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MEDICAL NOTES POWERHOUSE

Medical Notes Powerhouse

The Complete High-Yield Notes for NEET SS & INI SS-ET

Gastroenterology, Hepatology & Rheumatology

07 VOLUME
of 10 · Volume VII · CH 332–387

56	6	10
CHAPTERS	SECTIONS	VOLUME SET

SECTIONS IN THIS VOLUME

- Gastroenterology
- Nutrition
- Hepatology
- Immunology & Allergy
- Rheumatology — Systemic
- Rheumatology — MSK

Sources Harrison's Principles of Internal Medicine, 22nd Edition

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CH 332 · Approach to the Patient with GI Disease — Anatomy, ...

GI anatomy, classification of GI diseases, symptom overview, evaluation tools (endoscopy, imaging, functional), and treatment principles. Frequently asked NEET SS / INI SS-ET foundation chapter.

Anatomy & GI Function

- GI tract = mouth → anus; sphincters compartmentalize organs.
- Wall layers: **mucosa** (transfer + barrier), **smooth muscle + enteric nerves** (propulsion), **serosa**.
- **Pancreaticobiliary** conduits → duodenum (bile + enzymes).
- **Intrinsic nerves** = propulsion + fluid; **extrinsic** = volitional / involuntary.
- Two functions: **nutrient assimilation + waste elimination**.

Sequential events

- Mouth → salivary **amylase** → pharynx.
- Esophagus: aboral peristalsis + UES/LES coordination. **LES basal tone** prevents reflux.
- Stomach: proximal = storage (accommodation); distal = trituration vs pylorus; emptied to duodenum.
- Small bowel: villi + enzymes/transporters; mixes with pancreatic juice + bile.
- **Pancreatic juice** = enzymes + HCO3- (pH optimization).
- **Proximal SI** = most nutrients/minerals; **ileum** = bile acids + **vitamin B12**.
- **Ileocecal valve** sphincter -> limits coloileal reflux of microbes.
- Colon: to-and-fro dehydrates; 1000-1500 mL ileal -> 100-200 mL rectal.
- Transit: esophagus = seconds; stomach + SI = min-hrs; **colon >1 day**.
- Colonic microbiome ferments CHO -> **SCFAs**; immune modulation.
- Anus: volitional + involuntary continence.

Extrinsic Modulation

- Gut = only system in continuity with environment -> multilayered protection.
- **Mucosal immune**: epithelial + lamina propria lymphocytes + plasma cells + lymph nodes.
- **Paneth cells** -> antimicrobial peptides.
- **Liver** filters/detoxifies portal venous drugs + toxins.
- **Brain-gut axis**: vagus + splanchnic reflexes; **stress disrupts** motor/secretory/sensory.

Classification of GI Diseases

Impaired digestion / absorption

- Most common = **lactase deficiency** (gas + diarrhea, no morbidity).
- **Sucrase-isomaltase** deficiency -> similar with sucrose.
- Diffuse: **celiac, SIBO, infectious enteritis, Crohn's ileitis, radiation enteritis** -> anemia, dehydration, electrolyte/nutrition disorders.
- **Acid hypersecretion** -> mucosal damage + impaired enzyme activation + accelerated transit.
- Biliary obstruction -> fat maldigestion; chronic pancreatitis/cancer -> malnutrition.

Altered secretion

- **Hyper-acid**: gastrinoma, G-cell hyperplasia, retained antrum, duodenal ulcer subset.
- **Hypo-acid**: atrophic gastritis, pernicious anemia.
- Secretory diarrhea: bacterial/viral, *Giardia*, *Cryptosporidium*, SIBO, bile salt, microscopic colitis, diabetic, **VIPoma**.

Altered transit - obstruction

- **Esophagus**: stricture (acid, EoE) or neoplasm.
- **Stomach**: ulcer or cancer.
- **Small bowel: adhesions** (MCC); Crohn's, radiation/drug strictures, malignancy.
- **Colon: colon cancer (MCC)**; IBD/diverticular strictures, drugs.

Altered transit - motility

- **Achalasia** = impaired peristalsis + incomplete LES relaxation.
- **Gastroparesis** = delayed emptying (antral hypomotility or pyloric spasm).
- **Intestinal pseudoobstruction** = enteric nerve/smooth muscle injury.
- **Slow-transit constipation**; outlet: prolapse, intussusception, **dyssynergia**.
- Rapid: post-vagotomy **dumping**, cyclic vomiting, hyperthyroid diarrhea.

Immune dysregulation

- **Celiac** (gluten), **EoE / eosinophilic gastroenteritis**, **UC / Crohn's**.
- **Microscopic colitides** (lymphocytic + collagenous) - subepithelial infiltrate, normal endoscopy.
- **Mastocytosis** + mast-cell role in IBS subset.
- **COVID-19 GI**: nausea, vomiting, diarrhea, abdominal pain, hepatic abnormalities.
- **Dysbiosis** -> IBD, celiac, IBS flares; possible role in pancreatic cancer.

Ischemia & neoplasia

- Mesenteric ischemia: arterial embolus/thrombosis, venous thrombosis, hypoperfusion.
- **US MCC GI cancer = colorectal** (typically >45 y).
- Gastric ca -> high in Asia, increased with *H. pylori*.
- Esophageal ca -> chronic reflux, alcohol, tobacco.
- **HCC** -> chronic viral hepatitis / cirrhosis.

DGBI (Disorders of Gut-Brain Interaction)

- Most prevalent GI disorders - **normal biochemical + structural testing**.
- Examples: **IBS, functional dyspepsia, functional heartburn**.
- Mechanism: altered motility + visceral hypersensitivity + CNS processing + mucosal immunity.
- Frequent emotional disturbance on psychometric testing.

Genetic

- IBD: family clustering, genetic predisposition.
- **Lynch syndrome** = AD; increased colon + gynecologic cancer.
- Genetic dysmotility syndromes described.

♥ NEET SS HIGHLIGHTS

- ♥ **B12 + bile acids** = absorbed in **terminal ileum**.
- ♥ **Colon transit >1 day**; esophageal = seconds.
- ♥ **Adhesions** = MCC small bowel obstruction.
- ♥ **Colon cancer** = MCC large bowel obstruction.
- ♥ **Ileocecal valve** prevents coloileal microbial reflux.
- ♥ **Achalasia** = absent peristalsis + increased LES tone with incomplete relaxation.
- ♥ Rome criteria for DGBI: sensitivity/specificity ~ **55-75%**.

Symptoms of GI Disease

Abdominal pain

- **Visceral** = midline + vague. **Parietal** = localized + precise.
- Inflammatory: PUD, appendicitis, diverticulitis, IBD, pancreatitis, cholecystitis, enterocolitis.
- Non-inflammatory: **biliary colic, mesenteric ischemia, neoplasia**.
- **MCC = IBS + functional dyspepsia**.

Heartburn

- Burning substernal - **40% of population**.
- Usually = increased acid reflux; subset = nonacid reflux or **esophageal hypersensitivity**.

Nausea / vomiting

- Causes: GI, meds, toxins, infection, endocrine, labyrinthine, CNS.
- **Exclude obstruction** in chronic NV.
- DGBI subtypes: chronic NV syndrome, **cyclic vomiting, cannabinoid hyperemesis**.

Altered bowel habits

- Constipation: decreased frequency, straining, hard stool, incomplete evac.
- Causes: obstruction, motor, meds, **hypothyroidism, hyperparathyroidism**.
- Diarrhea: infection, inflammatory, malabsorption, meds.
- **Mucus in stool = IBS; pus + blood = IBD**.
- Malabsorption -> steatorrhea. Contaminated water -> *Giardia, Crypto*.

