Intestinal Obstruction

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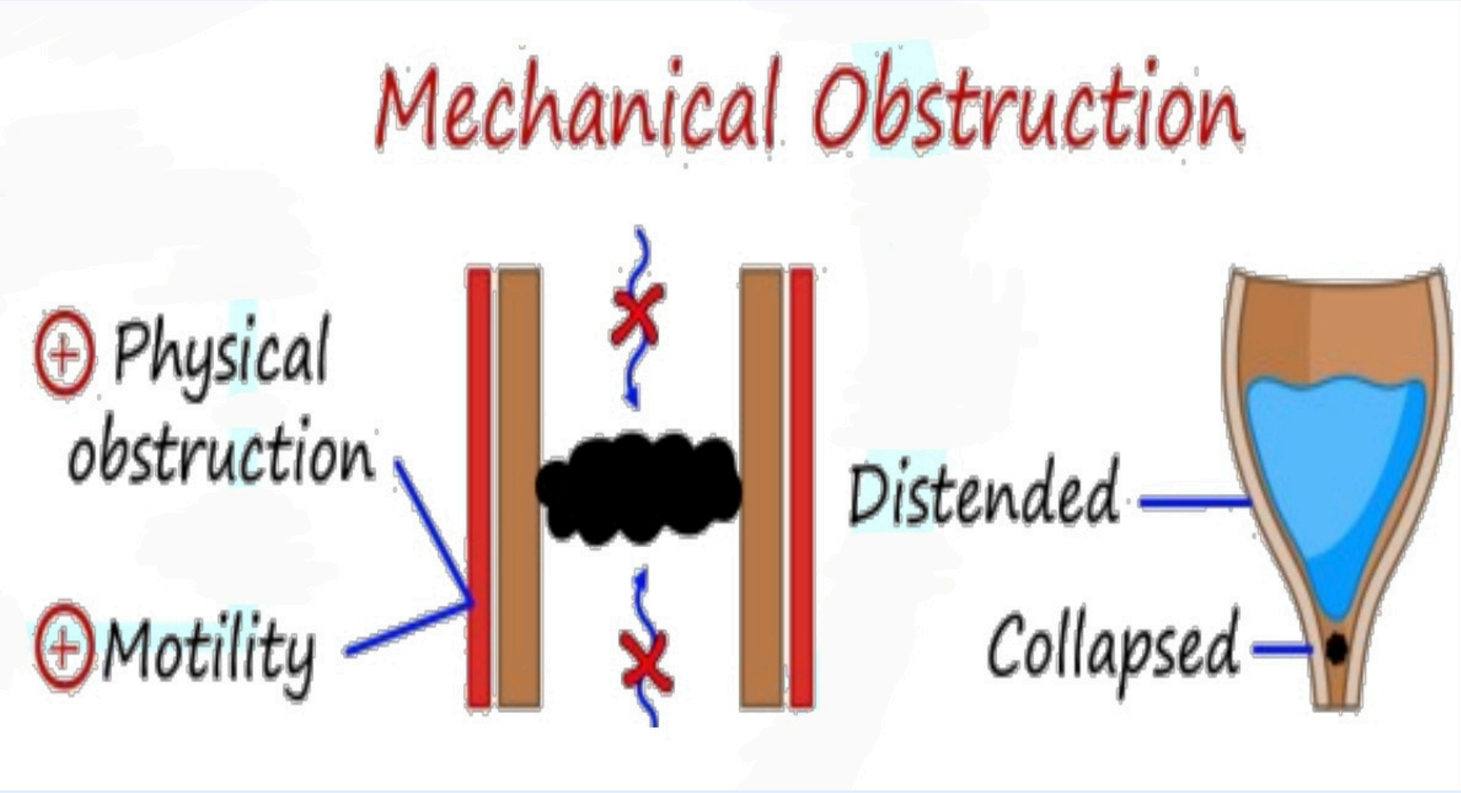
❖ DEFINITION:

- Interruption of normal passage of intestinal content through the small or large intestine due to mechanical barrier or functional impairment.
- Classified according to:

1. Motility (Dynamic, Adynamic).
2. Onset and the Course of Obstruction.
3. Site of Obstruction.

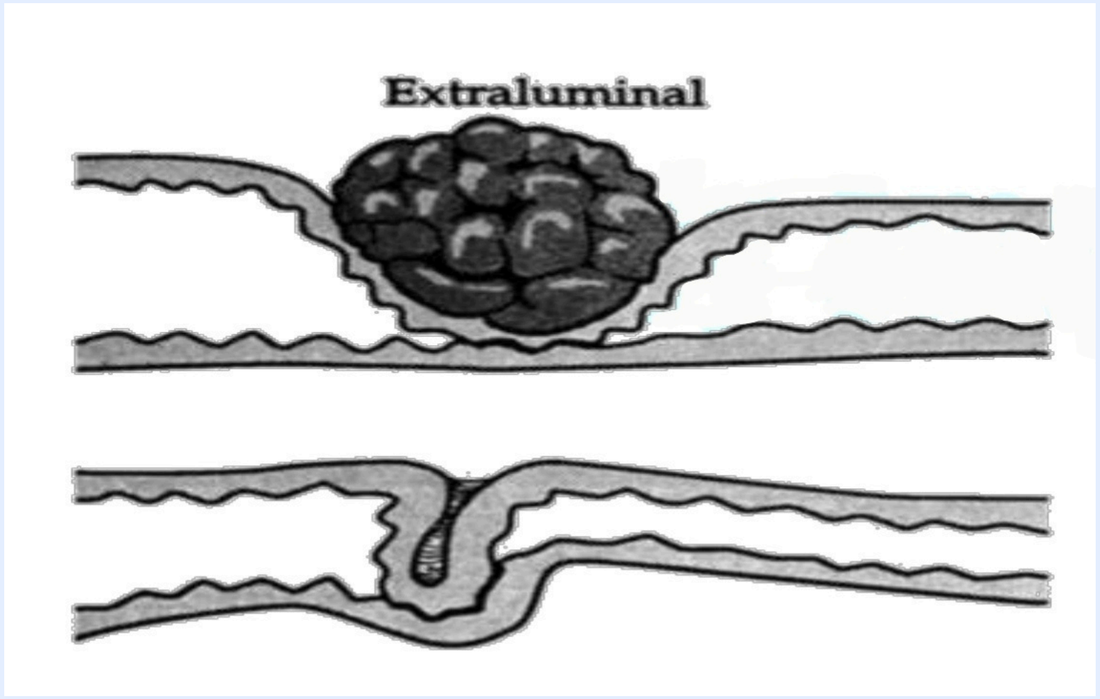
MOTILITY

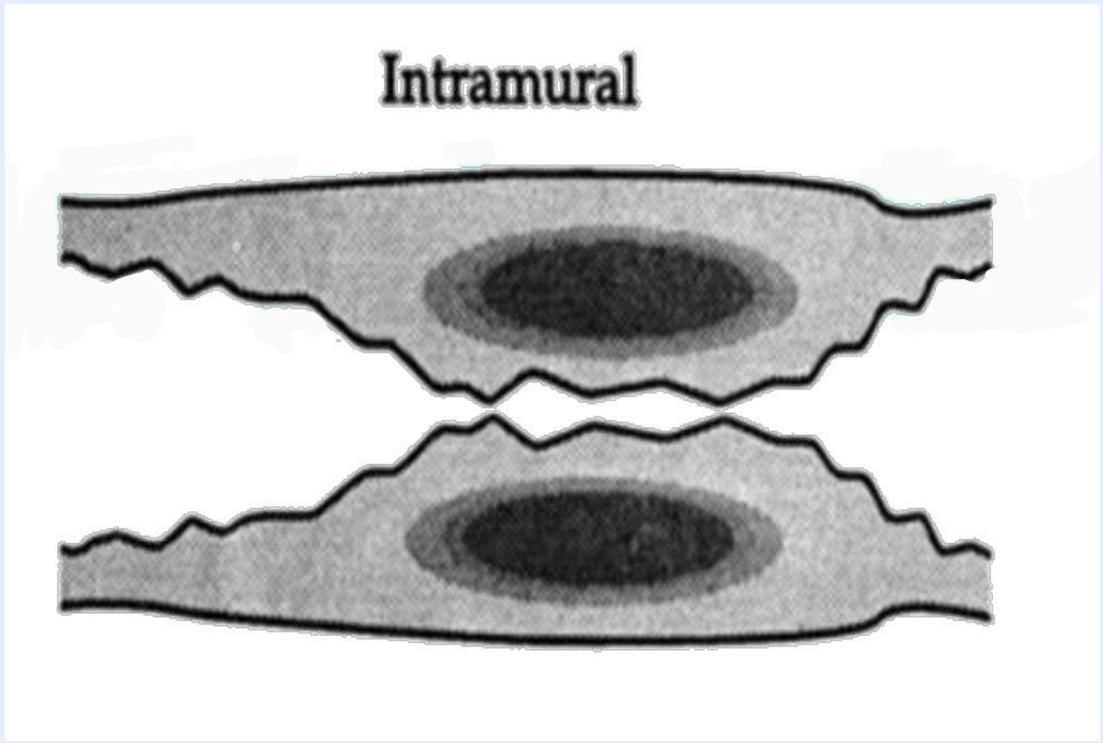
A. MECHANICAL OBSTRUCTION(DYNAMIC)



- It is the interruption of normal passage through the bowel due to a structural barrier. (a tumor, adhesions), may be complete or partial blockage.
- Because in the early stage of obstruction peristalsis is heard, it is referred to as dynamic obstruction.

