

GI SURGERY

1. Postoperative Complications

Adhesions and Small Bowel Obstruction

- The most common side effect after abdominal surgery is **adhesion**.
- **Adhesive mechanical small bowel obstruction:-**
- sepsis can occur without frank ischemia.
- Diffuse abdominal tenderness is a common finding.
- is the most common cause of mechanical small bowel obstruction.

Sequence of return of gastrointestinal motility after abdominal surgery:

- intestine → stomach → colon.

2. Bowel Obstruction

Small vs Large Bowel Obstruction

Feature	Small Bowel Obstruction (SBO)	Large Bowel Obstruction (LBO)
Pain	Colicky, periumbilical	Colicky or constant
Vomiting	Early onset, bilious, large volume	Late onset → initially bilious, progresses to feculent vomiting
Constipation	Late onset (especially proximal SBO)	Early onset (especially distal LBO)
Distention	Less severe	Early and significant

Small Bowel Obstruction

- Pain is colicky periumbilical
- Vomiting is early onset, bilious, large volume
- Constipation is late onset, especially proximal SBO
- Distention is less severe

Large Bowel Obstruction

- Pain is colicky or constant
- Vomiting is late onset → feculent
- Constipation is early
- Distention is early and significant

Shared Features

- Dehydration
- Hypotension
- Tenderness
- Tympanic percussion
- Increased bowel sounds early → absent late

Pseudo obstruction syndrome (Ogilvie)

- Increase sympathetic tone
- decrease parasympathetic tone
- Perforation risk 15%
- More common in right side & cecum

Additional Points

- Not dangerous signs: crampy abdominal pain
- Dangerous signs: fever, rigidity, absent bowel sounds, feculent vomiting

Laxatives

- Bulk forming laxative fiber
- Stimulant laxative, sodium Tico, Senna, castor oil, bisacodyl
- Osmotic laxative. 2x magnesium, lactulose, polyeth

3. Diverticular Disease

General

- Most common site: LLQ sigmoid colon (>90%)
- Not premalignant
- Most common cause of lower GI bleeding

Complications

- Diverticulitis
- Abscess
- Peritonitis
- Obstruction
- Hemorrhage
- Fistula
- Stricture
- Does NOT progress to carcinoma

Hinchey Classification 4 Grades:-

- Grade 1: pericolic abscess → antibiotics + fluids
- Grade 2: pelvic abscess → antibiotics + fluids + Radiological drainage
- Grade 3: purulent peritonitis → urgent surgery
- Grade 4: fecal peritonitis → urgent surgery

True vs False Diverticula

- True diverticula: traction diverticulum, all layers involved
- False diverticula: pulsion diverticulum, Zenker's diverticulum only mucosa involved

Notes

- Colonoscopy contraindicated during acute attack
- CT of the abdomen and pelvis with intravenous contrast is diagnostic modality of choice

4. Upper GI Disorders

Dyspepsia

- Dyspepsia + weight loss → upper endoscopy

GERD

- Initial test: upper endoscopy
- Mechanisms:
 - **Impaired esophageal clearance:**
 - Reduced salivation
 - Esophageal dysmotility
 -
 - **Defense against epithelial injury:**
 - Impaired mucosal integrity
 -
 - **Gastric reservoir function:**
 - Increased intragastric pressure

- Delayed gastric emptying

Fundoplication

Indications:

- Failed medical therapy
 - Respiratory symptoms
 - Severe esophagitis
 - Hiatal hernia
- Contraindication: esophageal dysmotility
- Complication: dysphagia

5. Esophageal Disorders

Esophageal Cancer

Adenocarcinoma

- Lower third
- More common in America
- Risk factors:
 - Barrett's esophagus (most important) characterized by intestinal columnar epithelium
 - Barrett's with high-grade dysplasia → esophagectomy
 - GERD
 - Obesity
 - Smoking
 - Male , over (50-60 years old)

Squamous Cell Carcinoma

- Upper two-thirds
- More common worldwide
- Risk factors:
 - Alcohol
 - Smoking
 - Hot liquids

- Nitrosamines rich food
- Achalasia
- Stricture
- Plummer vinson syndrome

Symptoms

- Dysphagia (80%) best test barium swallow
- Weight loss
- Hoarseness
- Chronic GI blood loss
- Changes in diet, anorexia
- Early satiety
- Regurgitation of saliva or food
- Aspiration pneumonia