GI bleeding & jaundice

- **Upper bleed** = melena/hematemesis; **lower** = hematochezia.
- Brisk upper can give red rectal; slow R-colon can give melena.
- Chronic occult -> **IDA**.
- Posthepatic jaundice: **CBD stones, cholangitis, PSC, stricture, cholangiocarcinoma**; pancreatic disease.

Other

- Dysphagia / odynophagia / unexplained chest pain -> esophageal disease.
- **Globus** = UES dysfunction, hypersensitivity, affective disorder.
- Weight loss + anorexia -> neoplasia, inflammation, pancreas, motility, psychiatric.
- IBD -> hepatobiliary, skin, eye, joint manifestations.
- Celiac -> **dermatitis herpetiformis**. SLE -> gut ischemia.

Evaluation - History & Exam

- **Short duration** -> acute infection, inflammation, toxin, ischemia.
- **Long-standing** -> chronic inflammation, neoplasia, DGBI.
- Meals worsen: obstruction, ischemia, IBD, DGBI. Meals relieve: **ulcer**.
- Ulcer = intermittent weeks-mo. Biliary colic = sudden, lasts hours. Acute pancreatitis = severe, days-weeks.
- **Awakening from sleep by pain -> organic** (not functional).
- Malabsorption diarrhea improves with fasting; **secretory diarrhea persists** with NPO.
- Prior surgery -> adhesions. Post-gastrectomy -> dumping; post-chole -> bile diarrhea.
- Celiac -> N European descent; IBD increased in Jewish populations.
- **Rome criteria** for DGBI (sens/spec 55-75%).

Physical examination

- Fever -> inflammation/neoplasm.
- Orthostasis -> blood loss, dehydration, sepsis, autonomic neuropathy.
- Skin/eye/joint -> IBD; pelvic exam -> gyne pain; rectal -> blood/mass.
- **Loss of bowel sounds = ileus; high-pitched hyperactive = obstruction**.
- **Ischemia = pain out of proportion to tenderness**.
- Parietal/peritonitis -> localized, guarding, rigidity, rebound.
- **Carnett sign**: tenderness increased on Valsalva/leg lift -> abdominal wall pain.

Diagnostic Tools

Laboratory

- IDA -> mucosal blood loss; **B12 def** -> intestinal/gastric/pancreatic disease.
- Increased WBC + ESR + CRP = inflammation; leukopenia = viral.
- Vomiting/diarrhea -> electrolyte, acid-base, increased BUN.
- Tumor markers: **CEA, CA 19-9, CA 125, AFP**.
- **Secretin-gastrin test** for gastrinoma.
- Ascitic fluid: infection, malignancy, portal HTN findings.
- Urine: carcinoid, porphyria, heavy metals.
- Pharmacogenetics -> drug avoidance (e.g., TPMT for thiopurines).

Luminal contents (stool)

- **Fecal H. pylori antigen** = active infection.
- Stool culture + leukocytes + parasites + **Giardia antigen**.
- Increased fecal fat -> malabsorption; decreased **fecal elastase** -> exocrine pancreatic insufficiency.
- **Fecal calprotectin / lactoferrin** elevated in IBD.
- Stool electrolytes for diarrheal workup; laxative screen for abuse.
- **FIT + multitarget fecal DNA** -> colon ca screening (low risk).
- **Esophageal pH/impedance** for refractory GERD + unexplained belching.

Endoscopy - high-yield

- **EGD normal in 85%** of unexplained dyspepsia.
- **Colonoscopy** = preferred colon ca screening + surveillance + polypectomy.
- **Sigmoidoscopy** -> distal causes, young low-risk patients.
- Obscure bleed: **push, capsule, double-balloon enteroscopy**.
- **Capsule** visualizes SB Crohn's when imaging negative.
- **EUS**: stage GI malignancy, exclude CBD stones, pancreatitis, anal sphincter.
- **ERCP**: dx + tx pancreaticobiliary disease.

Table 332-1 - Endoscopy indications (key)

Procedure	Top indications
EGD	Dyspepsia w/ alarm, dysphagia, upper GIB, anemia, Barrett surveillance, EMR/ESD
Colonoscopy	CRC screening, lower GIB, anemia, IBD surveillance, diarrhea, polypectomy
ERCP	CBD stones, cholangitis, gallstone pancreatitis, pancreaticobiliary tumor
EUS	Staging malignancy, CBD stones, chronic pancreatitis, anal sphincter
Capsule	Obscure bleed, SB Crohn's
Double-balloon	Ablation/biopsy of SB lesions

Radiology / Nuclear

- **Barium esophagram** = initial for dysphagia (rings, strictures, achalasia).
- Triple-phase swallow -> oropharyngeal dysphagia.
- **Defecography** for outlet constipation.
- **CT/MR enterography** -> IBD assessment.
- **MRCP** -> biliary/pancreatic ducts (stones, neoplasm, PSC).
- **Elastography** (US/MR) -> liver fibrosis.
- **PET-CT with DOTA-octreotate** -> neuroendocrine tumors.
- **Tagged RBC scan** -> brisk bleed localization.
- Gastric emptying scintigraphy = standard for gastroparesis.

Histopathology

- Mucosal biopsy -> celiac, IBD, microscopic colitis, infection, dysplasia, neoplasia.
- Gastric biopsy -> *H. pylori* IHC + culture sensitivity.
- **Deep rectal biopsy** -> Hirschsprung, amyloid.
- **Liver biopsy** -> abnormal LFTs, jaundice, viral hepatitis, transplant rejection.
- Advanced imaging: **NBI, chromoendoscopy, confocal endomicroscopy, OCT**; AI-assisted dysplasia detection emerging.

Functional testing

- **HRM (high-resolution manometry)** -> achalasia + esophageal motility.
- SB + colon manometry -> pseudoobstruction / colonic inertia.
- **Anorectal manometry + balloon expulsion** -> outlet constipation / incontinence.
- **FLIP (functional lumen imaging probe)**: LES in achalasia, UES in Zenker, pylorus in gastroparesis.
- **Breath H2/CH4**: CHO intolerance + SIBO.
- **Urea breath** -> active H. pylori.

CLINICAL PEARLS

- Sudden awakening from sleep by pain -> **organic** cause (rules against DGBI).
- **Mesenteric ischemia**: severe pain, minimal exam findings - high index of suspicion.
- **EGD normal in 85%** of dyspepsia patients.
- Mucus = IBS; **pus + blood = IBD**.
- Fecal calprotectin = best stool marker for IBD activity.

Treatment Principles

Nutritional

- **Symptom-only**: lactose restriction, liquid in gastroparesis, CHO restriction in dumping, low-FODMAP in IBS, alpha-gal meat avoidance.
- **Disease-modifying**: **gluten-free in celiac**, elimination diet in EoE.
- **MCT** -> short-gut / severe ileal disease.
- **Gastrostomy** -> unsafe swallow; **jejunostomy** -> gastric dysmotility.
- **TPN** -> generalized gut failure unable to tolerate enteral.