Mechanical bowel obstruction can be classified into the following etiologic categories : Extrinsic and Intrinsic



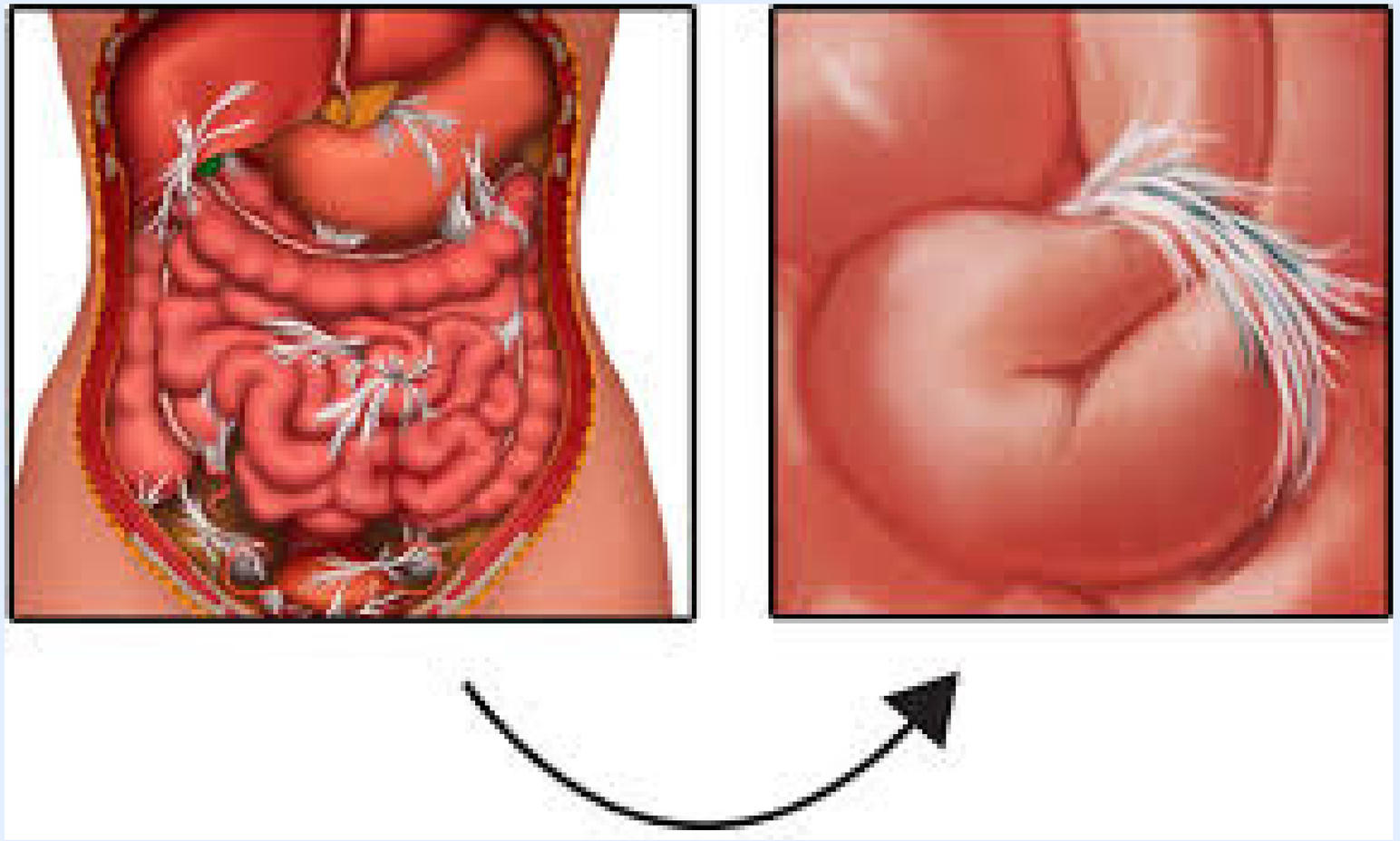


CAUSES OF MECHANICAL OBSTRUCTION:

1 .EXTRINSIC COMPRESSION OF THE BOWEL (EXTRAMURAL)

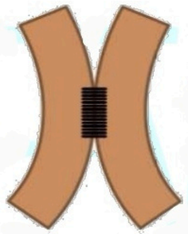
- **Bowel adhesions**
- **Volvulus**
- **Strangulated hernia** (inguinal hernia, umbilical hernia, femoral hernia)
- **Intra-abdominal mass** (metastatic lymphadenopathy, large intra-abdominal abscess or cyst)

BOWEL ADHESIONS



Surgical Adhesions (Most common cause)

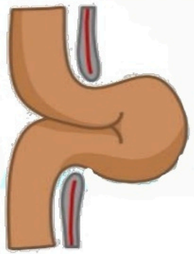
- **Prior abdominal surgeries →**
  ↑Fibrotic scarring that entangles small bowel loops →
  ↑Luminal obstruction



Adhesions
-Abdominal surgeries

Hernias

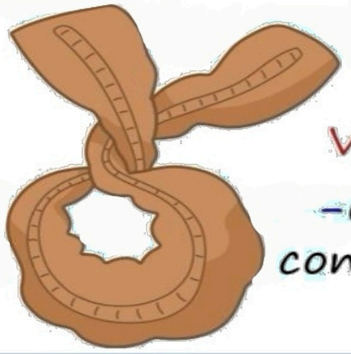
- **Inguinal and Femoral Hernias →**
  Small bowel loops slip through wall defect → Trapped bowel leads to luminal obstruction



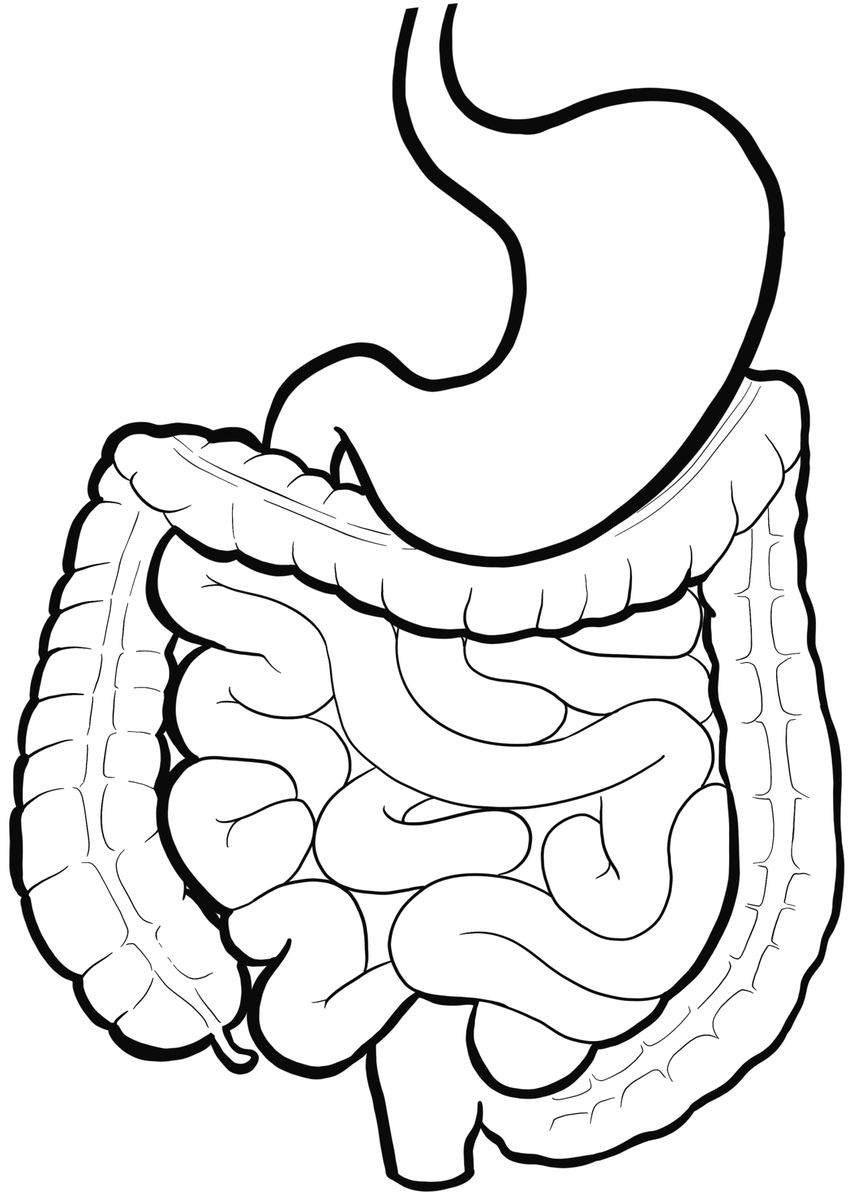
Hernias
- Femoral
- Inguinal

Sigmoid Volvulus

- **Chronic Constipation or Megacolon →**
  Lengthen the mesentery large bowel causing rotation and torsion on itself → Luminal obstruction



Volvulus
-Chronic constipation



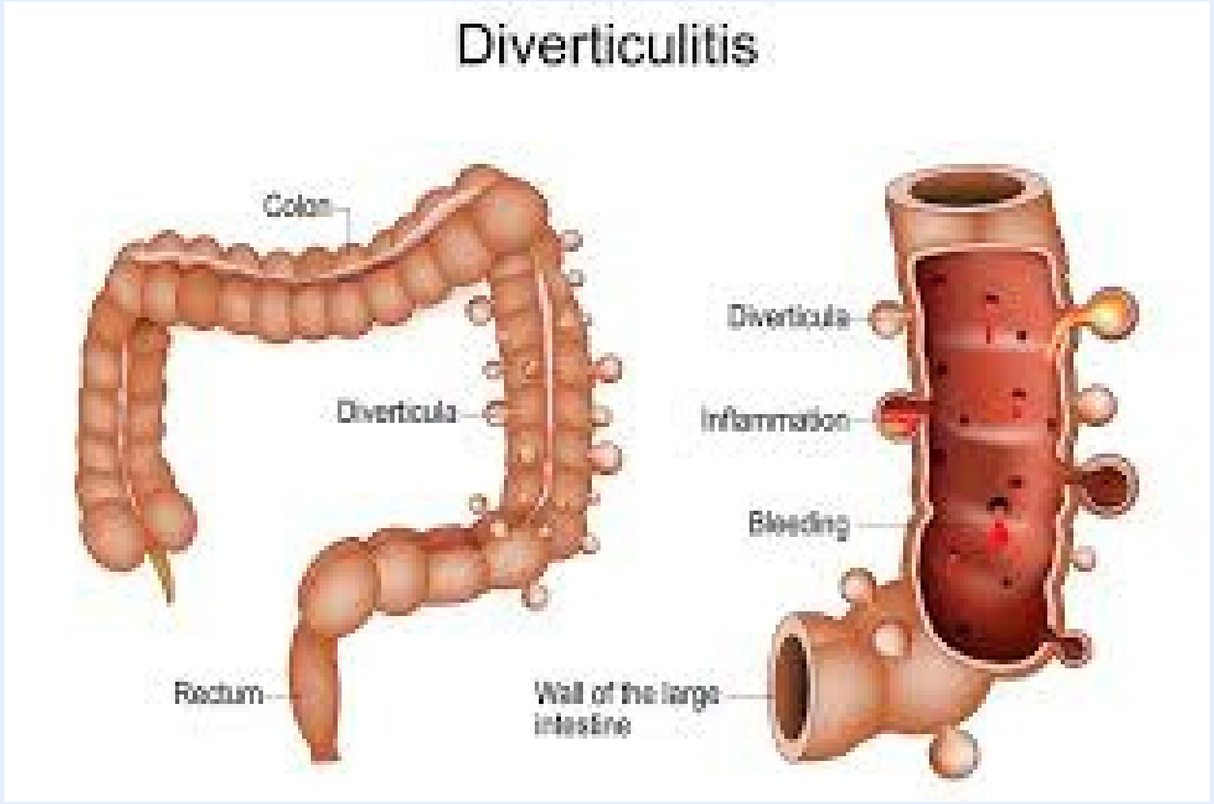
2. INTRINSIC BOWEL OBSTRUCTION

INTRAMURAL BOWEL OBSTRUCTION:

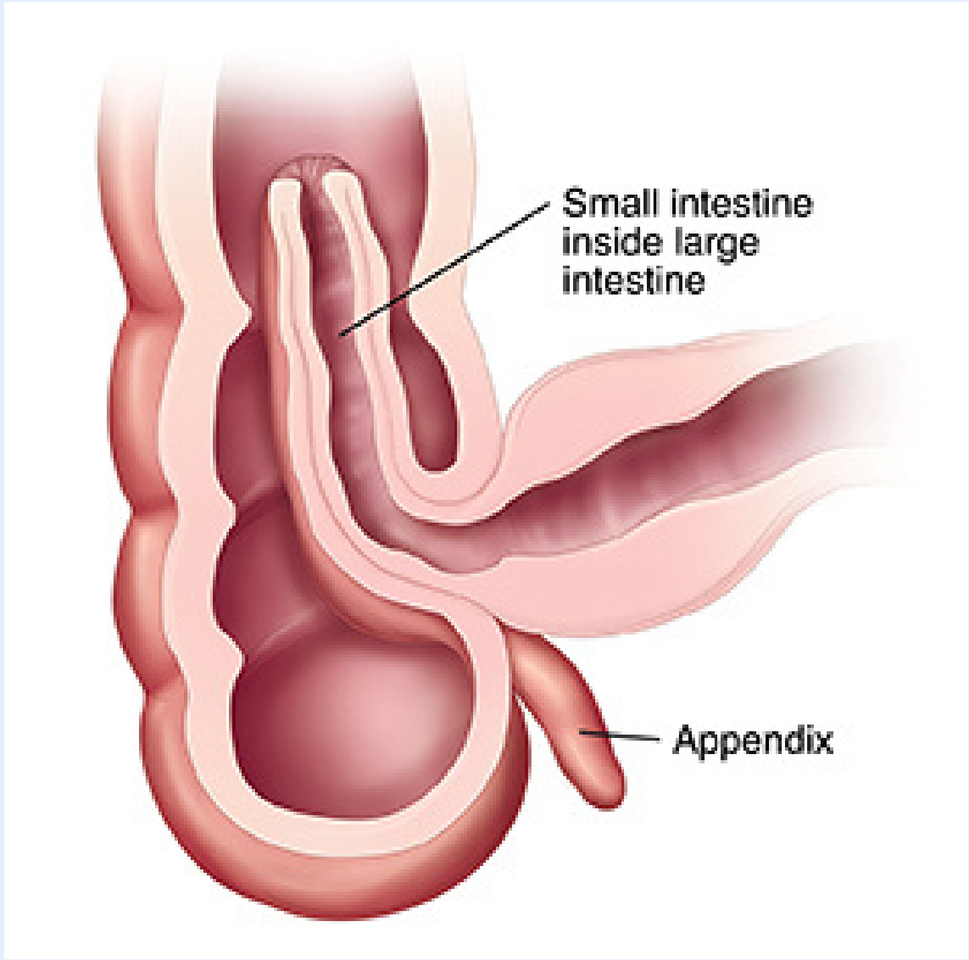
The underlying etiology arises from the intestinal wall.

1. **Strictures**
2. **Intestinal tumors** (colorectal carcinoma, lymphoma)
3. **Diverticulitis**
4. **Intussusception**

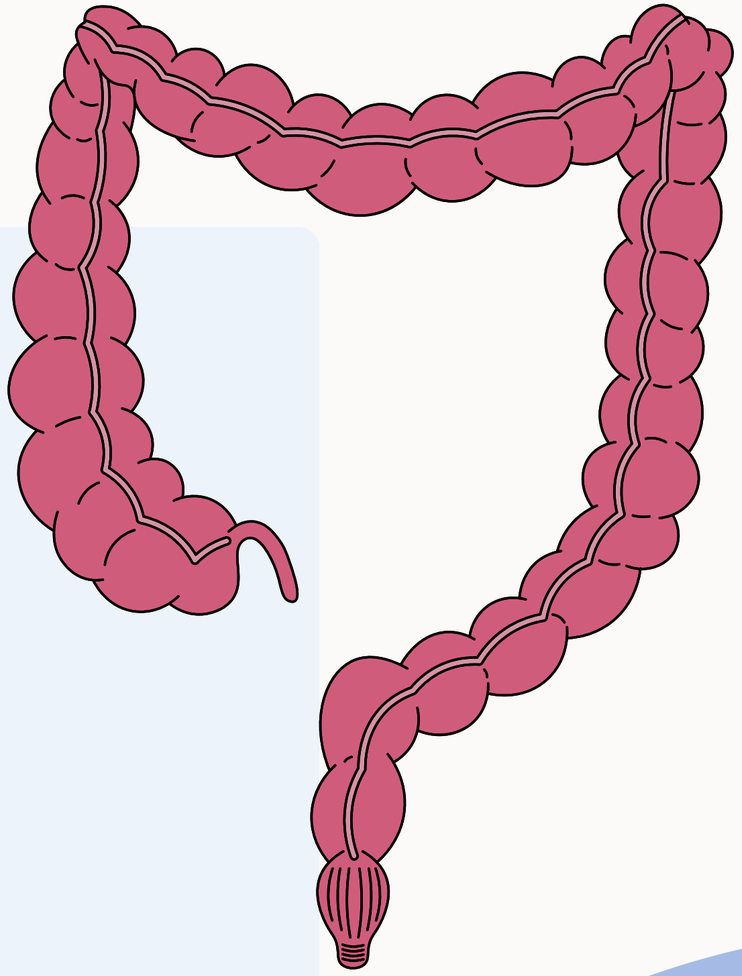
DIVERTICULITIS



INTUSSUCEPTION



INTRALUMINAL BOWEL OBSTRUCTION:



THE OBSTRUCTING AGENT LIES WITHIN THE GASTROINTESTINAL LUMEN.

1. **Gallstone ileus**
2. **Foreign body ingestion**
3. **Bezoars**

(Lactobezoars ,Trichobezoars, phytobezoars)

4. **Fecal impaction.**

B. NON-MECHANECHAL OBSTRUCTION (ADYNAMIC)

Obstruction of the intestines due to loss of peristalsis in the absence of any mechanical blockage. It results in the inability of the intestines to move contents forward.

COMMON ETIOLOGIES:

- **Vascular**
- **Nervous**
- **metabolism** (hypokalemia)
- **Trauma**
- **Post OP** (more than 72 hour after abdominal surgery)
- **Medication** (anti-cholanergic)

Ogilvie's Syndrome

Pseudo-obstruction

- **A disorder in which the colon becomes massively dilated in the absence of mechanical obstruction, it result from autonomic dysfunction and severe Adynamic ileus.**
- **Most commonly occurs in hospitalized patients and is associated with the use of narcotics, bed rest, and comorbid disease.**
- **Presence of massive dilatation of the colon (usually predominantly the right and transverse colon) in the absence of a mechanical obstruction is diagnostic.**

HISTORY & EXAMINATION

Clinical features

Abdominal pain

Distension

Cardinal Symptoms

vomiting

Constipation

1)Abdominal Pain :

The first symptom to appear , due to hyper-peristalsis movement as early response of the bowel attempting to overcome the blockage

* Sudden intermittent colicky pain
* Pain felt in center of the abdomen (small bowel) or lower abdomen (large bowel).
*Pain does not usually occur in paralytic ileus but the pain may occur as a result of abdominal distention .
*Continuous if perforation or strangulation is present

2) Nausea and Vomiting :

60-70% of cases

*occurs due to significant bowel wall dilation proximal to obstruction→ leading to back-flow of fluid and food contents.
*As a late symptom when obstruction progresses, the character of the vomitus alters from digested food to feculent material, because of the presence of enteric bacterial overgrowth.

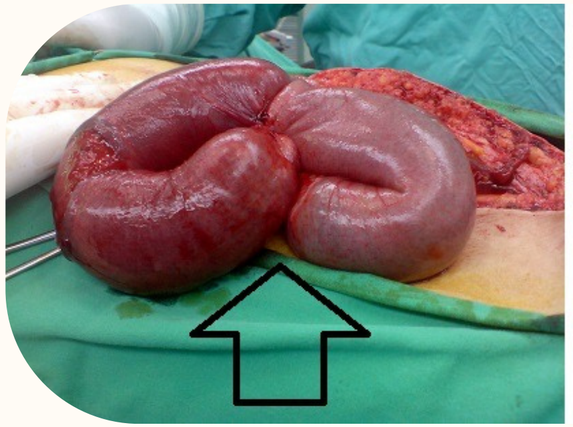
3) Constipation

Cessation of bowel movements

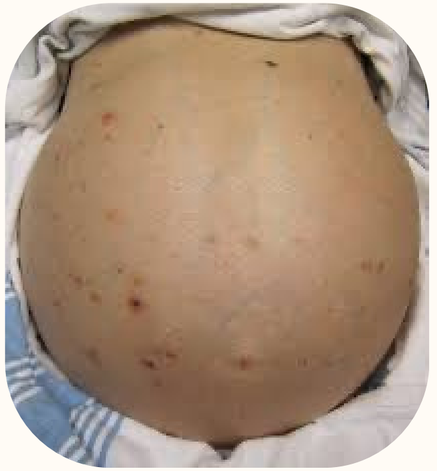
80-90% of cases

*Once an obstruction is complete and the bowel below is empty, absolute constipation develops.

*This occurs early in lower large bowel obstructions
and late in high small bowel obstructions.



