

ACUTE ABDOMEN & PERFORATION

PERITONITIS • PNEUMOPERITONEUM • VISCERAL PAIN

KMU FINAL YEAR SURGERY

1. PAIN PHYSIOLOGY (LOCALIZATION)

Visceral Pain (Early): Dull, poorly localized, midline.
• **Foregut (Stomach/GB):** Epigastrium.
• **Midgut (Appendix/Small Bowel):** Perumbilical.
• **Hindgut (Colon):** Suprapubic.

Somatic Pain (Late): Sharp, localized to site of pathology.
• Due to irritation of parietal peritoneum (e.g., RIF pain in late appendicitis).

2. PERFORATED VISCUS (SURGICAL EMERGENCY)

⚠ BOARD-LIKE RIGIDITY

Presentation: Sudden severe pain (Patient lies still, shallow breathing).

Signs: Tachycardia, Hypotension (Septic Shock), Silent Abdomen (Paralytic Ileus).

Common Sites: Duodenum (Peptic Ulcer) > Stomach > Colon (Diverticulitis).

3. INVESTIGATIONS FOR PERFORATION

Erect Chest X-Ray:

- Shows **Free Gas under Diaphragm** (Pneumoperitoneum).
- Sensitivity 70%. If negative but high suspicion -> do CT.

CT Abdomen (Gold Standard):

- Can detect tiny amounts of free air.
- Identifies site of leak (e.g., contrast extravasation).

4. MANAGEMENT OF PERFORATION

1. Resuscitation (Drip & Suck):

- IV Fluids (Aggressive rehydration).
- NG Tube (Decompression).
- IV Antibiotics (Triple therapy: Ceftriaxone + Metronidazole + Gentamicin).

2. Definitive Surgery:

- **Peptic Ulcer:** Graham Patch Repair (Omental patch).
- **Colonic Perforation:** Resection + Stoma (Hartmann's). Primary anastomosis is risky in sepsis.
- **Typhoid Perforation:** Ileal resection / Exteriorization.

5. NON-SURGICAL MIMICS

Condition	Clue to Diagnosis
DKA	Young, Kussmaul breathing, High Sugar/Ketones.
Inferior MI	Epigastric pain. ECG changes (II, III, aVF).
Porphyria	Recurrent pain, red urine, precipitating drugs.
FMF	Familial Mediterranean Fever. Recurrent serositis.

6. CLINICAL SCENARIOS

Q: 70M, sudden generalized abdominal pain. Rigid abdomen. Erect CXR shows gas under right dome. **Management?**

Exploratory Laparotomy. (Perforated Viscus).

Q: Patient on NSAIDs for arthritis presents with severe epigastric pain radiating to shoulder.

Perforated Peptic Ulcer. Shoulder tip pain = Diaphragmatic irritation (Kehr's Sign).

INTESTINAL OBSTRUCTION

VOLVULUS • HERNIA • ADHESIONS • X-RAY SIGNS

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7. THE CARDINAL SIGNS

"Colicky Pain, Distension, Vomiting, Constipation"

- **Pain:** Colicky (comes and goes). Continuous pain = Strangulation!
- **Vomiting:** Early in High (Small Bowel) obstruction. Late/Feculent in Low (Large Bowel).
- **Constipation:** Absolute (no flatus/stool) = Complete Obstruction.

8. ETIOLOGY: SMALL VS LARGE

Small Bowel (SBO)	Large Bowel (LBO)
1. Adhesions (Previous surgery)	1. Cancer (Colorectal)
2. Hernias (Inguinal/Femoral)	2. Diverticulitis (Stricture)
3. Intussusception (Kids)	3. Volvulus (Sigmoid)

9. STRANGULATION (RED FLAG)

⚠ ISCHEMIC BOWEL RISK

Signs:

- Pain becomes Continuous (not just colicky).
- Tachycardia, Fever, Leukocytosis.
- Tenderness/Guarding over the site.

Action: Immediate Surgery: Remove necrotic part & anastomose!
Do NOT wait.

10. SIGMOID VOLVULUS

Patient: Elderly, chronic constipation, neuropsychiatric history.