Pharmacotherapy - symptom

- **OTC**: antacids, H2 blockers, PPIs, fiber, laxatives, loperamide, bismuth, kaolin-pectin, lactase, alpha-galactosidase.
- **PPIs**: GERD, slow UGIB, Barrett's, EoE (high dose).
- **Vonoprazan** = first **P-CAB** (potassium-competitive acid blocker) - severe acid disease + H. pylori adjunct.
- **Baclofen** -> increased LES barrier in reflux.
- Swallowed **fluticasone / budesonide** for EoE.
- Prokinetics -> gastroparesis, pseudoobstruction, Ogilvie, slow-transit constipation.
- **Secretagogues** (lubiprostone, linaclotide, plecanatide) -> refractory constipation.
- **Peripheral opioid antagonists** (methylnaltrexone, naloxegol) -> OIC.
- Prescription antidiarrheals: opioids, anticholinergic antispasmodics, TCAs, bile-acid binders, 5-HT3 antagonists.
- **Octreotide** = somatostatin analog -> hypersecretory states.
- DGBI -> **neuromodulators** (TCAs).
- **Nonselective beta-blockers** reduce variceal bleeding risk in portal HTN.

Pharmacotherapy - disease modifying

- Immunomodulators: IBD, microscopic colitis, ICI colitis, refractory celiac, autoimmune pancreatitis, gut vasculitis.
- **Biologics in IBD**: anti-TNF, anti-integrin (vedolizumab), anti-cytokines (IL-12/23 - ustekinumab; IL-23 - risankizumab), **JAK inhibitors**, cell-adhesion molecule abs.
- **Acute severe UC (hospitalized)**: **corticosteroids -> infliximab or cyclosporine**.
- Eosinophilic disease -> eosinophil-depleting/mast-cell biologics.
- **H. pylori eradication** can treat **MALT gastric lymphoma**.
- GI carcinomas -> poor chemo/radiation response; **lymphomas curable**.
- Frontier: immunotherapy, ICIs, tumor vaccines.

Other modalities

- Therapeutic endoscopy, interventional radiology, surgery.
- **Psychological / behavioral therapy** for DGBI.
- Physical therapy -> pelvic floor for dyssynergia.
- Smartphone apps for prep + adherence.
- CAM: **ginger, acupressure, acustimulation** for nausea; pyridoxine in pregnancy NV.

✦ MNEMONIC

DIANN-GG *8 categories of GI disease*

D — Digestion / absorption impairment
I — Immune dysregulation (IBD, celiac, EoE)
A — Altered transit (obstruction / motility)
N — Neoplastic degeneration
N — iNadequate blood flow (ischemia)
G — Gut-brain DGBI (functional)
G — Genetic (Lynch, dysmotility)

8th = altered Secretion (acid hyper/hypo, secretory diarrhea) - completes the matrix.

✎ MCQ CORNER

Q1. 55 y/o male, sudden severe periumbilical pain x 6 h, soft abdomen, minimal tenderness, lactate 7. MCC?

A. Diverticulitis
✓ **B. Acute mesenteric ischemia**
C. Acute pancreatitis
D. Bowel obstruction

► *Pain out of proportion to exam + elevated lactate = classic AMI. Embolic SMA occlusion in AF a frequent cause.*

Q2. Chronic watery diarrhea x 3 months. Best initial stool marker to assess for IBD?

A. Fecal occult blood
B. Stool osmotic gap
✓ **C. Fecal calprotectin**
D. Stool culture

► *Fecal calprotectin/lactoferrin = sensitive marker of mucosal inflammation; distinguishes IBD from IBS.*

Q3. Most common cause of small bowel obstruction in a previously operated abdomen?

A. Crohn's stricture
✓ **B. Adhesions**
C. Hernia
D. Neoplasm

► *Postoperative adhesions = MCC of SBO in industrialized world. Hernia = 2nd; malignancy with non-operated.*

Q4. Which test is the first-line for unexplained dysphagia?

A. Upper endoscopy
✓ **B. Barium esophagram**
C. Esophageal manometry
D. pH-impedance

► *Esophagography first - detects subtle rings, strictures, achalasia; informs subsequent endoscopy/manometry.*

Q5. A drug class that potentiates LES barrier function to reduce GERD?

A. PPI
B. Vonoprazan
✓ **C. Baclofen**
D. Octreotide

► *Baclofen (GABA-B agonist) increases LES tone + reduces transient relaxations -> less reflux.*

Q6. Acute severe UC requiring hospitalization. First-line + rescue if no response in 3-5 days?

A. Mesalamine then surgery
✓ **B. Steroids then infliximab or cyclosporine**
C. Vedolizumab then steroids
D. Methotrexate then colectomy

► *IV corticosteroids first-line; if no response in 3-5 days -> infliximab OR cyclosporine rescue; colectomy if both fail.*

◷ LAST MINUTE REVISION

► **B12 + bile acids** absorbed in terminal ileum.
► **Pancreatic juice** = enzymes + HCO3-.
► Colon transit >1 day; esophagus = seconds.
► **Mucus = IBS; pus+blood = IBD.**
► Adhesions = MCC SBO; **colon ca** = MCC LBO.
► **Achalasia:** failed peristalsis + incomplete LES relaxation.
► Awakening from sleep by pain -> **organic.**
► Malabsorption diarrhea = decreased with fasting; **secretory persists.**
► EGD normal in **85% of dyspepsia.**
► **Vonoprazan** = first P-CAB; **Baclofen** increases LES.
► Fecal **calprotectin/lactoferrin** = IBD activity; **elastase** = pancreatic function.
► FIT + multitarget fecal DNA = CRC screening (low-risk).
► **DOTA-octreotate PET** for NETs.
► Acute severe UC: **steroids -> infliximab / cyclosporine.**
► **H. pylori eradication** can treat gastric MALT lymphoma.
► Lynch = AD, increased colon + gynae.
► Rome criteria sensitivity/specificity ~ 55-75%.
► Visceral pain = midline + vague; parietal = localized + sharp.
► Loss bowel sounds = ileus; high-pitched = obstruction.
► **Ischemia: pain >> tenderness.**

◉ UPDATES

◉ **Vonoprazan** (P-CAB) approved for severe acid disease + H. pylori regimens (post-2020).
◉ **Risankizumab** (anti-IL-23) and **upadacitinib** (JAK1 inhibitor) approved for Crohn's / UC.
◉ Rome IV criteria + new term **DGBI** replaces 'functional GI disorder'.
◉ AI/machine-learning polyp detection on colonoscopy increasingly adopted.
◉ COVID-19 recognized as cause of GI symptoms + hepatic abnormalities.

CH 333 · GI Endoscopy — Procedures, Indications & Therapy

Endoscopic procedures (EGD, colonoscopy, ERCP, EUS, capsule), therapy (EMR/ESD, POEM, EVL, stenting), urgent endoscopy for bleeding/obstruction, antibiotic + antithrombotic management, CRC screening. NEET SS / INI SS-ET high yield.

Endoscopic Procedures

Upper endoscopy (EGD)

- Flexible scope: mouth -> esophagus, stomach, duodenum.
- Best method for upper GI mucosa.
- Superior to barium for **gastric ulcers** + flat lesions (Barrett's).
- Permits directed biopsy + endoscopic therapy.
- Unsedated EGD with **5-mm ultrathin scope** (transoral or transnasal).

Flexible sigmoidoscopy

- Examines colon to splenic flexure (60 cm).
- Distal causes of bleeding/inflammation/obstruction.
- Young patients not at significant CRC risk.

Colonoscopy

- **Cecum reached in >95%**; terminal ileum usually examined.
- **Gold standard** for colon mucosa imaging.
- Greater sensitivity than barium enema for colitis, polyps, CRC.
- CT colonography rivals for some lesions but findings require f/u colonoscopy.