Bowel distention caused by intestinal obstruction



4) Abdominal Distention

60% of cases

*Degree of distention is dependent on the site of the obstruction.

*Generalized in large bowel obstruction

*Epigastric or hypogastric in small bowel obstructions and Typically less severe than in LBO

COMPLICATION OF INTESTINAL OBSTRUCTION :

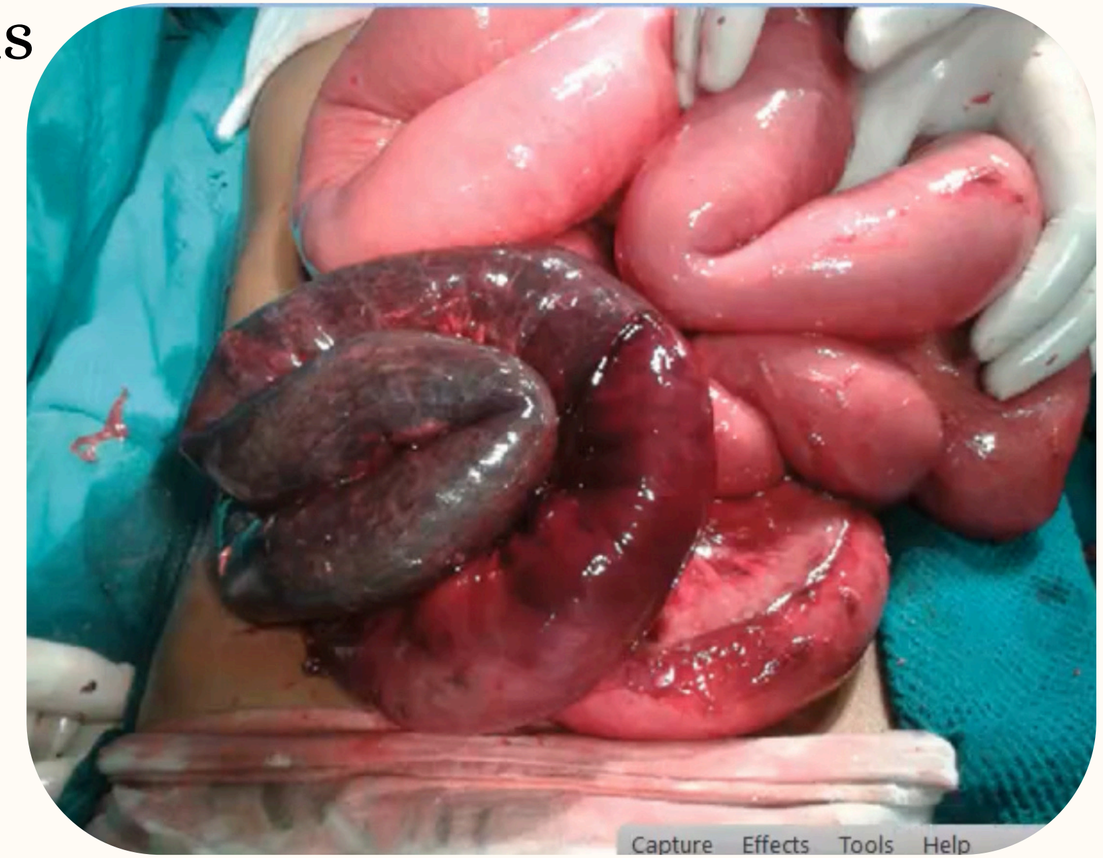
Strangulation → Perforation → peritonitis

* The pain becomes constant and sever tenderness and rebound tenderness and loss of abdominal movement with respiration.

*Fever and tachycardia.

*Shock: May be neurogenic from pain, hypovolemic, toxic or septic.

* Fluid and electrolytes imbalance due to vomiting → hypovolaemic shock.



Clinical features

Simple bowel obstruction:

*Present with the cardinal signs : (Constipation, pain, vomiting, distention)

*No evidence of complications:

1. Bowel ischemia
2. Bowel perforation

Complicated obstruction:

*Change in the character of pain distension) from colicky to continuous.

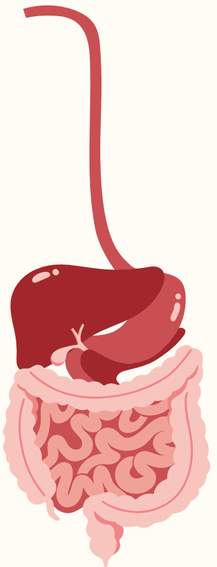
*Peritoneal signs

* Bowel sounds absent or reduced

*high grade fever

* tachycardia

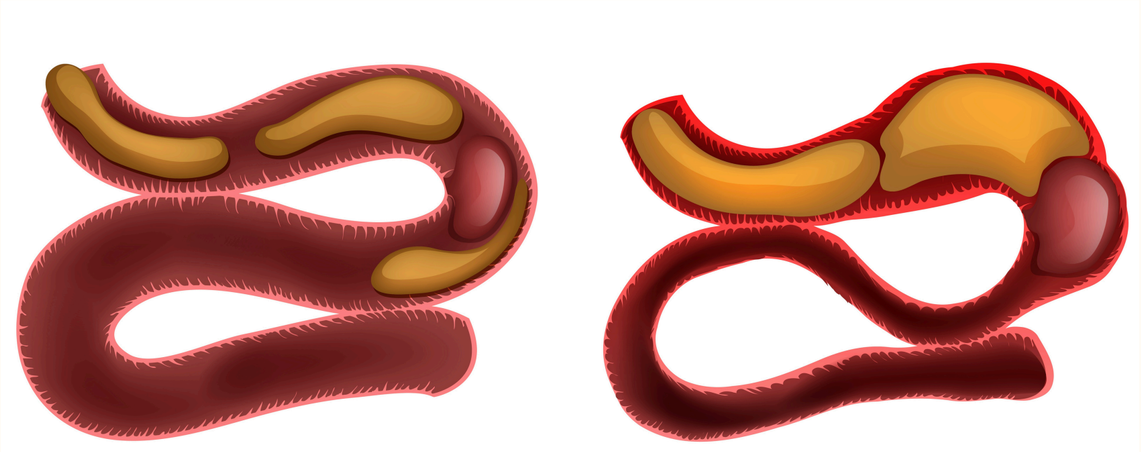
*leukocytosis



Partial bowel obstruction

- Partial obstruction allowing a small amount of air and fluid to pass through.
- Clinical features like cardinal symptoms, dehydration, early satiety and fatigue may be less severe than in complete bowel obstruction.
- Can be associated with the intermittent passage of flatus and overflow diarrhea.
- Partial bowel obstruction causes gradually progressive symptoms that are typically milder than those caused by complete obstruction (complete inability to pass stool or gas) .

Complete bowel obstruction



- Total obstruction of the intestinal lumen, preventing the passage of air and fluid.
- Rapid progressio3n of clinical features.
- Can be associated with **obstipation**.
-clinical features : tachycardia , fever , abdominal pain , vomiting , constipation and abdominal distention .

PHYSICAL EXAMINATION

- **Inspection:**

- Scar.
- Distension, central in small bowel obstruction and peripheral in large bowel obstruction.
- Visible peristalsis.

- **Palpation:**

- Abdominal mass may suggest carcinoma or strangulated bowel.
- Rigidity and rebound tenderness: indicates ischemia & peritoneal irritation.

- **Percussion:**

- Tympanic because of gas filled bowel

- **Auscultation:**

- Increased high-pitched bowel sounds (early) or the absence of any bowel sounds (late).
- Gurgling borborygmi if gas and fluid are present in the bowel.
- Silence if generalized peritonitis or paralytic ileus is present.

Digital rectal examination:

Determines whether there is any fecal impaction or abnormal masses and it helps to assess the consistency and presence of stool, which can indicate the severity.

*Comments:

-Impacted feces

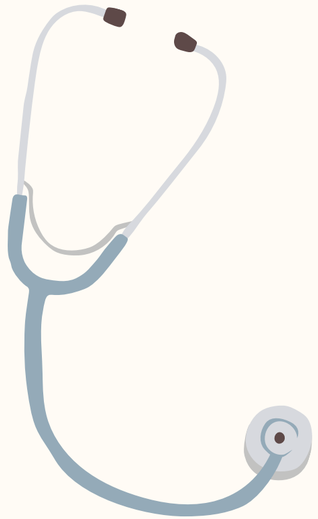
-Rectal cancer

-Blood on finger: which maybe present with mesenteric artery occlusions, intussusception or Volvulus.

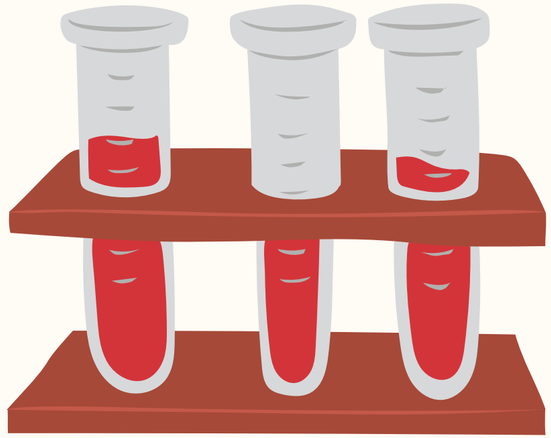
-Empty rectum: it can be a significant finding and may necessitate further investigation to determine the cause of the obstruction and the overall condition of the patient.

hernial orifices

Investigation and imaging



INVESTIGATION



Blood Examination:

- **CBC (Complete blood count):**

  - rise white cell count will indicate an infection.

  - Normal or slight rise in W.B.C count: simple mechanical obstruction.

  - Moderate rise in W.B.C count (15000-20000): strangulation.

  - Very high-rise in W.B.C count (30000-40000): primary mesenteric vascular occlusion.

- **Serum Urea & electrolytes:**

  - Derangement may be seen with vomiting & diarrhea.

  - Dehydration will be reflected in raised serum urea and creatinine.

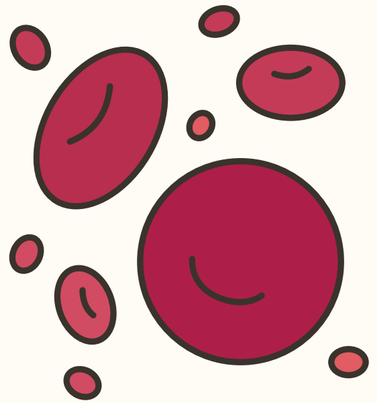
- **Serum Amylase:**

  - it is non specific test & may be raised in cases of small intestinal obstruction.