X-Ray: "Coffee Bean Sign" (Bent inner tube sign). Arises from pelvis.

Management:

1. **Rigid/Flexible Sigmoidoscopy:** Decompression (Flatus tube). Success 80%.

2. **Surgery:** Sigmoid Colectomy if gangrenous or recurrent.

11. RADIOLOGICAL SIGNS

Small Bowel Obstruction (SBO):

- **Central** loops.
- **Valvulae Conniventes** (Lines cross full width).
- "Step-Ladder" air-fluid levels.

Large Bowel Obstruction (LBO):

- **Peripheral** loops.
- **Haustra** (Lines do NOT cross full width).
- Dilated Caecum > 9cm (Risk of rupture).

12. PARALYTIC ILEUS (PSEUDO-OBSTRUCTION)

Mechanism: Loss of peristalsis (Functional).

Causes: Post-op (physiological), Hypokalemia, Peritonitis, Spinal trauma.

Signs: **Absent Bowel Sounds** (Mechanical obstruction has "tinkling" sounds).

Rx: Conservative (NPO, Fluids, Correct Electrolytes).

13. MANAGEMENT PROTOCOL

Conservative (Drip & Suck): For Adhesions (uncomplicated).

- NPO + IV Fluids.
- NG Tube (Decompression).
- Monitor for 24-48h. (Gastrografin challenge helps).

Surgical Indications:

- Strangulation / Peritonitis.
- Closed Loop Obstruction (Volvulus/Hernia).
- Failure of conservative management (>48h).
- Virgin Abdomen (No previous surgery = unlikely adhesions, likely tumor/hernia).

14. SCENARIOS

Q: 65M, absolute constipation, massive distension. X-ray: Coffee Bean Sign. Rx?

Sigmoid Volvulus. Decompress with flatus tube/sigmoidoscopy.

Q: 30F, previous C-section. Colicky pain, vomiting. X-ray: Multiple central air-fluid levels.

Adhesive SBO. Start conservative management (Drip & Suck).

Q: Newborn with bilious vomiting. X-ray: "Double Bubble" sign.

Duodenal Atresia. (Associated with Down Syndrome).

OBSTRUCTIVE JAUNDICE

SURGICAL JAUNDICE • COURVOISIER • ERCP

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1. THE LAB PROFILE (IS IT SURGICAL?)

Surgical (Obstructive) Jaundice Profile:

- **Bilirubin:** Conjugated (Direct) is High. Dark Urine, Pale Stool.
- **ALP (Alkaline Phosphatase):** VERY High (>3x normal).
- **GGT:** High (Confirms liver origin of ALP).
- **ALT/AST:** Normal or mildly elevated.
(If ALT > 1000, it's Medical/Viral Hepatitis, NOT Surgical).

2. THE CLINICAL DIVIDE

Type	Painful Jaundice	Painless Jaundice
Cause	Gallstones (Choledocholithiasis)	Cancer (Head of Pancreas, Cholangiocarcinoma)
History	Colicky pain, fluctuating jaundice, fever (Cholangitis).	Progressive deep jaundice, weight loss, anorexia.
Gallbladder	Not Palpable (Fibrosed due to chronic stones).	Palpable (Distended, non-tender).

3. COURVOISIER'S LAW (EXAM GOLD)

"In a patient with painless jaundice, a **palpable gallbladder** is unlikely to be due to stones."

Why? Stones cause chronic inflammation -> Fibrosis -> Small shrunken GB.

Implication: Palpable GB + Jaundice = **Carcinoma Head of Pancreas** until proven otherwise.

4. INVESTIGATION LADDER

Step 1: Ultrasound Abdomen (First Line)

- Tells you: Are ducts dilated? (Yes = Obstruction).
- Is there a stone? Is there a mass?

Step 2: CT Scan / MRCP (Definitive)

- **CT (Triphasic):** Best for Pancreatic Mass/Staging.
- **MRCP:** Best for Stones in CBD (Non-invasive map of biliary tree).

Step 3: ERCP (Therapeutic ONLY)

- Do NOT use for diagnosis alone (risk of Pancreatitis).
- Use to remove stone (Sphincterotomy) or stent a tumor.