Small-bowel endoscopy

- **Capsule endoscopy**: swallowed wireless camera -> jejunal/ileal lesions; **solely diagnostic**.
- **Patency capsule** (radio-opaque biodegradable) before capsule in Crohn's/post-op (risk of retention at stricture).
- **Push enteroscopy**: pediatric/adult colonoscope or dedicated enteroscope -> proximal-mid jejunum; allows biopsy/therapy.
- **Single/double-balloon enteroscopy**: pleats SB on overtube; entire SB possible if oral + anal routes.
- Therapy: thermal ablation of vascular ectasias, polypectomy, biopsy.

ERCP

- **Side-viewing scope** -> duodenum; cannulate bile/pancreatic duct + fluoroscopic contrast.
- Sphincterotomy of major papilla.
- Therapy: stone retrieval, biopsy, stricture dilation/stenting, ductal leak repair.
- **Primarily therapeutic**; diagnostic role = tissue sampling of ductal strictures.

EUS

- US transducer at scope tip -> wall + adjacent organs/vessels/nodes.
- **Most accurate preoperative local staging**: esophageal, pancreatic, rectal cancer (T + N).
- **Does NOT detect distant metastases** beyond range.
- Dx: bile duct stones, GB disease, subepithelial lesions, chronic pancreatitis.
- EUS-FNA/FNB for tissue sampling.
- Therapy: drainage (pseudocyst, necrosis), **celiac plexus neurolysis** for pancreatic pain, NET ablation, varix Rx, biliary drainage, EUS-gastrojejunostomy.

NOTES + advanced therapy

- Established: **PEG, endoscopic necrosectomy**.
- Newer: **POEM** (achalasia, gastroparesis), **POET** (subepithelial tumors), **EFTR** (GIST, mural lesions).
- **EMR / ESD**: resection of benign + early malignant lesions; **ESD = en bloc**, better histology + curative for some.
- Closure: through-the-scope clips, over-the-scope clips, endoscopic suturing.

Risks of Endoscopy

- Sedation -> respiratory depression / allergic reaction.
- Diagnostic EGD/sig/colonoscopy: **perforation <1:1000**.
- Therapeutic (polypectomy, EMR/ESD, hemostasis, dilation): **0.5-5%**.
- EUS without FNA = similar to diagnostic EGD.

ERCP specific

- **Pancreatitis ~5%**; **up to 25%** in young, anicteric pts with normal ducts.
- Post-ERCP pancreatitis usually mild; can be severe -> diabetes, death.
- **Significant bleed ~1%** after sphincterotomy.
- Ascending cholangitis, pseudocyst infection, duodenal perforation, abscess.

PEG

- **10-15% adverse events**; mostly wound infections.
- Fasciitis, pneumonia, bleeding, **buried bumper syndrome**, colonic injury.

Antibiotic Prophylaxis

Table 333-1 - Endoscopic ABx prophylaxis (key)

Condition	Procedure	ABx?
Any cardiac (incl prosthetic valve)	Any endoscopy	NOT recommended
Biliary obstruction, complete drainage	ERCP	NOT recommended
Biliary obstruction, incomplete drainage (PSC, hilar)	ERCP	YES + continue
Sterile pseudocyst comm w/ duct	ERCP	YES + continue
Cystic lesions (GI/mediast/panc)	EUS-FNA	YES
Solid GI lesion	EUS-FNA	NOT recommended
All patients	PEG placement	YES (cefazolin)
Cirrhosis + acute GIB	Any	YES (ceftriaxone/quinolone) on admission
Peritoneal dialysis	Lower GI	YES
Prosthetic joint / vascular graft	Any	NOT recommended

Antithrombotic Management

Risk categories

- **Low-risk procedures**: diagnostic EGD/colonoscopy +/- biopsy, EUS w/o FNA, ERCP stent exchange.
- **High-risk procedures:** EGD/colon w/ dilation/polypectomy/thermal ablation, PEG, EUS-FNA, ERCP w/ sphincterotomy / pseudocyst drainage.

Table 333-2 - Antithrombotic management before endoscopy

Drug	High-risk procedure: action	Comment
Warfarin	Stop 5d; INR <=1.5	Bridge w/ LMWH if high thrombosis risk
Dabigatran	Stop 2-3d (GFR>=50); 4-5d (GFR 30-49)	No bridge; reversal for life-threat bleed
Rivaroxaban/apixaban/edoxaban	Stop 2d (GFR>=60); 3d (30-59); 4d (<30)	No bridge
Heparin	Stop 4-6h (UFH); skip 1 dose LMWH	—
Aspirin	**Continue**	Low-dose ASA OK
P2Y12 (clopidogrel, etc.)	Stop 5d (clopid/ticag); 7d (prasugrel); 10-14d (ticlop)	Discuss w/ cardio if stent <12mo DES / <1mo BMS

- **Bridging with LMWH** indicated for: prosthetic metal valve, AF w/ CHA2DS2-VASc >=3 + mitral stenosis/prior CVA, mechanical mitral, mechanical aortic w/ risk factors, VTE within 3 mo.
- Life-threatening hemorrhage: **unactivated PCC** for warfarin reversal.

NEET SS HIGHLIGHTS

- **EUS** = best local T/N staging (esophageal, pancreatic, rectal); **no distant mets**.
- **Post-ERCP pancreatitis** = 5%; up to 25% in young anicteric w/ normal ducts.
- **PEG** infection 10-15% (cefazolin prophylaxis).
- **Cirrhotic + GIB** = ceftriaxone on admission.
- Capsule endoscopy = **diagnostic only**; check patency capsule in Crohn's.
- **POEM** = peroral endoscopic myotomy for achalasia.
- Aspirin = **continue** for all endoscopies.

Acute GI Hemorrhage

Initial evaluation + triage

- Severity = supine HoTN/tachycardia, postural changes, frequency hematemesis/melena.
- **Hb/Hct lag behind** acute bleed - unreliable acute.
- NG aspirate **no longer routine**.
- Urgent endoscopy (12-24h): hypotension/orthostasis, repeat hematemesis, bloody aspirate not clearing, transfusion-requiring.
- High rebleed risk: **cirrhosis, coagulopathy, resp/renal failure, >70 y**.
- **>90% with melena** = bleed proximal to ligament of Treitz.
- **~85% hematochezia** = colonic; brisk upper can give hematochezia.
- Pre-endoscopy: resuscitate, correct coagulopathy/thrombocytopenia, address metabolic.
- **Erythromycin 250 mg IV 30-90 min pre-EGD** -> ↑ gastric emptying, clears blood.
- **Intubate** for airway if recurrent hematemesis, esp suspected varices.

Peptic ulcer - Forrest stigmata + rebleed

Table 333-3 - Ulcer stigmata & rebleed risk

Finding	Rebleed risk	Endoscopic Rx
Clean base	3-5%	None; safe discharge
Flat pigmented spot	10%	None
Adherent clot	20%	Often treat
Visible vessel / sentinel clot	40%	Treat
Active spurting	90%	Treat urgently

- Endoscopic Rx of high-risk stigmata -> rebleed **5-10%**.
- Techniques: **epinephrine injection** (NOT standalone), **thermal coagulation**, **through-the-scope or over-the-scope clips**, hemostatic powder/gel.
- **PPI** adjunct -> ↓ rebleed + improved outcome.

