

# INTESTINAL OBSTRUCTION

DEFINITION  
CLASSIFICATION  
PATHOLOGY

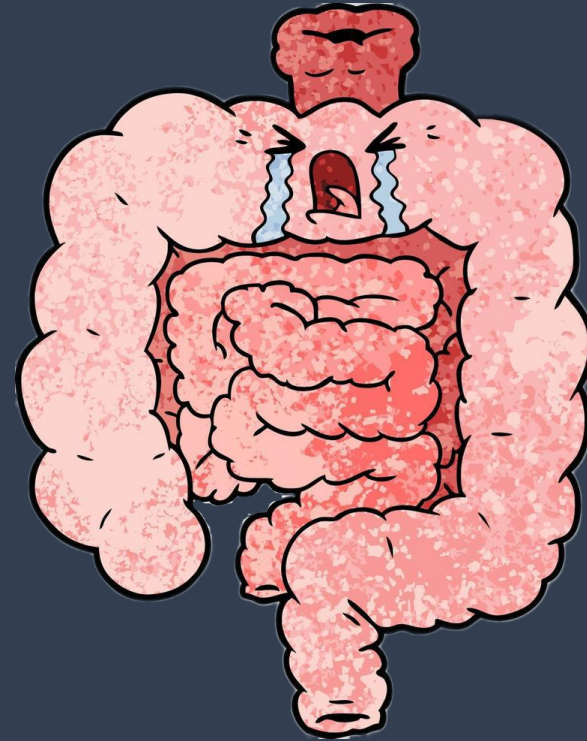
CAUSES &  
RISK FACTORS

CLINICAL  
PRESENTATION

COMPLICATIONS

INVESTIGATION

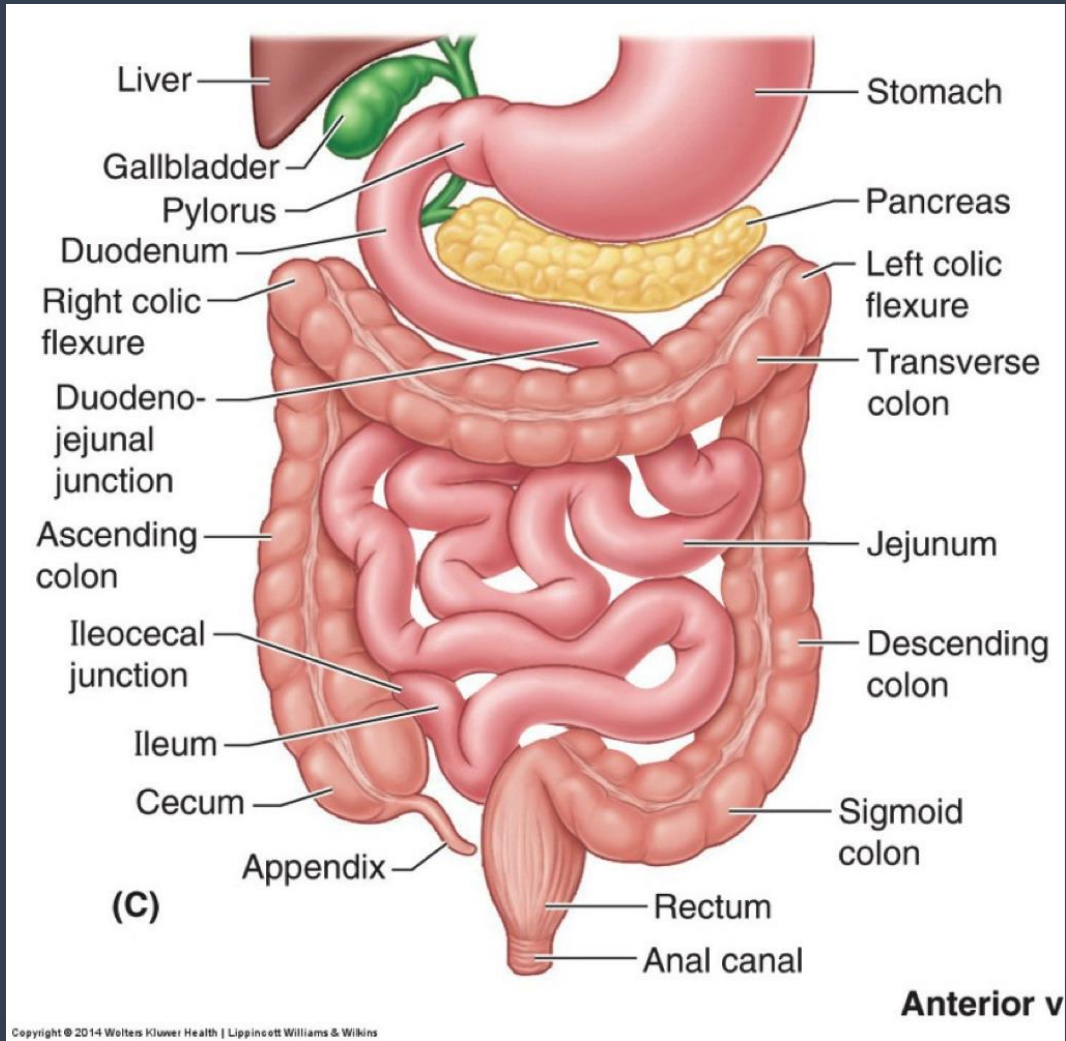
TREATMENT



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DEFINITION  
CLASSIFICATION  
PATHOLOGY

# QUICK ANATOMY:



# DEFINITION OF INTESTINAL OBSTRUCTION:

- a restriction to the normal passage of intestinal contents.
- which part of the intestine?!  
any part of the intestine, but small intestine is more common to be obstructed.
- the contents?  
Fluids, food, gas...