- **Metabolic acidosis:**

  - It occurs due to combined effects of dehydration, ketosis and loss of alkaline secretion.

  - Very common in distal intestinal obstruction.



Imaging

- **depends on the type of bowel obstruction and hemodynamic stability of the patient.**
  - **Acute bowel obstruction**
    - **Stable patients:** CT abdomen and pelvis with IV contrast.
    - **Unstable patients**: Consider abdominal x-ray or abdominal ultrasound first, along with urgent surgical consultation.
  - **Subacute bowel obstruction**
    - **Preferred:** CT abdomen and pelvis with IV contrast.
    - **Alternatives**: MRI with and/or without IV contrast, water-soluble contrast challenge, and specialized dynamic contrast studies

Abdominal x-ray

- **Indication:**

It is the appropriate initial test in patients .

- **Findings**:

1. Proximal bowel dilatation.
2. Minimal or no intraluminal air distal to the obstruction.
3. Stepladder sign (best seen on an upright view): multiple air-fluid levels and stacked dilated loops of small bowel.
4. Air under the diaphragm is an indicator of bowel perforation.

WARNING

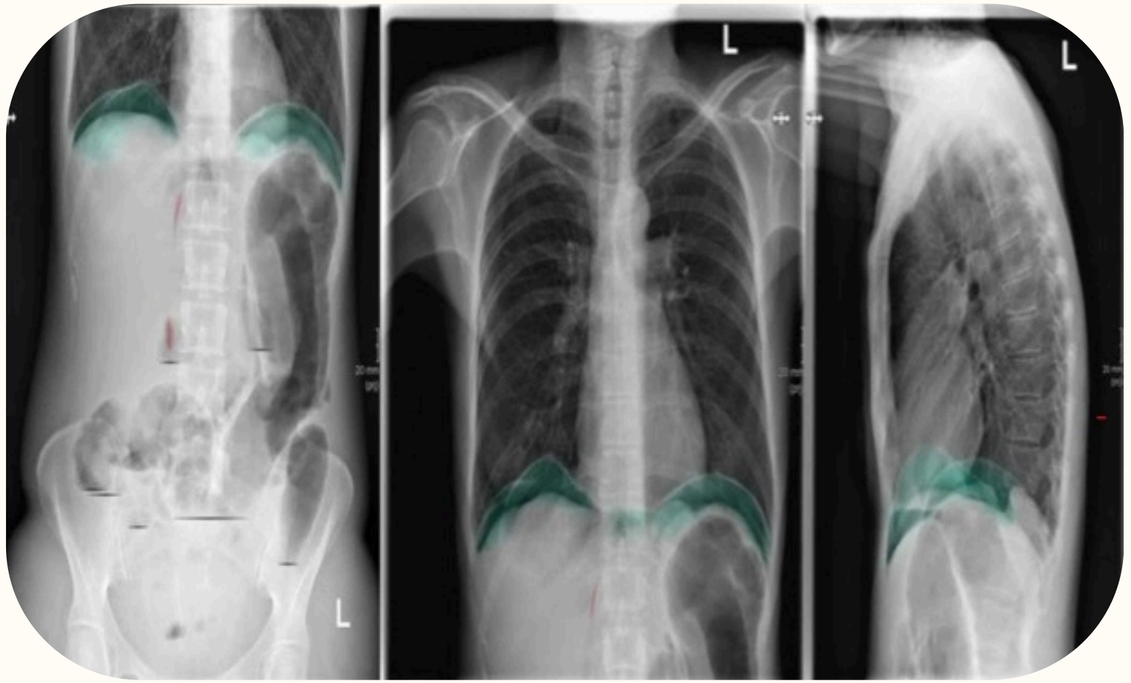
Important considerations:

X-rays have a number of limitations.

- Variable sensitivity (50–65%)
- Cannot reliably identify the site of obstruction, underlying etiology or extent of complications.
- Do not influence the management of acute bowel obstruction to the same extent as CT abdomen.

Findings: X-ray abdomen (AP erect view) and chest (PA and lateral views):

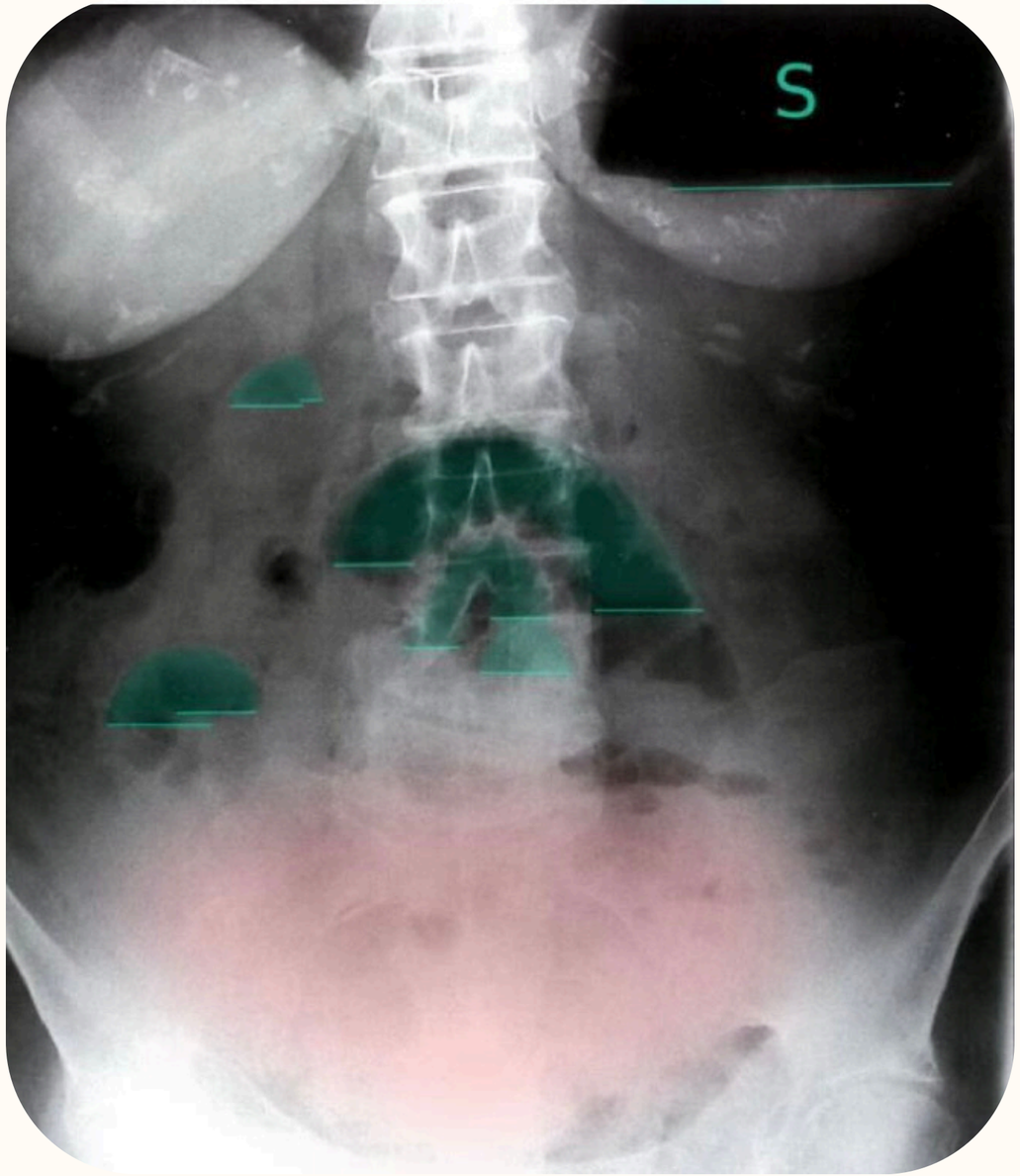
- **Multiple air-fluid levels** are seen in the colon and small bowel examples indicated by black lines)
- **Pneumoperitoneum** - X-ray chest (PA view) Free intraperitoneal gas(green overlay) is visible under both the right and left hemidiaphragms.



Air-fluid level

- Visible on upright or decubitus views
- Common criteria for diagnosing SBO:

1. > 3 air-fluid levels
2. Air-fluid level diameter > 2.5 cm
3. Air-fluid levels of different heights visible within the same bowel loop



X-ray abdomen (AP view, erect position) Multiple air-fluid levels (green overlay) are visible in the mid-abdomen. The opaque appearance of the pelvis (red overlay) is due to fluid-filled loops of small bowel. A lack of distal gas and air-fluid levels at different heights in the same bowel loop (differential air-fluid levels) suggest obstruction.