Variceal bleeding

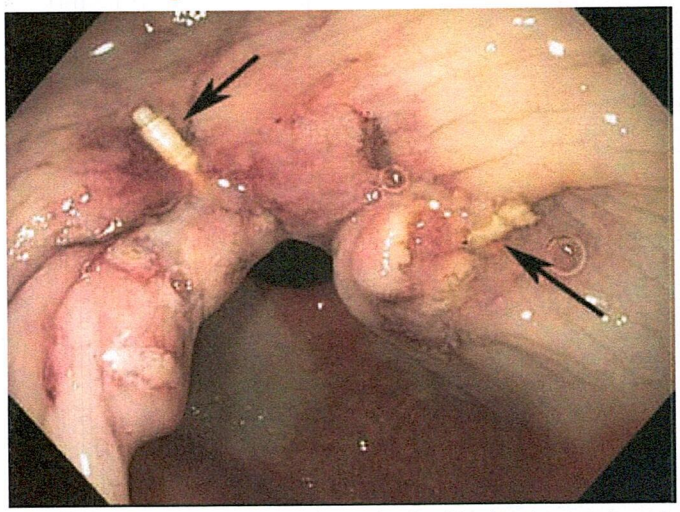


Fig 333-1 — Endoscopic variceal ligation (EVL): rubber band on esophageal varices

- **EVL (endoscopic variceal ligation)** = preferred for:
- - Primary prophylaxis of large varices (esp if β-blocker C/I).
- - Acute esophageal variceal bleed (controls in **~90%**).
- - Secondary prophylaxis (eradication).

- **EVS (sclerotherapy)**: salvage when banding fails (higher complications).
- **Gastric fundal varices** -> **cyanoacrylate glue** injection or EUS-guided coil + glue (NOT EVL).
- **Combo EVL + nonselective β-blocker** = best secondary prophylaxis.
- Glue complications: infection, **embolization** (lung, brain, spleen).

Other bleeding lesions

- **Dieulafoy's**: large submucosal artery, focal erosion; **proximal stomach lesser curve**; impressive arterial bleed; Rx: thermal/band/clip/suture.
- **Mallory-Weiss**: linear tear at GEJ after retching; nonbleeding sentinel clot - **rarely rebleeds**, no Rx needed; active = coap coag/band/clip.
- **Vascular ectasias**: flat anomalies; sporadic or **GAVE (watermelon stomach)**, radiation rectum; **argon plasma coagulation** standard.
- Diffuse SB ectasias (CKD, HHT): deep enteroscopy +/- **octreotide / thalidomide**.
- **Colonic diverticula**: nutrient artery at base; painless impressive hematochezia; treat at colonoscopy.

Obstruction & Pseudoobstruction

Esophageal

- Food impaction / FB = endoscopic emergency.
- Persistent obstruction -> hypersalivation, can't swallow water.
- Med temporizing: sips of carbonated drink, **sublingual nifedipine/nitrates**, **IV glucagon**.
- Endoscopy = best initial test; usually removes bolus + identifies underlying web/ring/stricture.
- Pre-endoscopy CXR/neck for: fever, obstruction >=24h, **sharp object (fishbone)**.
- Contrast studies = avoid (interfere w/ subsequent endoscopy).

Gastric outlet obstruction

- Causes: **gastric/duodenal/pancreatic malignancy, peptic stenosis**.
- Vomit undigested food hours after eating.
- Decompress with NG -> endoscopy.
- Benign pyloric stenosis: **balloon dilation** (long-term relief ~50%) or **LAMS**.
- Malignant: expandable stent or EUS-gastroenterostomy.

Colonic obstruction vs pseudoobstruction

- Both = distention, tympany, dilated colon on x-ray.
- **Acute colonic pseudoobstruction (Ogilvie)**: electrolyte abnl, opioids/anticholinergics, immobility post-op, retroperitoneal pathology.
- **Cecal diameter >12 cm** = ↑ perforation risk.
- Pseudoobstruction Rx: **IV neostigmine** or colonoscopic decompression after conservative trial.
- Mechanical obstruction: **self-expanding metal stent** palliates malignant; permits elective 1-stage surgery.
- Sigmoid volvulus = 'bent inner tube' on x-ray.

Acute Biliary Obstruction

- Imaging: **MRCP + EUS >90% accurate**; transabdominal US misses majority of stones.
- **ERCP** = primary treatment + gold standard for diagnosis when urgent.
- **Ascending cholangitis - Charcot triad**: jaundice + pain + fever (~70%).
- **Reynolds pentad**: triad + shock + confusion = severe; urgent ERCP.
- Goal: biliary drainage within ~24 h after fluid + IV ABx.

Gallstone pancreatitis

- Only **~20%** retain stone in ampulla/CBD (most pass).
- Retained stone risk: jaundice, rising LFTs after admission, severe pancreatitis, cholangitis.
- **Urgent ERCP** if cholangitis suspected (esp jaundiced) or severe pancreatitis (Glasgow/Ranson).
- Initial MRCP/EUS -> reduces unnecessary ERCP.

Elective Endoscopy Indications

Dyspepsia + GERD + PUD

- Dyspepsia + **alarm features** (wt loss, obstructive Sx, IDA) -> endoscopy upfront.
- GERD classic Sx -> empirical PPI; endoscopy if alarm Sx or refractory.
- Long-standing GERD: **6-fold ↑ Barrett's risk**; screen EGD if ≥10 y GERD.
- **Barrett's surveillance**: periodic EGD + biopsy.
- Barrett's high-grade dysplasia / intramucosal ca -> EMR/ESD +/- ablation.
- **RFA = most common ablative modality** for Barrett's; alt = cryotherapy.
- **Squamous dysplasia** -> chromoendoscopy with **Lugol's iodine**; EMR/ESD/RFA.
- Suspected PUD: H. pylori test (serology/breath/stool); endoscopy if >50 y or alarm.

Dysphagia

- ~50% = mechanical, ~50% = motility (achalasia, DES) or inflammatory (EoE).
- Stricture: progressive, solids -> liquids.
- Motility: intermittent for solids + liquids.
- **Schatzki ring**: episodic, solids at start of meal.
- **Oropharyngeal**: transfer dysphagia, nasal regurg, cough w/ swallow.
- **Achalasia**: nocturnal regurg of undigested food.
- **EoE**: linear furrows + corrugated rings; biopsy **>=15 eos/HPF**.
- Mechanical suspected -> endoscopy (biopsy + dilation).
- Transfer dysphagia / motility -> **barium esophagram + video swallow** first.
- Caution: **Zenker's diverticulum + cervical stenosis** - blind passage = perforation risk.
- Therapy: balloon/polyvinyl dilation, needle-knife electroincision for refractory, malignant -> SEMS palliation.
- **POEM** for achalasia; flexible endoscopic **cricopharyngeal myotomy** for Zenker's.

Diarrhea / hematochezia / anemia

- Bloody diarrhea, tenesmus, fever, fecal WBC -> **sig/colonoscopy** for colitis.
- Large-volume watery + wt loss + Fe/Ca/fat malabs -> **EGD + duodenal biopsy/aspirate** (SIBO, celiac).
- **IDA in men + postmenopausal women**: colonoscopy mandatory; ~30% have polyps/CRC.
- If colon neg -> EGD + duodenal biopsy (sprue); then capsule/CTE/enteroscopy.
- Capsule yield in obscure bleed: **50-70%**; MCC finding = mucosal vascular ectasia.
- Minor hematochezia >40 y or polyp/CRC h/o -> colonoscopy + anoscopy.

Pancreatitis idiopathic

- ~20% idiopathic after routine w/u (incl IgG4, US, CT/MRI).

