMPA)
- Breastfeeding mothers: trial dairy-free elimination
- Frequent burping; **upright 20–30 min** after feeds

POSITIONING
- Hold upright; avoid car-seat slump post-feed
- **SLEEP SUPINE** per AAP (even with GERD) — never prone
- Adolescents: elevate HOB, avoid late meals, weight ↓ if obese

2 Pharmacologic

ACID SUPPRESSION
- **H_2RA** — famotidine (first-line for short-term in infants)
- **PPI** — omeprazole, lansoprazole, esomeprazole; for confirmed esophagitis or older children
- Give PPI **30 min before meals**; reassess at 4–8 wk

PROKINETIC (LIMITED USE)
- Metoclopramide — black-box: tardive dyskinesia, EPS
- Reserved for severe motility cases; specialist only

3 Surgical (Refractory)

NISSEN FUNDOPLICATION
- Fundus wrapped 360° around distal esophagus
- Indications: failed max medical tx, life-threatening events, severe neuro impairment, aspiration

POST-OP PRIORITIES
- Monitor for **gas-bloat syndrome**, dumping, inability to vomit/belch
- G-tube often placed concurrently
- Small frequent feeds; advance slowly
- Strict I&O, pain control, incentive spirometry

08 Pharmacology Quick-Hit

DRUG CLASS	EXAMPLES	MECHANISM & PEARLS	NCLEX WATCH-OUTS
H_2 Blocker	Famotidine, ranitidine (withdrawn)	Blocks histamine-2 receptor on parietal cells → ↓ acid. Onset ~30 min; tachyphylaxis within weeks.	Adjust dose in renal impairment; **not as potent as PPI** for healing esophagitis.

DRUG CLASS	EXAMPLES	MECHANISM & PEARLS	NCLEX WATCH-OUTS
PPI	Omeprazole, lansoprazole, esomeprazole, pantoprazole	Irreversibly blocks H^+/K^+-ATPase. Give **30 min before breakfast**. Heals erosive esophagitis.	Long-term: ↑ **C. difficile**, pneumonia, B_{12}/Mg/Ca deficiency, ↑ fracture risk; rebound acid on stop.
Antacid	Aluminum/Mg hydroxide, Ca carbonate	Neutralizes existing acid; PRN symptom relief only. Not for chronic use in young children.	Constipation (Al/Ca) or diarrhea (Mg); chronic use → aluminum toxicity, electrolyte shifts.
Prokinetic	Metoclopramide, erythromycin (off-label)	↑ LES tone & gastric emptying via dopamine antagonism.	**BLACK BOX:** tardive dyskinesia, EPS, NMS; limit use < 12 wk; specialist only.
Mucosal Protectant	Sucralfate	Forms barrier over ulcerated mucosa; activated in acidic environment.	Give on empty stomach; separates from other meds by 2 hr; avoid in renal failure.

09 NGN Clinical Judgment Applied — All Six Cognitive Skills

Scenario: 6-mo-old, 4th–10th centile drop, arching, hematemesis, recurrent wheeze

CJ 1 — Recognize Cues
Coffee-ground emesis, FTT, arching, wheeze, nocturnal cough — cluster = pathologic reflux.

CJ 2 — Analyze Cues
Esophagitis (bleeding), micro-aspiration (wheeze), caloric loss (FTT). Sandifer ≠ seizure.

CJ 3 — Prioritize
Airway/aspiration risk > bleeding evaluation > nutrition restoration > pharm therapy.

CJ 4 — Generate Solutions
Upright positioning, thickened feeds, PPI trial, EGD if no response, weight checks q-visit.

CJ 5 — Take Action
Educate caregiver, start PPI 30 min pre-feed, plot growth, dietary referral, follow-up 2–4 wk.

CJ 6 — Evaluate
↑ weight, ↓ vomiting, resolved arching, Hgb normalizing, no respiratory events = effective plan.

10 Click-Traps & NCLEX Answer Patterns

⚡ Avoid these tempting-but-wrong answers

TRAP 01 · SLEEP POSITION
"Place infant **prone** to reduce reflux." **WRONG.** AAP: **always supine** for sleep — SIDS risk outweighs reflux benefit.

TRAP 02 · "JUST GER"
Vomiting in any infant + **FTT, bilious emesis, projectile, hematemesis, or fever** = NOT physiologic. Escalate.

TRAP 03 · UGI SERIES
Upper GI is **not diagnostic** for GERD. It rules out **anatomic** causes. pH-MII probe is the gold standard.

TRAP 04 · PPI TIMING
PPI must be given **30 min before** a meal — not with or after. Most-effective option on a med-admin matrix.

TRAP 05 · METOCLOPRAMIDE
Beware tempting "give metoclopramide PRN" options — **black-box tardive dyskinesia**; not routine peds.

TRAP 06 · SANDIFER = SEIZURE?
Sandifer posturing is reflux-driven; **consciousness preserved, EEG normal**. Don't pick "start anticonvulsant."

TRAP 07 · THICKENED FEEDS AGE
Don't thicken in < 1-mo-old or premature (NEC risk & airway). Acceptable after term + ~1 month.

TRAP 08 · POST-NISSEN "SHOULD VOMIT"
Inability to vomit/belch is **expected** post-fundoplication — not a complication unless severe gas-bloat.

Red Flags ▸ *"VOMITS"*
- **V** Vomiting bilious / projectile
- **O** Onset < 1 wk or > 6 mo
- **M** Malnutrition / FTT
- **I** ICP signs (bulging fontanel)
- **T** Tarry stool / hematemesis
- **S** Sepsis / lethargy

Complications ▸ *"BLEEDS-APP"*
- **B** Barrett's esophagus
- **L** Laryngitis / hoarseness
- **E** Esophagitis (erosive)
- **E** Enamel erosion (dental)
- **D** Dysphagia / stricture
- **S** Sandifer / sleep loss
- **A** Anemia (iron deficiency)
- **P** Pneumonia (aspiration)
- **P** Poor growth (FTT) / Apnea

Feeding Plan ▸ *"SUPER-T"*
- **S** Smaller, frequent feeds
- **U** Upright 20–30 min post-feed
- **P** Position supine for sleep (always)
- **E** Eliminate cow-milk protein trial
- **R** Reflux precautions (no smoke, no overfeed)
- **T** Thicken feeds (rice cereal > 1 mo)