5. MANAGEMENT STRATEGY

Pruritus (Itching): Due to bile salts. Rx: Cholestyramine or Ursodeoxycholic Acid.

Coagulopathy: No bile = No Vit K absorption = High INR. Rx: **IV Vitamin K.**

Hepatorenal Risk: Jaundiced patients are prone to renal failure. Hydrate aggressively before surgery!

6. CLINICAL SCENARIO

Q: 60M, deep jaundice, scratching marks, lost 10kg. Palpable mass in RUQ. Diagnosis?

Carcinoma Head of Pancreas. (Painless + Palpable GB = Courvoisier Positive).

Q: 45F, colicky RUQ pain, fever with rigors, jaundice. BP 90/60. Diagnosis?

Acute Ascending Cholangitis (Reynolds Pentad). Charcot's Triad + Shock + Confusion. Requires urgent ERCP drainage.

ACUTE APPENDICITIS

ALVARADO SCORE • CLINICAL SIGNS • MANAGEMENT

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7. PATHOPHYSIOLOGY

Obstruction of Lumen is the primary event.
• **Children:** Lymphoid Hyperplasia (post-viral).
• **Adults:** Fecolith (Stool stone).
• **Obstruction** -> Bacterial overgrowth -> Ischemia -> Gangrene -> Perforation.

8. CLINICAL FEATURES (MURPHY'S TRIAD)

The Sequence (Chronology Matters):

- Pain:** Starts Periumbilical (Visceral/T10), then shifts to RIF (Somatic/Peritoneal).
- Vomiting:** Usually follows the pain. (If vomiting starts before pain, think Gastroenteritis).
- Fever:** Low grade initially. High grade = Perforation.

9. PHYSICAL SIGNS

Sign	Description
McBurney's	Max tenderness at junction of lateral 1/3 and medial 2/3 of spinoumbilical line.
Rovsing's	Palpation of LLQ causes pain in RLQ (Gas shift).
Psoas Sign	Pain on extension of right hip (Retrocecal appendix).
Obturator	Pain on internal rotation of flexed right hip (Pelvic appendix).

10. ALVARADO SCORE (MANTRELS)

Migration of pain (1)
Anorexia (1)
Nausea/Vomiting (1)
Tenderness in RIF (2)
Rebound tenderness (1)
Elevated Temperature (1)
Leukocytosis (2)
Shift to left (Neutrophils) (1)
Total 10. Score > 7 = Likely Appendicitis (Surgery). Score 5-6 = CT Scan/Observe.

11. PAEDS & ELDERLY (TRAPS)

Pediatric: Omentum is underdeveloped -> Cannot wall off infection -> **Rapid Perforation & Generalized Peritonitis**.

Elderly: Reduced pain perception. Often present late with mass/abscess. High suspicion needed for caecal cancer mimicking appendix.

12. MANAGEMENT

Gold Standard: Laparoscopic Appendectomy.
Appendicular Mass: (Pain 3-5 days, palpable mass).
• Do NOT operate immediately (stuck bowel risk).
• **Ochsner-Sherren Regimen:** Conservative (IV Antibiotics + Fluids).
• **Interval Appendectomy after 6-8 weeks.**
Modern Alternative = Early Surgery

13. SCENARIOS

Q: 20F, RIF pain. LMP 6 weeks ago. Hypotensive.

Ectopic Pregnancy Rupture. Always do UPT (Pregnancy test) in female with RIF pain.

Q: Child with sore throat 2 weeks ago, now RIF pain, high fever. Normal Appendix on USG.

Mesenteric Adenitis. Enlarged lymph nodes. Self-limiting.

ABDOMINAL HERNIAS

INGUINAL • FEMORAL • ANATOMY • MANAGEMENT

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1. THE VOCABULARY

Reducible: Contents return to abdomen spontaneously or with manipulation.

Irreducible (Incarcerated): Cannot be returned. Risk of strangulation.

Obstructed: Loop of bowel is blocked (Vomiting/Constipation), but blood supply is intact.

Strangulated: Blood supply cut off. **Surgical Emergency.** Gangrene within 6 hours.

4. FEMORAL HERNIA (THE DANGEROUS ONE)

⚠ HIGHEST RISK OF STRANGULATION

Anatomy: Through Femoral Canal.