- **EUS**: microlithiasis (leading cause), occult chronic pancreatitis, mass, pancreas divisum.
- Autoimmune pancreatitis -> EUS-guided biopsy if needed.
- Severe -> walled-off necrosis/pseudocysts: **endoscopic transmural drainage + necrosectomy**.

Endoscopic obesity therapy

- Intragastric balloon, duodenojejunal bypass liner, gastric aspiration tube, duodenal electroporation, **endoscopic sleeve gastroplasty**.
- Total-body weight loss **7-20%**; improves glycemia + MAFLD.

CRC Screening

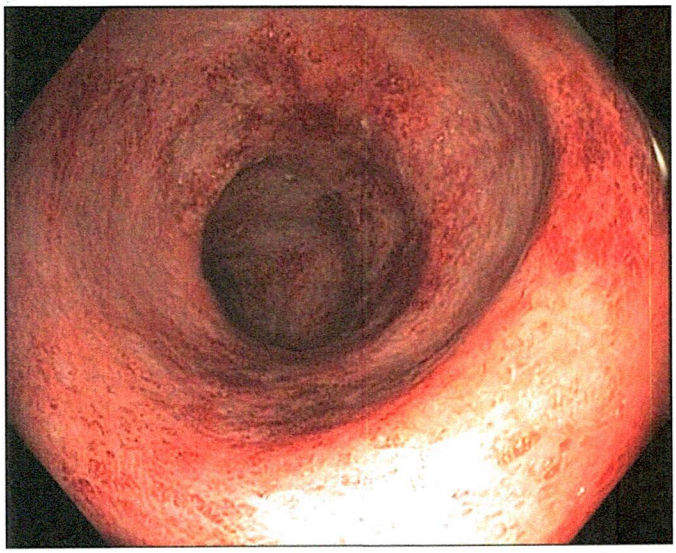


Fig 333-2 — Colonoscopy: ulcerative colitis with diffuse mucosal erythema + friability



Fig 333-3 — Pedunculated colonic polyp - amenable to endoscopic polypectomy

Table 333-4 - CRC screening (average risk, 45-75 y)

Test	Interval	Note
Colonoscopy	10 y	Gold standard
Multitarget stool DNA	1-3 y	Less sensitive; colonoscopy if positive
FIT / HSgFOBT	Yearly	Less sensitive; colonoscopy if positive
CT colonography	5 y	Colonoscopy if positive
Flex sig	5 y	Misses proximal lesions

Surveillance after polyps

- 1-2 small (<10 mm) tubular adenomas: **repeat 7-10 y**.
- 3-4 small adenomas: 3-5 y.
- 5-10 adenomas: 3 y.
- **>10 adenomas**: 1 y + consider FAP/HNPCC eval.
- Adenoma >=10 mm, tubulovillous/villous, HGD: **3 y**.
- Piecemeal removal: 6-mo recheck.
- Small hyperplastic sigmoid/rectum: 10 y.
- Hyperplastic >=10 mm or SSP >=10 mm or SSP w/ dysplasia: 3 y.
- Colon cancer: post-op 1 y; then 3 y if normal.

High-risk groups

- **UC pancolitis >8 y** or L-sided UC >15 y or Crohn's colitis: **colonoscopy + biopsy q1-2 y**; consider chromoendoscopy.
- FDR with CRC/adv adenoma >=60 y: start at **age 40**, average-risk intervals.
- FDR CRC/adv adenoma <60 y or 2 FDRs: **colonoscopy q5 y from age 40 or 10 y before youngest case**.
- **FAP**: sig/colonoscopy **annually from age 10-12 y**; genetic testing.
- **HNPCC (Lynch)**: colonoscopy q1-2 y from 20-25 y.

Cancer Staging + Open Access

- **EUS-FNA/FNB**: best local T/N staging - esophageal, gastric, pancreatic, biliary, rectal.
- EUS transesophageal needle biopsy of mediastinal nodes for NSCLC.
- **Open-access**: direct scheduling - dyspepsia (failed Rx), dysphagia, GIB, anorexia/early satiety; iron-def anemia; CRC screening.
- Pre-op: recent H/PE/med list; not for unstable cardiac/resp.
- **Colon prep**: PEG +/- citric acid, **split-dose preferred**; osmotic (Na phosphate) - avoid in CKD/CHF/>70 y.

CLINICAL PEARLS

- Charcot triad (~70%) = jaundice + pain + fever -> cholangitis.
- **Reynolds pentad** = Charcot + shock + confusion -> urgent ERCP.
- Gastric fundal varices: **cyanoacrylate glue** (NOT band).
- **EVL controls acute esophageal variceal bleed in ~90%.**
- Mallory-Weiss with sentinel clot - **rarely rebleeds**; PUD with sentinel clot - 40% rebleed.
- Capsule before-Crohn's/post-op SBO risk -> **patency capsule** first.
- **EoE biopsy = >=15 eos/HPF**.

✦ MNEMONIC

PUD-rebleed risk *Forrest classification rebleed % (clean->spurt)*

C — Clean base = 3-5%
F — Flat pigmented = 10%
A — Adherent clot = 20%
V — Visible vessel = 40%
S — Spurting active = 90%

Last 3 (A/V/S) get endoscopic therapy; rebleed drops to 5-10% with combo Rx + PPI.

TRIAD CIRRHOSIS-EARLY *Conditions needing urgent endoscopy in GIB*

T — Transfusion-requiring
R — Recurrent hematemesis
I — Instability (hypotension/orthostasis)
A — Age >70
D — Decompensated cirrhosis / coagulopathy / renal/resp failure

Aim endoscopy within 12-24 h.

✎ MCQ CORNER

Q1. 65 y/o with cirrhosis admitted with hematemesis. Best initial antibiotic and timing?
A. Ceftriaxone after endoscopy
✓ **B. Ceftriaxone on admission**
C. Vancomycin on admission
D. No antibiotics until source identified
► *Cirrhotic with acute GIB = ceftriaxone (or quinolone) on admission - reduces infectious complications + mortality.*

Q2. Endoscopy of duodenal ulcer shows non-bleeding visible vessel. Rebleed risk and management?
A. 5%, discharge
B. 20%, observe
✓ **C. 40%, endoscopic therapy + PPI**
D. 90%, emergency surgery
► *Visible vessel = ~40% rebleed; endoscopic therapy (clip/coag/inject + PPI) drops to 5-10%.*

Q3. Patient with large gastric fundal variceal hemorrhage. Best endoscopic therapy?
A. Band ligation
B. Sclerotherapy
✓ **C. Cyanoacrylate glue injection**
D. Hemostatic clip
► *Gastric fundal varices = cyanoacrylate glue or EUS-coil+glue. EVL fails (high rebleed).*

Q4. Best initial test for suspected achalasia + dysphagia in 35 y/o?
A. EGD
✓ **B. Barium swallow**
C. Esophageal manometry
D. EUS
► *Barium swallow first when motility suspected; can show classic bird-beak + dilated esophagus. Manometry confirms.*

Q5. 70 y/o post-op day 4 abdominal distention, no peritonism. AXR: massive colonic dilation; rectum has air; cecum 13 cm. Best initial Rx?
A. Emergent subtotal colectomy
✓ **B. Conservative + correct electrolytes, hold opioids; IV neostigmine if no improvement**
C. Colonoscopic stenting
D. ERCP
► *Ogilvie - conservative trial first; IV neostigmine or colonoscopic decompression if cecum >12 cm + no resolution. Surgery last.*