Diagnosis & Staging

- 1st step in dyspepsia & weight loss (upper endoscopy)
- Endoscopy + biopsy
- CT chest/abdomen gives accurate diagnosis and staging
- PET
- Endoscopic ultrasound

Achalasia

- Best test: manometry
- Finding: failure of LES relaxation + absent peristalsis

Manometry shows

- length of the intra-abdominal esophagus
- length of LES pressure in the esophagus
- peristaltic contractions

Zenker Diverticulum

- False diverticulum

- Present initially with difficulty initiating swallowing
- (transfer dysphasia, and halitosis)
- Herniation between upper oblique and lower transverse muscle of the UES
- Treatment is surgical resection
- We do not need esophagoscopy in fear of perforation

6. Gastric Disorders

Gastric Cancer:-

Risk Factors

- Helicobacter pylori (most important)
- GERD
- Smoking
- Pernicious anemia
- Gastric polyps
- Partial gastrectomy
- High salt and nitrate diet
- Low fruit/vegetable intake
- Smoked meat
- Male , black race

Diagnosis

- Endoscopy with multiple biopsy

Staging

- CT
- PET
- Endoscopic ultrasound
- Laparoscopy

Management

- T3 lesions → neoadjuvant therapy

Unresectable Gastric Cancer

- **Local invasion:** pancreas, peritoneum, diaphragm, vertebrae,
- **Major vessels** (aorta, hepatic artery, SMA, celiac axis)
- **Distant metastases:** liver, lung, lymph nodes, bone, brain, peritoneal carcinomatosis, malignant ascites

Types

- Diffuse type → associated with blood group A and genetic factors

Zollinger–Ellison Syndrome

- Gastrin secreting tumor
- Gastrinoma (duodenum or pancreas)
- Recurrent ulcers in duodenum & jejunum
- Abdominal pain & PUD
- diarrhea
- Increased gastrin after secretin administration
- Gastrinoma diagnosis → fasting gastrin level

Gastrin

- secreted by G cell
- increases by chronic PPI use
- increase in Zollinger-Ellison syndrome.
- increased, causes gastric carcinoid
- responsible for gastric phase of acid secretion.

Carcinoembryonic antigen (CEA)

- It is ordered as a baseline value to monitor and treat not for screening
- It is very nonspecific

Substance release in the stomach

- **Chief cell** → pepsin enzyme for protein and digestion
- **G cell** → gastrin for acidity and protection
- **D cell** → somatostatin inhibit secretion
- **P/d1** → ghrelin increase appetite

- **Enterochromaffin cell** → histamine

Large bowel lymphoma

- Most common location (cecum)

krukenberg tumor

- Metastasis by transcoelomic spread.

Bariatric procedure for excess weight loss

- Laparoscopic sleeve gastrectomy (most common) reduces hunger hormone (ghrelin)
- Laparoscopic adjustable gastric band least effective.
- Laparoscopic gastric bypass is the best Roux-en-y 62% 60 to 80% loss in weight
- laparoscopic mini gastric bypass
- laparoscopic bileo-pancreatic diversion with duodenal switch most effective weight loss 70-90% complications: highest mortality, protein malnutrition biliary cirrhosis

7. Hepatobiliary System

Hepatitis A

- Self-limiting
- No chronic disease
- Prognosis is good (No cirrhosis or HCC)

Liver Abscess

- Most common organism: E. coli
- Most common site: right lobe

Hydatid Cyst

- Most common complication: biliary communication
- Most dangerous: anaphylactic shock
- Treatment: albendazole (medical)

Hepatocellular Carcinoma

- Marker: alpha-fetoprotein
- Underlying liver usually diseased (except fibrolamellar variant)
- Diagnosis: CT-guided biopsy

Hepatocellular adenoma

- associates with the use of OCP If tumor was small, stop pill and re-evaluate after 6 months
- holds the risk of a malignant transform.
- The size plays in the risk assessment
- mass increase with steroid hormone.