- **Medial boundary:** Lacunar Ligament (Sharp edge = cuts blood supply).
- **Lateral boundary:** Femoral Vein.

Diagnostic Clue: Swelling is Below and Lateral to the Pubic Tuber. (Inguinal is Above and Medial).

Management: Urgent Surgery (McEvedy or Lockwood approach). No truss!

2. INGUINAL CANAL ANATOMY

"MALT" (2 Muscles, 2 Aponeuroses, 2 Ligaments, 2 Tendons)

- **Roof:** Conjoint Tendon (Internal Oblique + Transversus Abdominis).
- **Floor:** Inguinal Ligament + Lacunar Ligament.
- **Anterior:** External Oblique Aponeurosis.
- **Posterior:** Transversalis Fascia + Conjoint Tendon.

Deep Ring: Defect in Transversalis Fascia.

Superficial Ring: Defect in Ext Oblique.

5. HESSELBACH'S TRIANGLE

Medial: Rectus Abdominis.

Lateral: Inferior Epigastric Vessels.

Inferior: Inguinal Ligament.

Direct Hernias punch straight through this triangle (posterior wall weakness).

6. CLINICAL SCENARIOS

Q: 60M, swelling in groin, reduces on lying down. Cough impulse +. Occlusion test: Swelling appears MEDIAL to finger.

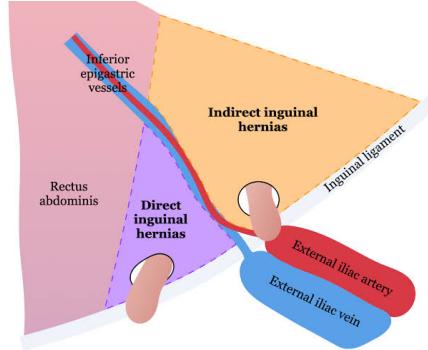
Direct Inguinal Hernia. (Medial to deep ring/vessels).

Q: 70F, severe colicky abdominal pain, vomiting. Small tender lump in right groin, hard, irreducible.

Strangulated Femoral Hernia. (Females > Males for Femoral. High strangulation risk).

3. DIRECT VS INDIRECT

Feature	Indirect Inguinal	Direct Inguinal
Route	Through Deep Ring (Lateral to vessels). Travels <i>inside</i> cord.	Through Hesselbach's Triangle (Medial to vessels).
Age	Young / Congenital (Patent Processus Vaginalis).	Old (Weakness of Transversalis Fascia).
Deep Ring Test	Controlled by pressure on deep ring.	Pops out despite pressure.
Strangulation	High Risk (Narrow neck).	Rare (Wide neck).



SURGICAL MANAGEMENT

OPERATIVE STEPS • MESH REPAIR • RARE HERNIAS

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7. PROCEDURES: THE DEFINITIONS

Herniotomy (Pediatric):

- Dissection + Ligation + Excision of sac.
- No repair needed* (muscles are strong, just PPV needs closing).

Herniorrhaphy (Tissue Repair):

- Herniotomy + Suturing muscles together (Bassini / Shouldice).
- High tension = High recurrence*. Rarely done now.

Hernioplasty (Mesh Repair):

- Herniotomy + Placing Prolene Mesh (Lichtenstein).
- Tension-free = Gold Standard for Adults.*

10. SPECIAL HERNIAS (EXAM FAVORITES)

Eponym	Feature
Richter's	Only part of the bowel circumference (antimesenteric wall) is trapped. Strangulation <i>without</i> obstruction.
Maydl's	"W" shape. Two loops in sac, one loop inside abdomen. The inner loop becomes gangrenous first.
Littre's	Sac contains Meckel's Diverticulum .
Amyand's	Sac contains Appendix (can be inflamed).
Spigelian	Lateral ventral hernia. Through Spigelian fascia (Linea semilunaris).
Pantaloons	Dual hernia. Direct + Indirect components on same side.