Q6. Patient on warfarin for mechanical mitral valve scheduled for polypectomy. Best peri-procedural plan?
A. Continue warfarin
✓ **B. Stop warfarin 5d, bridge with LMWH**
C. Stop warfarin 5d, no bridging
D. Cancel procedure
► *Polypectomy = high-risk procedure; warfarin off 5d (INR <=1.5), bridge LMWH because mechanical mitral = high thrombosis risk.*

LAST MINUTE REVISION

► **EUS** = local TN staging (esoph/panc/rectal); no distant mets.
► **ERCP pancreatitis** = 5%; up to 25% in young anicteric.
► **PEG** infection 10-15% (cefazolin prophylaxis).
► **Cirrhotic + GIB** -> ceftriaxone on admission.
► **Erythromycin 250 mg IV** 30-90 min pre-EGD clears blood.
► **EVL** controls esoph varix bleed ~90%; combo + NSBB for 2° proph.
► **Gastric fundal varix**: cyanoacrylate glue.
► **Dieulafoy**: proximal lesser curve stomach; large submucosal artery.
► **GAVE** = watermelon stomach; APC treats.
► **Charcot**: J+P+F (~70%); **Reynolds**: + shock + confusion.
► **Ogilvie**: cecum >12 cm -> neostigmine or colon decompression.
► **EoE**: linear furrows + rings; biopsy >=15 eos/HPF.
► **Schatzki ring**: episodic solid dysphagia at meal start.
► **Zenker**: caution endoscope; flexible cricopharyngeal myotomy.
► **POEM** for achalasia; **RFA** standard for Barrett's.
► CRC screen avg risk: colonoscopy q10 y from age 45.
► UC pancolitis >8 y -> colonoscopy q1-2 y.
► FAP: sig/colonoscopy **annual from age 10-12**.
► Aspirin = continue; clopidogrel stop 5d for high-risk.
► **Forrest stigmata**: clean 3-5%, flat 10%, clot 20%, vessel 40%, spurt 90%.

UPDATES

◉ **USPSTF 2021**: CRC screening start age **45** (lowered from 50) for average risk.
◉ **Multitarget stool DNA** (Cologuard) - q1-3 y screening option.
◉ EUS-guided gastroenterostomy + LAMS = newer palliation for malignant GOO.
◉ AI-assisted polyp detection during colonoscopy ↑ ADR (adenoma detection rate).
◉ POEM + EFTR for achalasia/GIST increasingly mainstream.
◉ Endoscopic bariatric (sleeve gastroplasty, balloons) - 7-20% TBW loss.

CH 334 · Diseases of the Esophagus — Motility, GERD, EoE, Tr...

Structural + motility disorders, GERD spectrum (Barrett -> adenocarcinoma), eosinophilic esophagitis, infectious esophagitis, traumatic/iatrogenic injury. Major NEET SS / INI SS-ET chapter.

Structure & Function

- 18-26 cm hollow tube; **striated muscle (UES + upper 1/3)**, **smooth muscle (lower 2/3 + LES)**.
- Squamous epithelium except distal columnar at GEJ.
- **UES** = cricopharyngeus; **LES** = tonic contraction + crural diaphragm + flap valve.
- Peristalsis: **primary** = swallow-initiated; **secondary** = distention-initiated.
- Innervation: vagal (long) + myenteric plexus (intrinsic).

Symptoms

- **Dysphagia**: solids only -> mechanical; solids + liquids -> motility.
- **Odynophagia**: pain with swallow -> **infectious / pill / corrosive**; rare in GERD.
- **Heartburn**: substernal burning, postprandial, recumbent.
- **Regurgitation**: passive return of gastric/esophageal content.
- **Globus**: lump sensation; **water brash**: hypersalivation.
- **Chest pain**: must exclude cardiac first.

Diagnostic Studies

- **Endoscopy**: mucosal lesions, biopsy, intervention; misses 1/3 of GERD (NERD).
- **Barium esophagram**: structural overview; first-line in motility disorder suspicion.
- **EUS**: T-staging cancers, subepithelial lesions.
- **HRM (high-resolution manometry)**: Chicago Classification; gold standard motility dx.
- **FLIP (functional lumen imaging probe)**: distensibility - achalasia, EoE, post-Nissen.
- **24-h pH/impedance**: most sensitive for GERD dx; quantify acid + non-acid reflux.

Structural Disorders

Hiatal hernia

- **Type I (sliding) = 95%**; GEJ + cardia herniated above diaphragm; correlates with GERD severity.
- **Type II (paraesophageal)**: GEJ in place, fundus alongside; risk of volvulus/strangulation -> surgery.
- **Type III = sliding + paraesophageal**; Type IV = additional organ herniated.

Rings & webs

- **Schatzki ring (B ring)**: mucosal ring at squamocolumnar junction; episodic solid food dysphagia at meal start ('steakhouse syndrome').
- Rx: dilation +/- PPI.
- **Esophageal webs**: thin mucosal folds, usually proximal.
- **Plummer-Vinson**: webs + Fe-deficiency anemia + dysphagia; postcricoid SCC risk.

Diverticula

- **Zenker (hypopharyngeal, Killian triangle)**: oldest age group; halitosis, regurg undigested food, aspiration; **cricopharyngeal myotomy** +/- diverticulectomy or endoscopic septotomy.
- **Midesophageal (traction)**: from mediastinal inflammation/TB.
- **Epiphrenic**: distal, near LES; associated with motility disorder (achalasia, DES).
- **Intramural pseudodiverticulosis**: dilated submucosal glands; often with stricture.

Motility Disorders

Achalasia

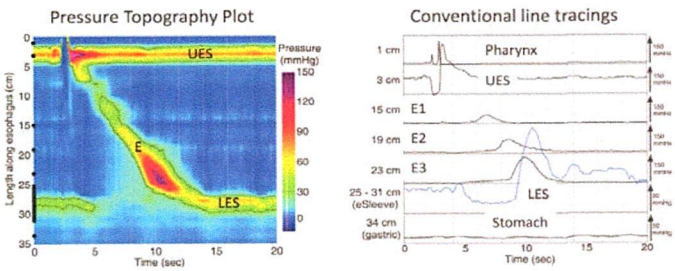


Fig 334-1 — High-resolution esophageal manometry (Chicago classification): pressure topography vs conventional line tracings

- Incidence **1-3/100,000**; usually **age 25-60**.
- **Autoimmune death of myenteric ganglion cells**; loss of inhibitory (NO) + excitatory (ACh) neurons.
- Possible HSV-1 trigger in genetically susceptible.
- Loss of **LES deglutitive relaxation + absent peristalsis**.
- Sx: dysphagia (solids AND liquids), regurgitation, chest pain, weight loss.
- **17-fold increased risk of esophageal SCC** (long-standing stasis).

Achalasia mimics

- **Pseudoachalasia (~5%)**: tumor at GEJ (gastric cardia ca); age >60, abrupt onset <1 y, weight loss.
- **Chagas disease**: *T. cruzi*, reduviid bug; destroys ganglia of heart/gut/urinary.
- Opioid-induced dysmotility.
- Paraneoplastic w/ antineuronal antibodies.

Achalasia - diagnosis

- **Barium**: **bird-beak** tapering at LES, dilated esophagus, air-fluid level; sigmoid in advanced.
- **Endoscopy**: mandatory to exclude pseudoachalasia.
- **HRM** = most sensitive; impaired LES relaxation + aperistalsis.
- **Chicago subtypes**: I classic (no pressurization), II compression (panesophageal pressurization), III spastic (premature spastic contractions).