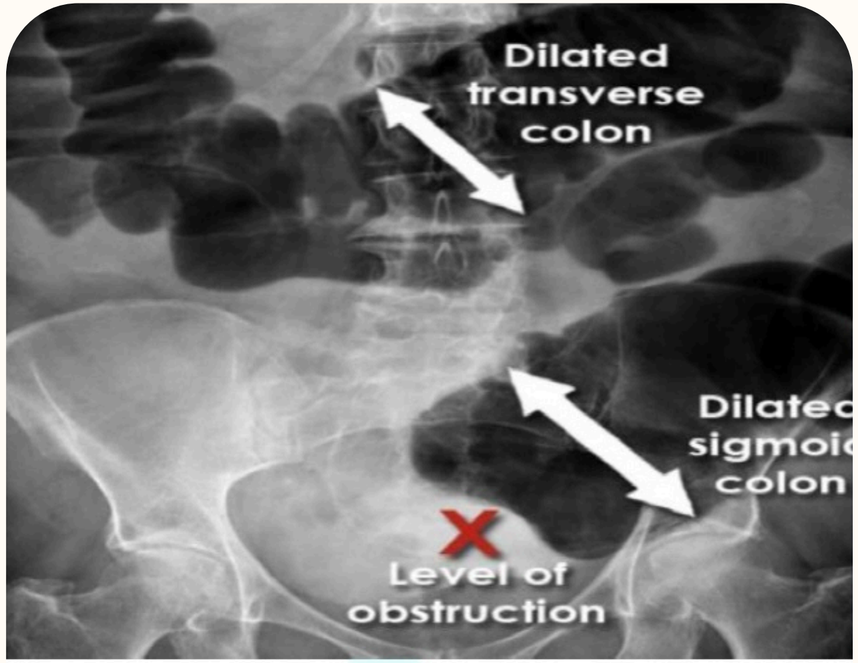
Small bowel dilation

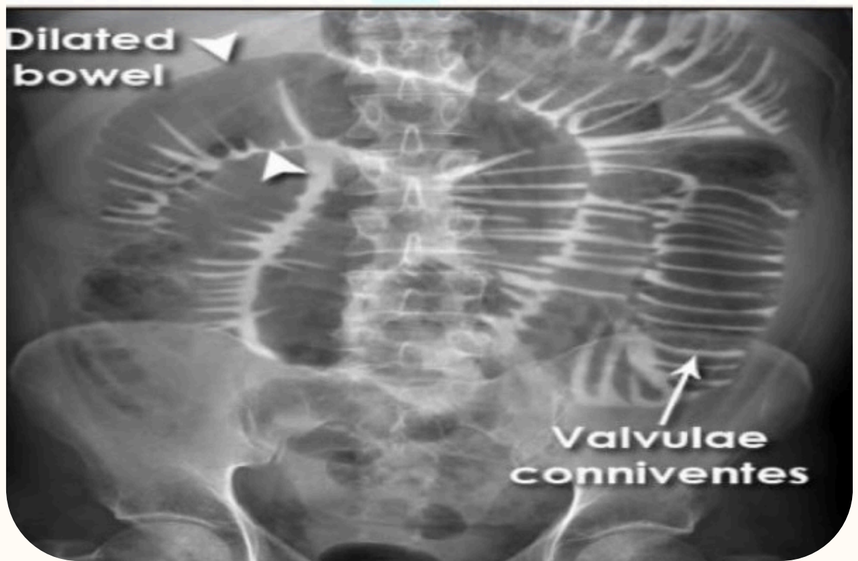
3-6-9 rule

– To help guide the identification of bowel dilatation on imaging .

– Transverse diameter greater than the following indicates dilation:

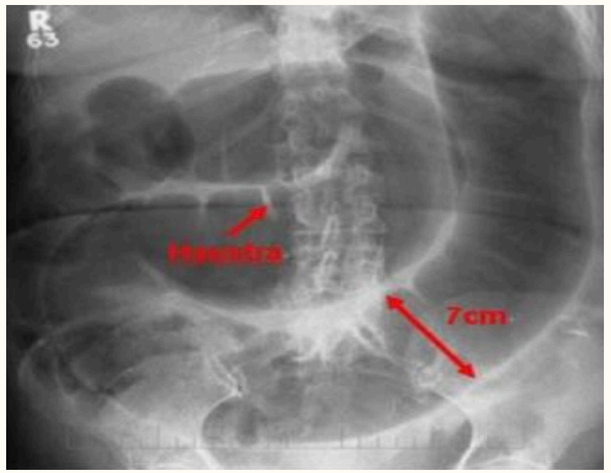
- Small bowel > 3 cm
- Large bowel > 6 cm
- Cecum > 9 cm
- **SBO**: Dilated loops are predominantly central.
- **LBO**: Dilated loops are predominantly peripheral.

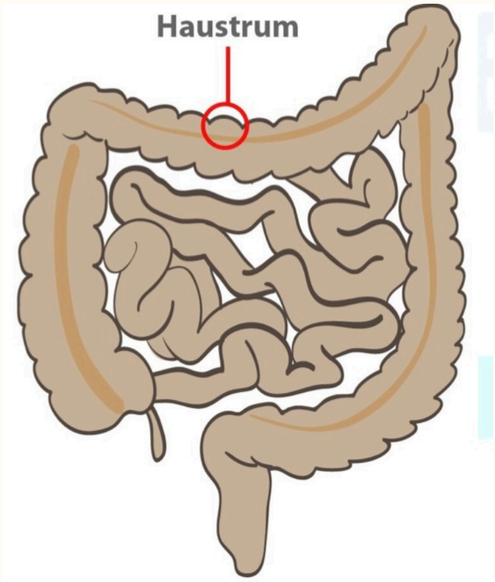




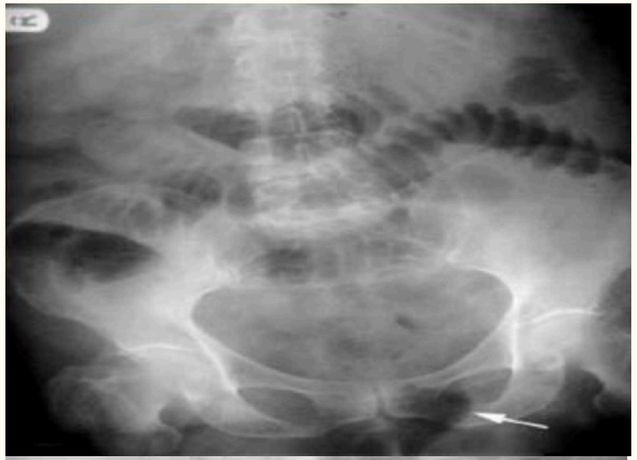
How to differentiate between the jejunum, ileum and the colon?

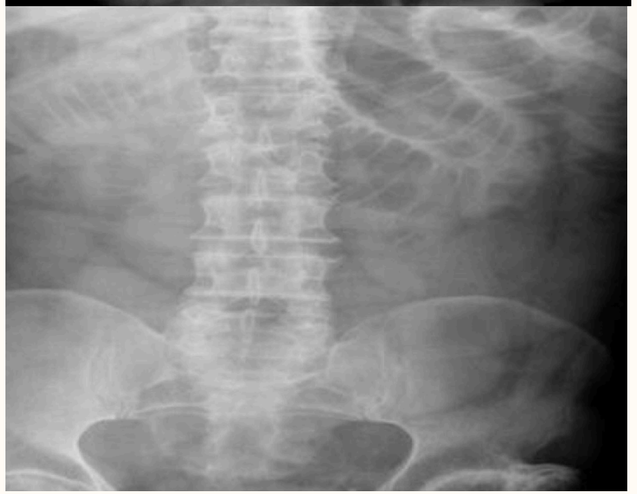
Periphral ditenstion presence of haustration



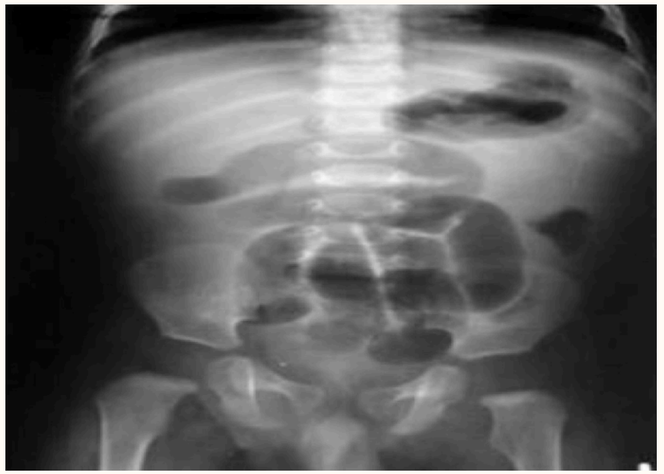


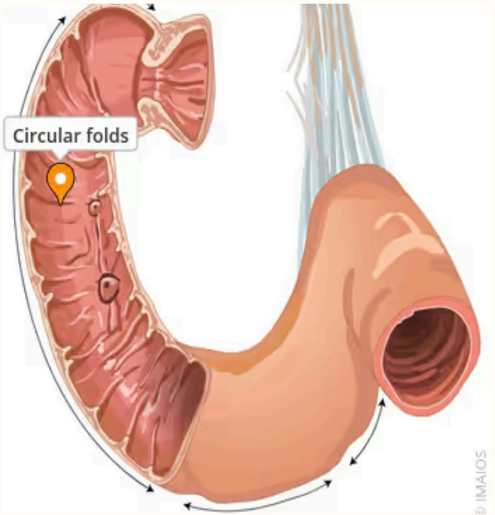
The jejunum is characterized by the presence of valvulae conniventes as result of plicea circularis





The ileum is characterized by structureless tube





CT abdomen and pelvis

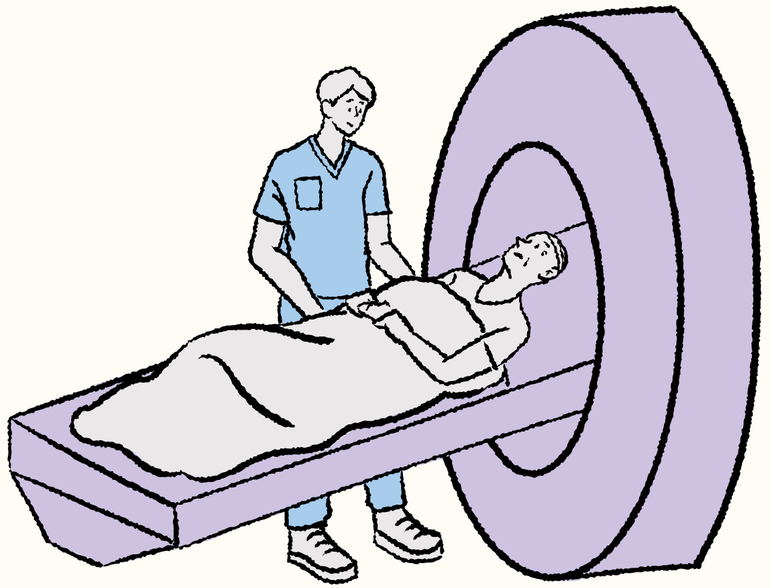
(golden standard)

Indications :

- **With IV contrast:** most appropriate initial test in hemodynamically stable patients with acute bowel obstruction.

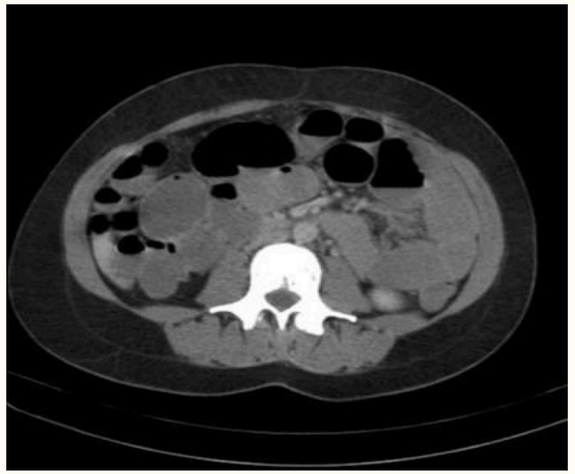
- **With water-soluble oral contrast:** Consider in patients with subacute bowel obstruction and no evidence of complications.