8. LICHTENSTEIN REPAIR (STEPS)

- Incision:** Parallel to inguinal ligament.
- Open Canal:** Incise Ext Oblique aponeurosis.
- Sac Handling:**
 - Indirect:* Separate from cord, ligate, reduce.
 - Direct:* Invaginate (push back).
- Mesh Placement:** Posterior to Spermatic Cord (Cord rests on mesh).
- Fixation:** Sutured to Pubic Tuber, Inguinal Ligament, and Conjoint Tendon.
- Closure:** Close Ext Oblique over cord.

9. COMPLICATIONS OF SURGERY

Immediate: Retention of urine, Scrotal hematoma.
Early: Infection (Mesh infection requires removal).

Late:

- Chronic Groin Pain:** Nerve entrapment (Ilioinguinal nerve).
- Ischemic Orchitis:** Tight ring or damage to testicular artery.
- Recurrence (<1% with mesh).

11. UMBILICAL VS PARAUMBILICAL

Umbilical (Kids):

- Congenital defect.
- 95% close spontaneously by age 2.
- Surgery only if persists > 3-4 years.

Paraumbilical (Adults):

- Acquired (Obesity, Multiparity). Defect in Linea Alba.
- Neck is narrow = High risk of strangulation.**
- Rx: **Mayo's Repair** (Overlap/Double-breasting of fascia) or Mesh.

12. INCISIONAL HERNIA

Risk Factors: Wound infection (Most common), Obesity, Steroids, Poor technique.

Repair: Requires Mesh (Onlay or Sublay). Simple suture has 50% recurrence rate.

IBD & CONSTIPATION

UC vs CROHN'S • RED FLAGS • MEGACOLON

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1. THE IBD BATTLE: UC VS CROHN'S

Feature	Ulcerative Colitis (UC)	Crohn's Disease
Location	Rectum always involved. Continuous proximal spread. Colon only.	Mouth to Anus. Skip lesions. Terminal Ileum most common.
Pathology	Mucosa/Submucosa only. Crypt Abscesses.	Transmural (Full thickness). Non-caseating Granulomas.
Symptoms	Bloody Diarrhea (Hallmark). Tenesmus.	Abdominal Pain, Mass (RIF), Weight loss. Non-bloody diarrhea.
Complications	Toxic Megacolon, CRC Risk (High).	Fistulas , Strictures, Abscesses.
Appearance	"Lead Pipe" Colon (Loss of haustra).	"Cobblestone" mucosa. String Sign (Ileum).

2. EXTRA-INTESTINAL MANIFESTATIONS

A PIE SAC

- Aphthous ulcers (Mouth).
- Pyoderma Gangrenosum (UC > Crohn's).
- Iritis / Uveitis (Eye pain/redness).
- Erythema Nodosum (Painful shin nodules).
- Sclerosing Cholangitis (PSC) - *Associated with UC.*
- Arthritis (Large joints).
- Clubbing.

3. TOXIC MEGACOLON (EMERGENCY)

⚠️ IBD EMERGENCY

Definition: Transverse colon > 6cm + Systemic Toxicity.

X-Ray: Dilated colon, loss of haustra, "Thumbprinting" (Edema).

Action: IV Fluids + IV Steroids + Antibiotics.

If no improvement in 24-48h -> Colectomy (Avoid perforation!).

4. IBD MANAGEMENT LADDER

1. Induce Remission (Flare-ups):

- **Steroids:** IV Hydrocortisone (Severe) or Oral Prednisolone.
- **5-ASA:** Mesalazine (Mild UC).

2. Maintain Remission:

- **Immunomodulators:** Azathioprine / Mercaptopurine.
- **Biologics:** Infliximab (Anti-TNF). *Check for TB before starting!*

3. Surgery:

- **UC:** Pan-proctocolectomy is **Curative**.
- **Crohn's:** Surgery is **NOT curative** (disease recurs). Only resect complications (strictures/fistulas).

5. CONSTIPATION (ROME IV SIMPLIFIED)

Criteria (>3 months): Straining, Lumpy hard stools, Sensation of incomplete evacuation, Manual maneuvers required.

Red Flags (Refer Urgent Colonoscopy):

- Age > 50 with new onset.
- Rectal bleeding / Melena.
- Weight loss / Anemia.
- Family history of CRC.