Portal Hypertension

- Most serious complication: esophageal variceal rupture

Hepatic Lesions

- Hemangioma: mostly asymptomatic
- Hydatid cyst: best agents include hydrogen peroxide 10% and chlorhexidine 0.15% with cetrimide 1.5%
- Most common complication: biliary communication
- Removal of hepatic metastasis benefits colon cancer

Child-Pugh Score (ABCDE) for liver cirrhosis

- A: Albumin

- B: Bilirubin
- C: Coagulation
- D: Distension (ascites)
- E: Encephalopathy

Budd–Chiari Syndrome

Hepatomegaly, ascites, abdominal pain.

Spleen

- span intercostal is 9, 10, 11.
- Palpation starts at the right iliac fossa.
- CML causes splenomegaly.
-
- **splenectomy**
- Most important risk factor post-is **VTE**.
- Splenectomy vaccines given 1-2weeks after surgery :
- Streptococcus pneumoniae
- Haemophilus influenzae type B
- Neisseria meningitidis
- **complications :-**
- post-operation bleeding
- gastric perforation
- pancreatic fistula
- pulmonary infection
- hypercoagulable state.

8. Gallbladder and Biliary Disease

Gallstones

- **Gallstones**
- Most common complication: cholecystitis
- 80% cholesterol stones, mixed 90–95%(mostly Asymptomatic)

- Risk factors: female, fat, fertile, 40, family history, rapid weight loss

gallstone ileus clinical picture

- air in the biliary tree
- small bowel obstruction
- bouts of cholangitis
- stone at the terminal ileum

Gallbladder Cancer Risk

- Primary sclerosing cholangitis (PSC)
- Porcelain gallbladder
- Choledochal cyst
- Gallbladder polyps >1 cm

Mirizzi Syndrome

Gallstone in cystic duct/neck causing external compression at the common hepatic duct → obstructive jaundice without duct stone.

Increase in both ALP & bilirubin outside CHD

how to differentiate?

- Hepatitis increase in ALT and AST
- Cholangitis charcot triad “HIGH fever”
- choledocholithiasis stone are seen in CBD

Cholangiocarcinoma

Most common at bile duct confluence.

Charcot Triad & Reynolds Pentad

- Charcot: RUQ pain, fever, jaundice

- Reynolds: + hypotension + altered mental status

Cholecystitis

- U/S is diagnostic test
- Emphysematous → emergency
- Xanthogranulomatous → mimics cancer
- Acalculous poor outcome in comparison to calculus
- Cholecystitis stones is the cause of calculus

Biliary Colic

- RUQ pain radiating to the back or right scapula (boas sign)
- Abrupt onset, constant
- Normal labs
- Triggered by fatty meals
- No fever, jaundice, or abnormal labs

Cholethiasis

- Acute upper abdominal pain
- Relieved by sitting forward
- Lipase 1300

Unconjugated bilirubin

- hemolysis

increase in bilirubin formation

- Conjugated hyperbilirubinemia

Indirect hyperbilirubinemia

- Rapid absorption of large hematoma

9. Pancreatic Disorders

Acute Pancreatitis

Symptoms

- Acute upper abdominal pain
- Radiates to the back only
- Site of pain is a epigastric
- **Diagnosis: 2 of 3 criteria:**
 - Epigastric pain
 - Radiological evidence of pancreatitis
 - Amylase $\geq 3\times$ normal
- Most common cause: biliary
- Cause of death: hypovolemia
- We don't rely on ALT, Amylase, lipase

Ranson Criteria (I GET SMASHED)

Includes:

- Idiopathic
- Gallstones
- Ethanol
- Trauma
- Steroids
- Mumps
- Autoimmune
- Scorpion sting
- Hypercalcemia/hypertriglyceridemia
- ERCP
- Drugs

Exception

- Amylase is NOT part of Ranson criteria
- Trypsin is key enzyme in pancreatitis

Pancreatic Cancer

- Most common site is the head
- Most common type ductal adenocarcinoma
- Most common risk factor: smoking
- Marker: CA 19-9

Pancreatic adenocarcinoma risk factors

- smoking (most common association)
- DM
- Chronic pancreatitis
- Age > 50 years

Insulinoma

- Most common pancreatic endocrine tumor

Pancreatic cyst.

- It is solid, pseudopapillary
- Young woman
- aggressive
- Pseudo cyst lacks epithelial lining.
- Investigation of choice is CT scan
- Pseudo cyst Doesn't require treatment and resolve on its own.