- **Without contrast:** for patients with a contrast allergy.



Findings:

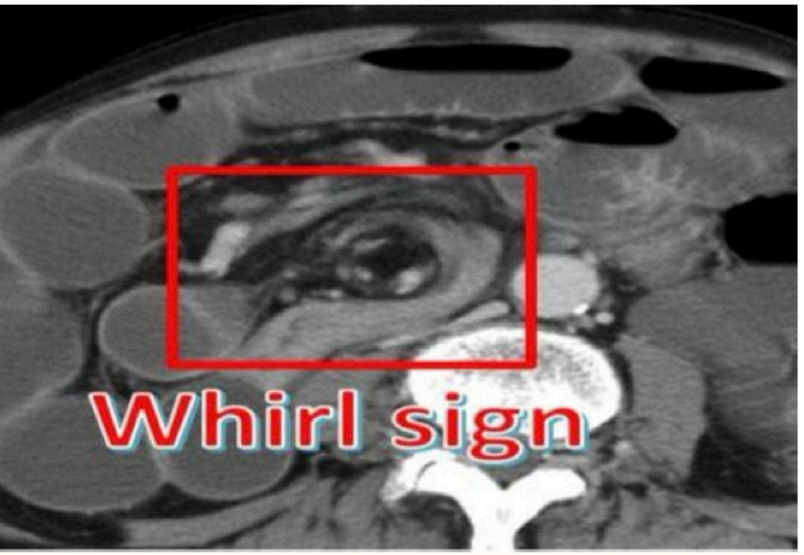
- A distinct transition point where bowel caliber changes from normal to abnormal.
- Dilated bowel loops proximal to the transition point
  - small bowel >3.0 cm
  - large bowel >5 cm
- A small bowel size threshold of 2.5 cm increases sensitivity for partial small bowel obstruction.
- Collapsed or normal caliber bowel distal to the transitional point.
- Bowel wall thickening.
- Surrounding mesenteric fat stranding indicating inflammation
- Twisting of the mesentery in cases of volvulus



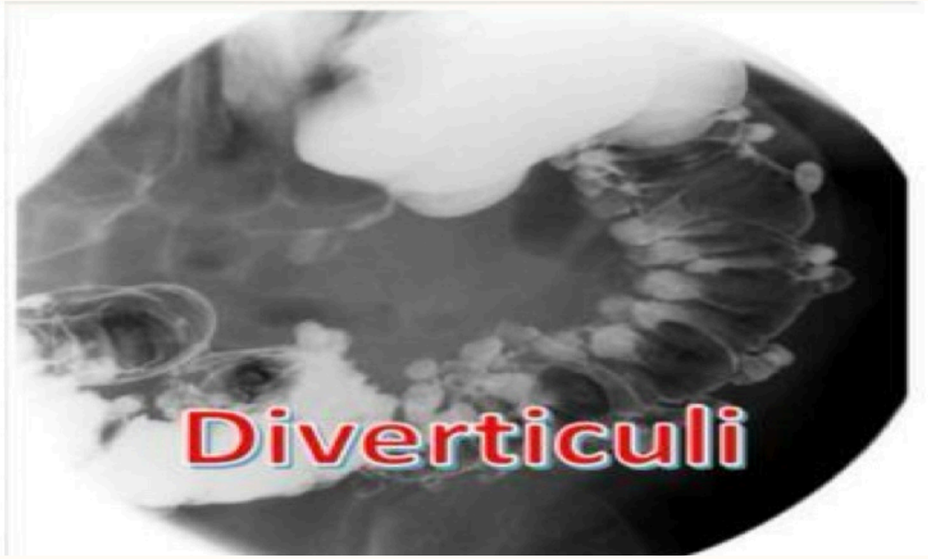
- If bowel obstruction is identified it is important to assess for complications and assess the viability of the involved bowel:

1. pneumoperitoneum indicating perforation
2. bowel strangulation
3. ischemia

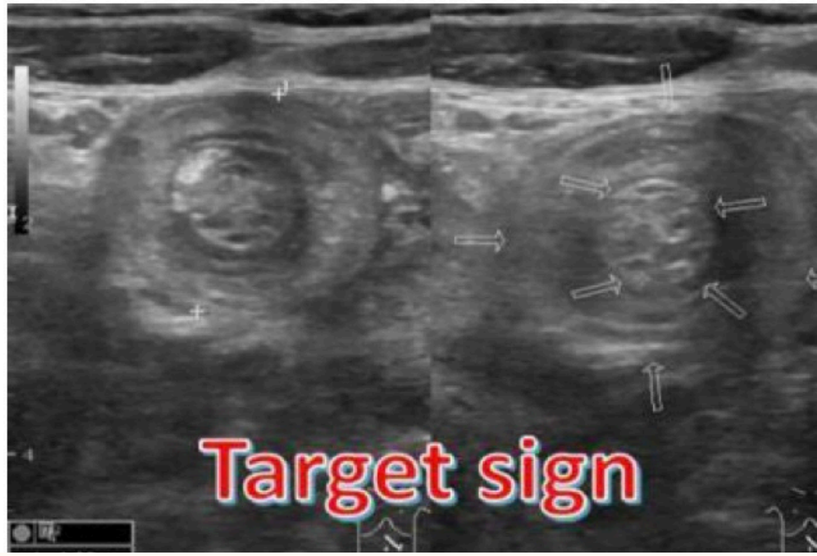
Sometimes the imaging can give us a clue to the underlying cause of the obstruction, examples:



Volvulus



Diverticular disease



may indicate Intussusception

Abdominal ultrasound

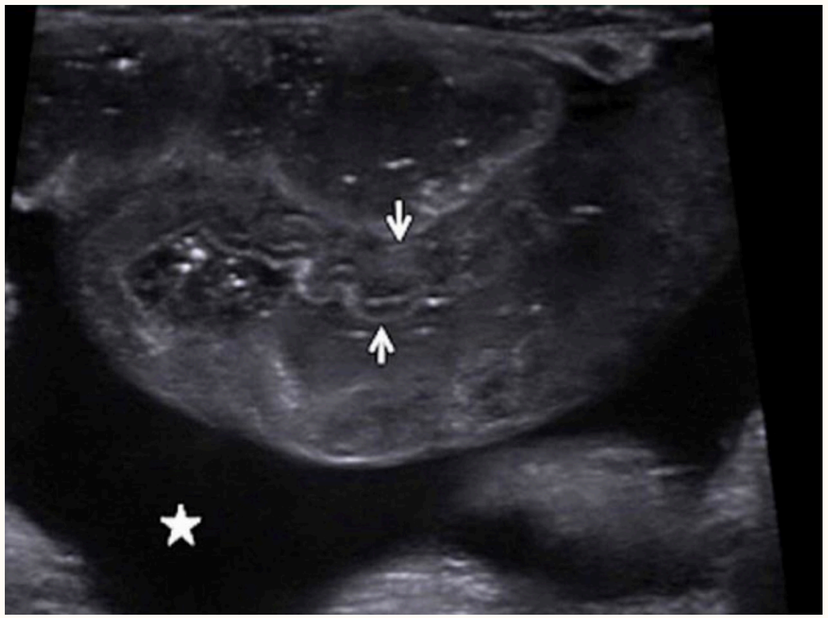
Indication:

Hemodynamically unstable patients

(may be preferred over abdominal x-ray)

Findings:

- Multiple fluid-filled dilated bowel loops > 2.5 cm in diameter adjacent to collapsed bowel loops (most specific finding)
- Thickened bowel wall



Barium enema vs contrast (water-soluble) enema

Indication:

- Suspected distal LBO if CT is unavailable.

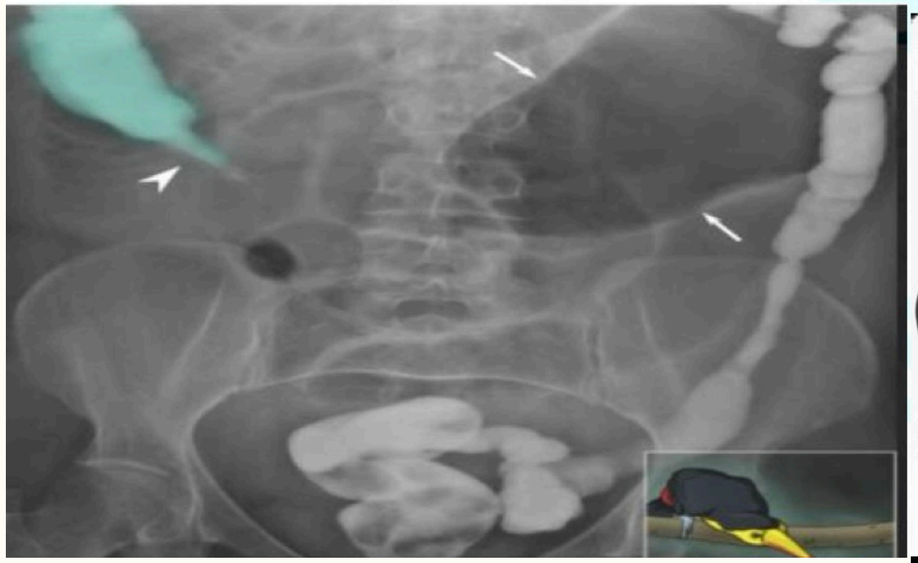
Findings:

- Tapering of the bowel lumen at the site of obstruction
- Complete bowel obstruction: contrast not visible beyond the obstruction.
- Partial bowel obstruction: small amount of contrast visible beyond the obstruction

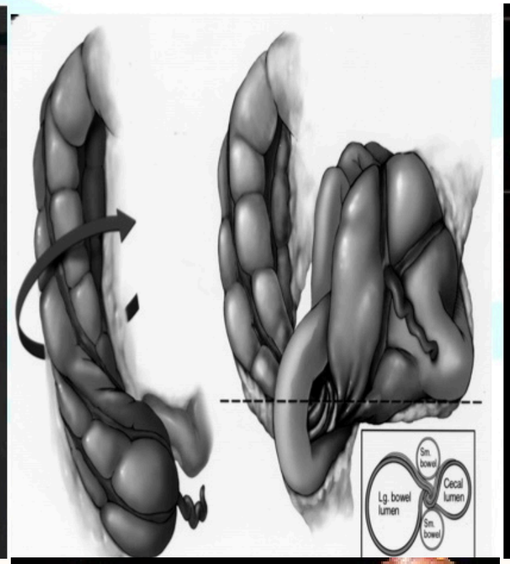
Notes:

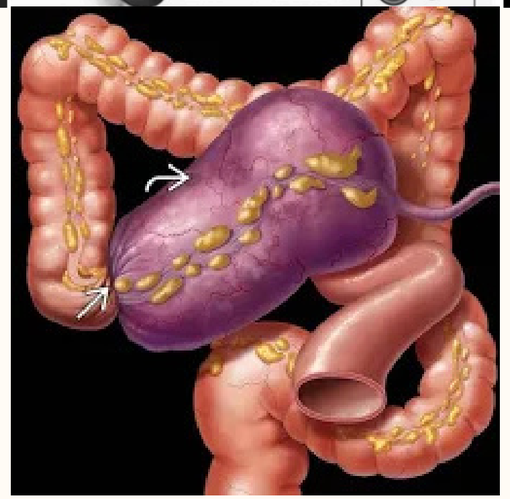
1. Contrast enema helps differentiate complete bowel obstruction from partial bowel obstruction.
2. Barium enema is contraindicated if bowel perforation is suspected (water-soluble contrast enema can be used instead).