6. CLINICAL SCENARIOS

Q: 25F with bloody diarrhea, fever, and tender shins (red nodules). Diagnosis?

Ulcerative Colitis with Erythema Nodosum.

Q: 30M, RIF pain, mass palpable. Appendix normal on USG. Colonoscopy shows "skip lesions".

Crohn's Disease. (Terminal ileitis often mimics appendicitis).

Q: Patient with UC has jaundice and high ALP. ERCP shows "beaded" bile ducts.

Primary Sclerosing Cholangitis (PSC). High risk of Cholangiocarcinoma.

COLORECTAL CA & PAEDS

STAGING • SURGERY TYPES • NEONATAL OBSTRUCTION

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7. COLORECTAL CANCER (CRC)

Right Sided (Caecum/Ascending):

- Grows large/fungating.
- **Presentation:** Iron Deficiency Anemia (Occult bleed), Mass in RIF. *Rarely obstructs* (liquid stool).

Left Sided (Sigmoid/Rectum):

- Annular/"Napkin Ring" growth.
- **Presentation:** Altered Bowel Habits (Constipation/Diarrhea), Fresh Bleeding, Obstruction (solid stool).

Tumor Marker: **CEA** (Carcinoembryonic Antigen). *Not for screening, but for monitoring recurrence.*

8. SURGICAL PROCEDURES (KNOW THE DIFFERENCE!)

Caecum / Ascending Colon:

- **Right Hemicolectomy.** (Anastomosis: Ileum to Transverse colon).

Sigmoid Colon:

- **Sigmoid Colectomy** or High Anterior Resection.

Upper Rectum (Tumor >5cm from anal verge):

- **Anterior Resection (AR).** Sphincter sparing. No permanent stoma.

Lower Rectum (Tumor <5cm from anal verge):

- **Abdominoperineal Resection (APR).** Anus removed. **Permanent Colostomy.**

9. DUKES STAGING (SIMPLIFIED)

Stage	Extent	5-Year Survival
Dukes A	Confined to Bowel Wall.	90%
Dukes B	Through Bowel Wall. Nodes Negative.	70%
Dukes C	Lymph Nodes Positive.	30-40%
Dukes D	Distant Metastasis (Liver/Lung).	< 10%

10. HIRSCHSPRUNG DISEASE

Pathophysiology: Failure of neural crest cells to migrate.

- **Aganglionic Segment:** Always involves Rectum and extends proximally.
- Segment is **Constricted** (cannot relax). The bowel *above* it dilates (Megacolon).

Presentation:

- Delayed passage of Meconium (>24-48h).
- Abdominal distension, Biliary vomiting.
- **DRE:** Rectum feels empty, followed by "Blast Sign" (explosive stool/gas on withdrawal).

11. HIRSCHSPRUNG MANAGEMENT

Diagnosis:

1. **Barium Enema:** "Cone" or Funnel transition zone.
2. **Rectal Suction Biopsy (Gold Standard):** Shows **Absence of Ganglion Cells** + Hypertrophied Nerve Trunks.

Treatment:

- Initial: Rectal washouts / Colostomy (if enterocolitis).
- Definitive: **Pull-Through Surgery** (Swenson / Duhamel / Soave).
(Resect aganglionic part, pull normal bowel to anus).

12. HIGH YIELD SCENARIOS

💡 EXAM FAVORITES

Q: 65M with Iron Deficiency Anemia. No visible bleeding. **Next Step?**

Colonoscopy. (Right sided colon cancer until proven otherwise).

Q: Neonate, distended abdomen, no stool for 48h. X-ray shows dilated loops. **DRE:** Explosive stool.

Hirschsprung Disease. (Classic presentation).

Q: Patient with rectal cancer 3cm from anal verge. **Consents for surgery. What must you warn him about?**

Permanent Colostomy. (APR is required because tumor is too low to save sphincters).

13. POLYPOSISSYNDROMES

FAP (Familial Adenomatous Polyposis): Thousands of polyps. APC gene. 100% Cancer risk by age 40. Rx: Prophylactic Colectomy.

HNPPC (Lynch Syndrome): Few polyps. DNA Mismatch repair. Risk of Colon + Endometrial + Ovarian cancer.