10. Intestinal Disorders

Crohn vs Ulcerative Colitis

Feature	Ulcerative Colitis (UC)	Crohn's Disease
Pattern of Inflammation	Continuous	Patchy (segmental, skip lesions)
Rectal Involvement	Always involved	May be spared
Bleeding (Hematochezia)	Very common	Less common, usually mild
Depth of Inflammation	Mucosal and submucosal	Transmural
Distribution	Colon only	Anywhere from mouth to anus

Fistula Formation	Rare	Common (due to transmural inflammation)
Strictures/Obstruction	Less common	Common
Most Common Surgical Indication	Toxic megacolon, perforation, bleeding, sepsis	Obstruction (especially ileal disease)
Perianal Disease	Uncommon	Common
Backwash Ileitis	Present (supports UC diagnosis)	Absent
Extraintestinal Manifestations	Present	Present (most common: arthritis)

Crohn

- Patchy (segmented)
- Transmural
- Fistulas
- Obstruction **due to ileal strictures** most common surgery indication
- Most common external manifestation is Arthritis
- Hematochezia less common and it is presented if the rectum was involved
- Bleeding is mild

UC

- Continuous
- Rectum involved
- Hematochezia very common
- Endoscopic evidence of backwash ileitis
- Defective gastric mucosal barrier is the pathogenesis of benign type one gastric ulcer

Perforated peptic ulcer

- The massive **bleeding** ulcer **posterior** wall of the duodenum,
- **anterior** duodenal wall is the most **common location**.
- Perforation is the most frequent indication for surgery
- Peritonitis results from acid exposure, exposure may present (board-like rigidity)
- 1/3 of patients only with peptic ulcer disease have a previous history of current known ulcer at the time of diagnosis of perforation.
- Sepsis leading cause of death.

Stress ulcer causes:-

- steroids
- burns
- head injury
- IV antibiotics does **NOT** cause stress ulcer.

C. difficile risk factors

- PPI
- steroids
- comorbidities
- broad-spectrum antibiotics.

Indications for Surgery in UC

- Toxic megacolon
- Perforation
- Massive bleeding
- Sepsis

Small intestine cancer

- Benign —> distal
- Malignant —> proximal “Adenocarcinoma”

Carcinoids

- most common site ileum
- most common tumor in the appendix.
- Ileal carcinoids are rarely multicentric
- usually associated with other tumor of the GI
- originates from the enterochromaffin cell
- Ileal carcinoid follow a more malignant course.
- Prognosis of carcinoid depends on size

Fistula Causes

- Crohn's: transmural inflammation
- Cancer: erosion
- Radiation: transmural damage
- Diverticulosis: complication
- Amebic infection: causes perforation, not fistula

Factors increase rate of closure in enterocutaneous fistula

- Decrease output
- Long tract >2 CM
- Small orifice <1 CM

11. Colorectal Disorders

Colon Cancer

- Tubulovillous polyp has higher malignant potential
- CEA: monitoring only
- Colonoscopy detects synchronous tumors (3–5%)
- Stage determines survival

Risk Factors

- UC

- Large villous adenoma
- Multiple polyps

Risk of metastatic spread Parameters after resection of colorectal cancer

- Degree of differentiation
- Lymph node positivity
- Positive circumferential margin
- Lymphovascular invasion
- NOT AN INFLUENCE (t stage)

rectal prolapse

- more common in elderly and females.
- Proctoscopy or colonoscopy
- Abdominal operation increases risk of recurrence
- Symptoms are constipation and incontinence.

lower GI bleeding

- radionuclide scanning it is only confirmatory of intermittent bleeding, not useful in identifying the site of bleeding.