Bird peaks sign



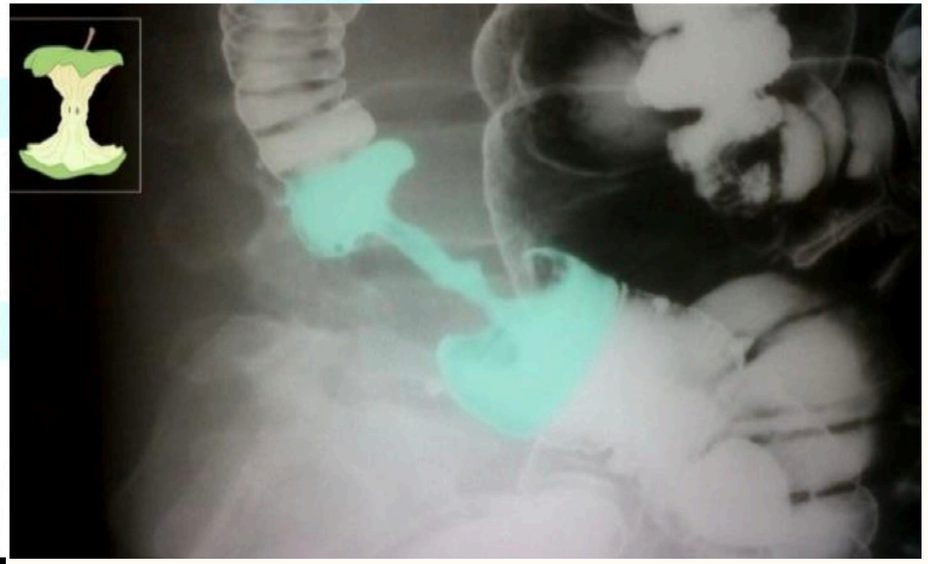
As a result of axial torsion of the cecum, the barium column tapers (green overlay) until it eventually terminates at a point of complete obstruction (arrowhead). Afeatureless loop of gas-filled bowel in the left upper quadrant (white arrows) may represent the dilated cecum proximal to the point of obstruction.





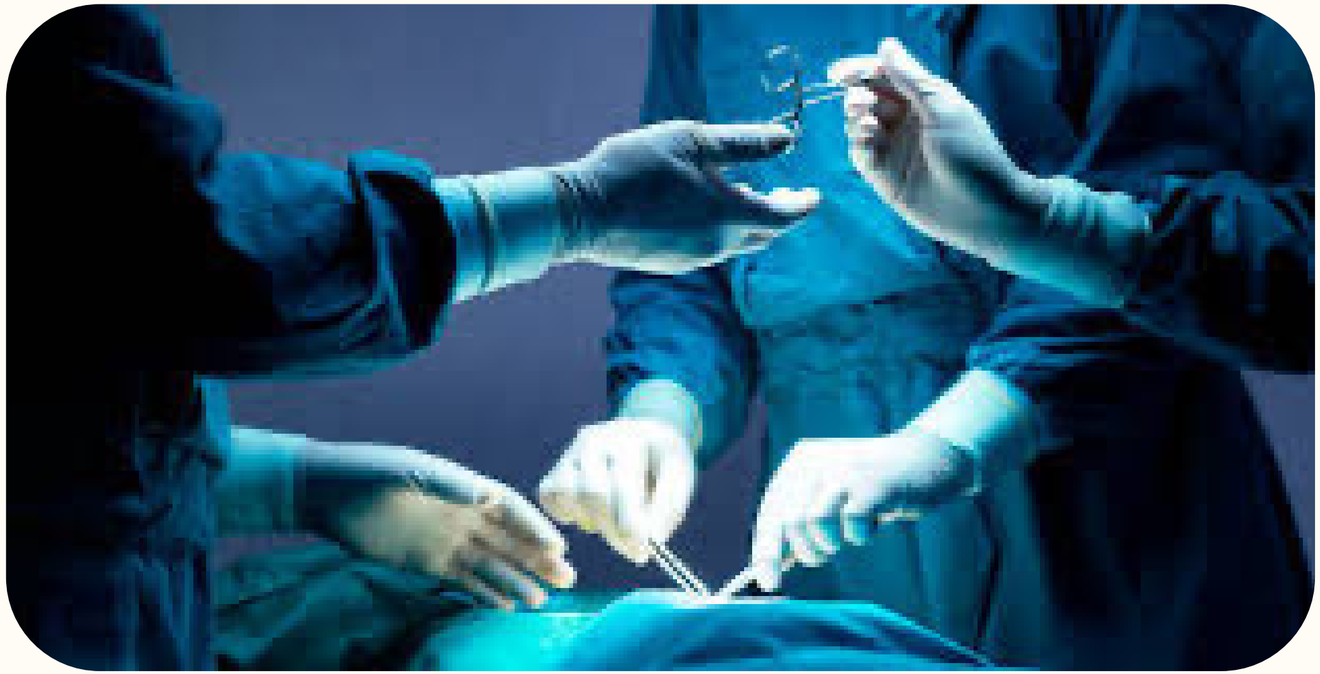
cecal volvulus

Apple core sign



(Also called napkin ring sign) is seen in the distal descending colon.
It is the result of annular constriction by a colorectal carcinoma.

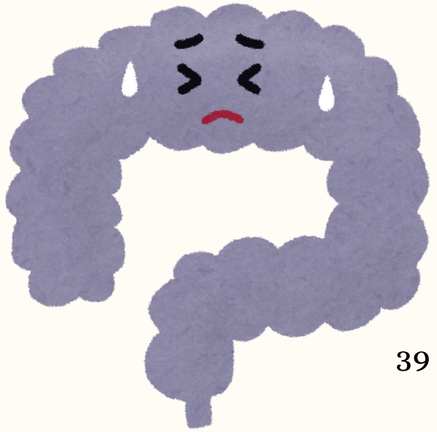
Management



MANAGEMENT

Bowel obstruction is an emergrency and should be detected and managed early to minimize the risk of bowel perfortion and strangulation ,and the subsequent development of sepsis

the initial management of bowel obstruction is similar to that of undifferentiated acute abdomen



1.Consevative treatment

A) NPO

B) IV fluid

C) NG tube , decompress the bowel (prevent strangulation) & to avoid inhalation & respiratory complications .

D)Antibiotics for complications

E) Analgesic may in need

F) Continuous observation and follow up.

2. surgical operation

Indication for surgery:

A. Complicated bowel obstruction (i.e., signs of ischemia, perforation, or clinical deterioration)

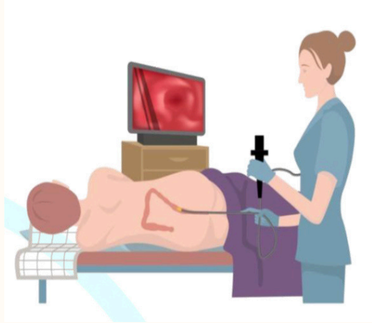
B. Closed-loop bowel obstruction (hernia , volvulus)

C. Failure of nonoperative management (i.e., no improvement after 3 days of NOM; clinical deterioration/development of complications during NOM)

D. Underlying etiology necessitates surgical intervention (e.g., surgery for inguinal hernia ;enterolithotomy for gall stone ileus)

-Surgical interference according to the underlying cause : Adhesion,tumor,hernia and volvulus .

3.Endoscopic intervention



Endoscopic intervention can be considered for bowel obstruction with no signs of strangulation or perforation

-indication

Inoperable malignant bowel obstruction: consider placement of stents and decompression tubes

Procedure : exploratory lapratomy

1.Operative decompression

2. Management of the obstruction (e.g., adhesiolysis, hernia reduction, cecopexy ,tumor resection)

3.Resection of gangrenous bowel with restoration of intestinal transit or creation of a stoma

Management of different causes:

Treatment of adhesive obstruction : adhesionlysis

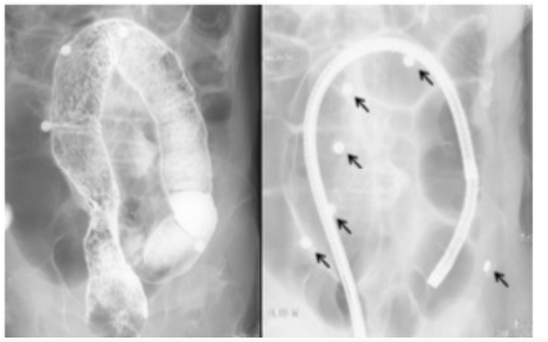
Treatment of volvulus:

Cecal volvulus is treated according to the viability of the cecum Viable cecum is reduced at the operation after being decompressed with a needle .A cecopexy (fixation of the cecum to the right iliac fossa) or cecostomy is then performed.

*Right hemicolectomy is performed for **non-viable cecum.**

Sigmoid volvulus is treated temporarily with untwisting by flexible sigmodoscopy or rigid sigmoidoscopy

Sigmoid volvuls managed by endoscopy



Treatment of malignancy

- Treated by resection & anastomosis (follows the colorectal cancer guidelines).

Thank you