Achalasia - treatment

- **Pharmacologic (temporary)**: nitrates, CCBs pre-meal; **botulinum toxin LES** (~2/3 effective >=6 mo).
- Sildenafil/PDE5 decreases LES tone.
- **Pneumatic dilation**: 60-90% efficacy; **perforation 0.5-5%**.
- **Laparoscopic Heller myotomy** + partial fundoplication: 62-90% good results.
- **POEM**: endoscopic submucosal tunnel + circular muscle myotomy; RCT > pneumatic dilation; equivalent to Heller. GERD common post-POEM (Rx with PPI).
- **POEM is preferred for type III spastic achalasia** (can extend myotomy proximally).
- Advanced refractory: esophagectomy + gastric pull-up or colon interposition.

Distal esophageal spasm (DES) + Jackhammer

- Episodic dysphagia + chest pain; normal LES relaxation.
- **Corkscrew / rosary bead esophagus** on barium.
- HRM definition: **short latency premature contractions** in distal esophagus (inhibitory neuron dysfunction).
- **Jackhammer (hypercontractile)**: normal latency + very vigorous repetitive contractions.
- Mimics angina - exclude cardiac first.
- Rx (limited evidence): nitrates, CCBs, hydralazine, botulinum toxin, TCAs.
- **POEM** emerging for spastic disorders.

Secondary motility disorders

- **Scleroderma**: smooth muscle atrophy -> hypotensive LES + absent distal peristalsis -> severe GERD + stricture.
- Chagas, opioids, eosinophilic infiltration.

NEET SS HIGHLIGHTS

- **Achalasia**: aperistalsis + incomplete LES relaxation; **bird-beak** + dilated esophagus.
- **Pseudoachalasia**: age >60, abrupt onset, wt loss -> tumor at GEJ.
- **Type III achalasia -> POEM preferred.**
- **Pneumatic dilation** perforation 0.5-5%.
- **Chagas**: reduviid bug -> T. cruzi -> mega-esophagus / mega-colon.
- **Schatzki ring**: steakhouse dysphagia at meal start.
- **Plummer-Vinson**: web + Fe-def anemia + postcricoid SCC risk.
- **Zollinger-Ellison**: severe esophagitis in ~50%.
- **EoE biopsy**: >=15 eos/HPF (peak).
- **Dupilumab** (IL-4/13) = first FDA-approved EoE biologic.
- Achalasia -> **17-fold increased SCC risk.**

GERD

Pathophysiology

- 10-15% of US adults; cytokine-mediated mucosal injury (not direct caustic).
- GEJ competence = LES + crural diaphragm + flap valve.
- Pathology drivers: wide hiatus, loss intra-abd esophagus, hiatal hernia, ↑ GEJ compliance.
- Exacerbators: **obesity, pregnancy, hypersecretion, gastroparesis, gluttony.**
- Acid clearance: peristalsis + salivary bicarbonate.
- **H. pylori atrophic gastritis** = paradoxically protective (hypoacidity).
- **Bile** persists despite acid suppression -> Barrett cofactor.

Symptoms & complications

- Heartburn + regurgitation (classic); dysphagia, chest pain.
- **Extraesophageal** (association, not always causation): chronic cough, laryngitis, asthma, **dental erosions.**
- Erosive esophagitis (~1/3); **Los Angeles A-D grading.**
- **Peptic stricture**; bleeding (less common in PPI era).
- **Barrett metaplasia**: salmon-colored mucosa proximal to GEJ; intestinal metaplasia on biopsy.
- Barrett cancer risk: **0.1-0.3%/y**; highest in obese white males in 60s.
- **Adenocarcinoma incidence ↑ 6x in 20 y.**

GERD treatment

- **Lifestyle**: weight loss most evidence-supported; head-of-bed elevation; avoid late meals.
- Trigger avoidance: fatty foods, alcohol, mint, coffee/tea, citrus.
- **Pharmacology hierarchy: PCAB (vonoprazan) > PPI > H2RA.**
- PPI long-term: rare AIN + severe hypoMg; ↓ B12 + Fe absorption; ↑ *C. difficile*; weak signals (renal, dementia, CV, fracture - confounded).
- **Laparoscopic fundoplication**: similar efficacy to PPI; risks - dysphagia, gas bloat, inability to belch.
- Magnetic LES augmentation (LINX) - newer surgical option.

Barrett management

- **Screen EGD** if >=10 y GERD (esp obese white male).
- **Periodic surveillance** EGD + 4-quadrant biopsies (Seattle protocol).
- No dysplasia: surveillance.
- **Low-grade dysplasia**: EMR/ESD + RFA OR surveillance.
- **High-grade dysplasia / intramucosal ca: endoscopic resection (EMR/ESD) + RFA** (preferred over esophagectomy - lower morbidity/mortality).
- Esophagectomy mortality 3-10%; high prevalence of coexisting cancer with HGD.
- Chemoprev: high-dose PPI + aspirin = ↑ all-cause survival (not Barrett progression).

Eosinophilic Esophagitis (EoE)

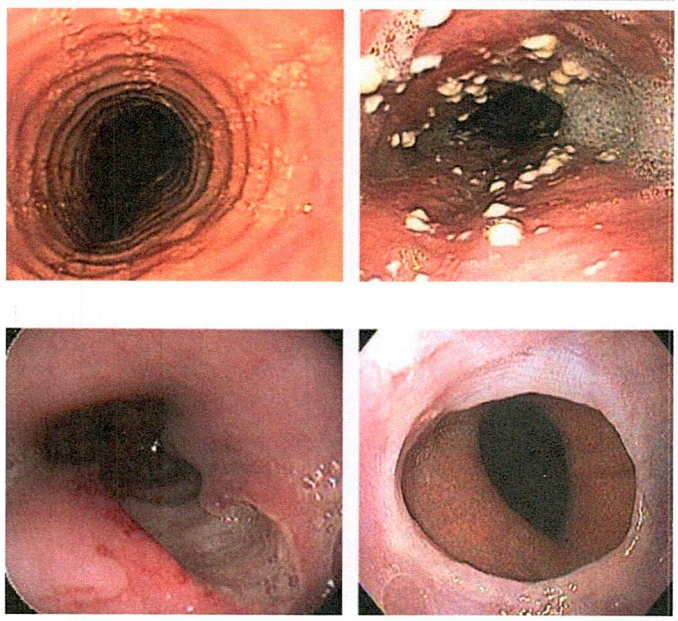


Fig 334-2 — Endoscopic appearances: (TL) EoE with rings/furrows, (TR) Candida plaques, (BL) HIV/HSV giant ulcer, (BR) Schatzki ring

- Prevalence 4-8/10,000; **white males 30-40 y.**
- Genetic: **5q22 TSLP, 2p23 CAPN14.**
- **Immunologic - antigen sensitization**; food allergens dominant; aeroallergens may contribute.
- Atopic h/o common: IgE food allergy, asthma, eczema, rhinitis.
- Peripheral eosinophilia in **25-50%.**
- Sx: dysphagia, food impaction (adults); abdominal pain, vomiting, food aversion (kids).
- Endoscopy: **edema (loss vascular markings), rings (trachealization), linear furrows, whitish exudate, strictures, narrow caliber.**
- **Biopsy: peak >=15 eos/HPF.**
- DDx of esophageal eosinophilia: GERD, drug hypersensitivity, CTD, HES, Crohn's, infection.

EoE treatment (3 D's + dupi)

- **Drugs (PPI)**: 30-50% response.