Lynch syndrome mutation

- MSH2

FAP

- Autosomal recessive
- APC mutation at short arm of chromosome 5
- Polyp formation in late adulthood
- Screening for colonic polyps should start at 13-15 years old
- Near 100% cancer risk
- Malignant transformation 75% of untreated patient

- Treatment: left total colectomy in affected patient
- Extraintestinal manifestation: osteoma(gardner syndrome)

peutz-jeghers Syndrome

- autosomal dominant
- mucocutaneous lesions and hyperpigmentation.
- anemia
- increased risk of breast and GI cancer.
- Small bowel contains hamartomatous polyps

HNPCC

- MLH1 / MSH2 mutation

12. Anorectal Conditions

Hemorrhoids

- Internal hemorrhoids not palpable
- Internal plexus: anorectal ring → dentate line
- Surgery: grade III–IV
- Stapled hemothoidectomy is done only for internal hemorrhoids and has high recurrence rate

Anal Fissure

- Posterior midline distal to dentate line
- Multiple → Crohn's
- Most acute ones heal conservatively
- Treatment:

- Lidocaine
- Calcium channel blocker
- Nitrates
- Stool softeners
- Sphincterotomy success >90%

Perianal Abscess

- Fever
- Pain unrelated to defecation

13. Hernias

Inguinal Hernia

- Direct: **medial** to inferior epigastric vessels (M > F)
- Indirect: **lateral** to the inferior epigastric vessel through deep inguinal ring (more common)
- Treatment: hernioplasty

Femoral Hernia

- More common in women
- Relatively uncommon
- Higher strangulation risk

Surgical exploration is done when there is New left growing swelling after writing inguinal hernia repair ?

- Due to concern about injury to the iliac vessel leading to pseudoaneurysm or AV fistula

14. Acute Abdomen

Causes (IPOV)

- Inflammation
- Perforation
- Obstruction
- Vascular

By Location

- RUQ: gallstones, hepatitis, cholecystitis
- LUQ: gastritis, pancreatitis, spleen
- RLQ: appendicitis, cecal diverticulitis
- LLQ: diverticulitis

Rules of Surgery in acute presentation

- **85% surgery is needed:**
- Stool frequency > 8/day
- CRP > 45mg/L at 3rd day
- IV steroids up to 5 days
- No benefits IV steroid after 7 to 10 days

15. Vascular & Anatomy

Celiac Trunk (LSH)

- Left gastric
- Splenic
- Hepatic

Supplies foregut: distal esophagus, stomach, liver, spleen, proximal duodenum

Portal Vein

- SMV + splenic vein

Transpyloric Plane (L1)

- Gallbladder fundus
- SMA origin
- Pancreas neck
- Duodeno-jejunal flexure (angle of Treitz)
- termination of spinal cord

Structures of the 3 main diaphragmatic openings

- Aorta
- Left vagus nerve
- right phrenic nerve
- IVC
- Esophagus

Retroperitoneal structures

- ascending colon
- descending colon
- seminal vessels
- duodenum D2
- Ovaries are **NOT** considered retroperitoneal structure

Vascularized ligament of the spleen

- Lienorenal

cardiogenic shock due to MI

- sinus rhythm and abdominal pain that is non-occlusive mesenteric ischemia.

Volvulus

- Coffee bean sign in x-ray
- Most common site sigmoid colon
- Colon twist on it's own mesentry
- Impaired arterial inflow and venous drainage
- Elderly
- History of chronic constipation
- African type is related to high fiber diet
- During pregnancy it's common in 3rd trimester

Management

- endoscopic reduction & decompression in the absence of peritoneal signs recurrence is about 50%→ surgery if recurrence
- Emergency surgery if perforated or ischemic
- Preferred treatment for cecal or transverse colon volvulus is surgical resection and anastomosis

Tumor Lysis Syndrome (PUKE Calcium)

- ↑ Phosphate, ↑ Uric acid, ↑ Potassium
- ↓ Calcium

16. Peritonitis

Types

- Primary: monomicrobial, children
- Secondary: polymicrobial, most common surgical cause is bacterial contamination due to GI or biliary tract bacteria

17. Various Important Facts

- Most common liver tumor: metastasis
- Most common penetrating trauma organ: small intestine
- Most **nutrients** absorbed in **jejunum**
- **Bile salts** absorbed in **ileum**
- **Trypsinogen** activated by **enteropeptidase**

18. Additional Integrated Clinical points

- Unexplained **microcytic anemia** in **elderly** patients → urgent **malignancy** workup
- RUQ pain with normal labs → ultrasound first
- Appendectomy specimen → must be sent for histopathology
- **Acute appendicitis** → definitive treatment is **surgery**
- Recurrence after endoscopic detorsion → surgery required
- The cell of origin in gastrointestinal stromal tumor **GIST** is the intestinal **cell of Cajal**
- If **Ileum** was resected, **vitamin B12** would be affected