# CLASSIFICATION:

## 1. INTESTINAL MOVEMENT:

**Dynamic:** mechanical

**Adynamic:** functional, paralysis. Example: paralytic ileus.

## 2. SPEED OF ONSET:

**Acute:** rapid onset. Usually affect the small intestine.

Most common: adhesions.

**Chronic:** the symptoms are insidious and slowly progressive.

Most common: carcinoma of large bowel.

**acute on chronic:** chronic obstruction may develop acute symptoms as the obstruction suddenly becomes complete.

Example: when a narrowed lumen becomes totally occluded by inspissated bowel contents.



## 3. SITE:

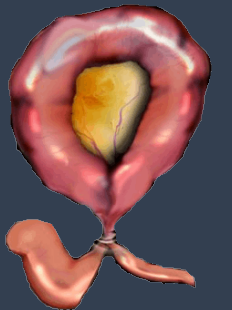
**High** (small intestine), **low** (large intestine)

## 4. NATURE:

**Simple:** without damage to its blood supply

**Strangulating:** blood supply of the involved segment of intestine is cut off. E.g: strangulated hernia, volvulus, intussusception or when a loop of intestine is occluded by a band.

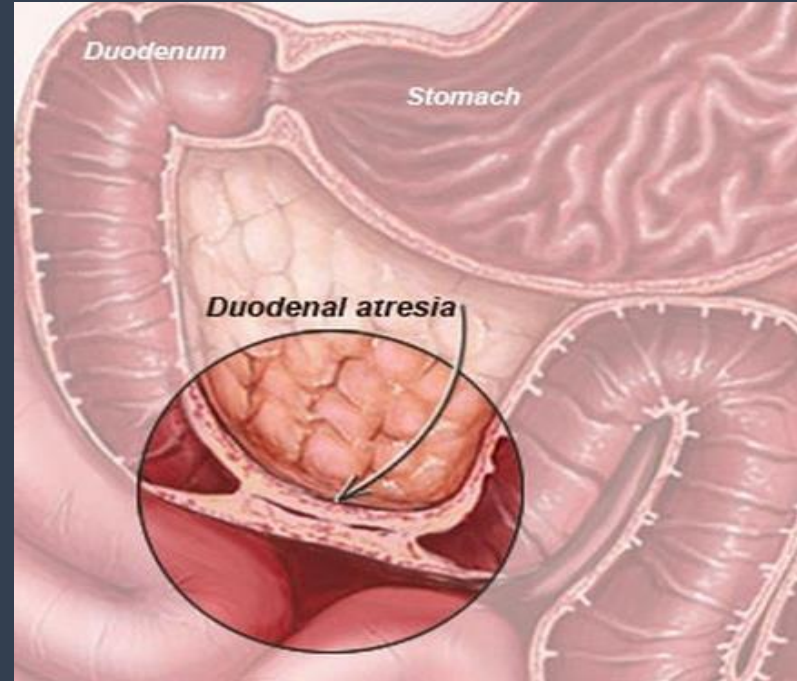
GANGRENE...





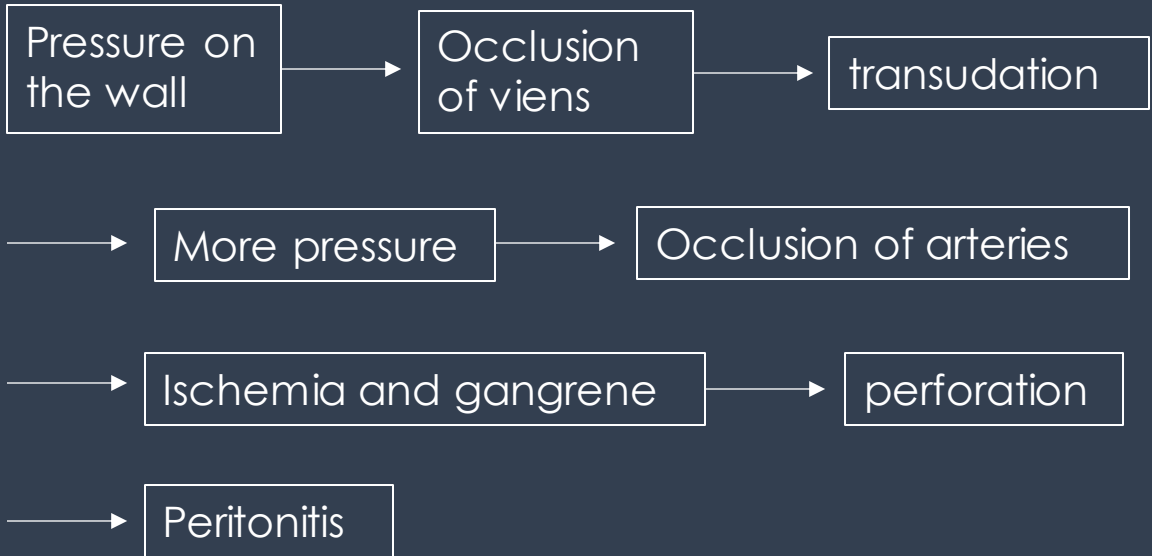
## 5. AETIOLOGY:

- In the lumen: faecal impaction, gallstone 'ileus', food bolus, parasites (e.g. ascaris worms in small bowel), intussusception.
- In the wall: congenital atresia, Crohn's disease, tumors, diverticulitis of the colon, carcinoma of the colon.
- Outside the wall: strangulated hernia (external or internal), volvulus and obstruction due to adhesions or bands.

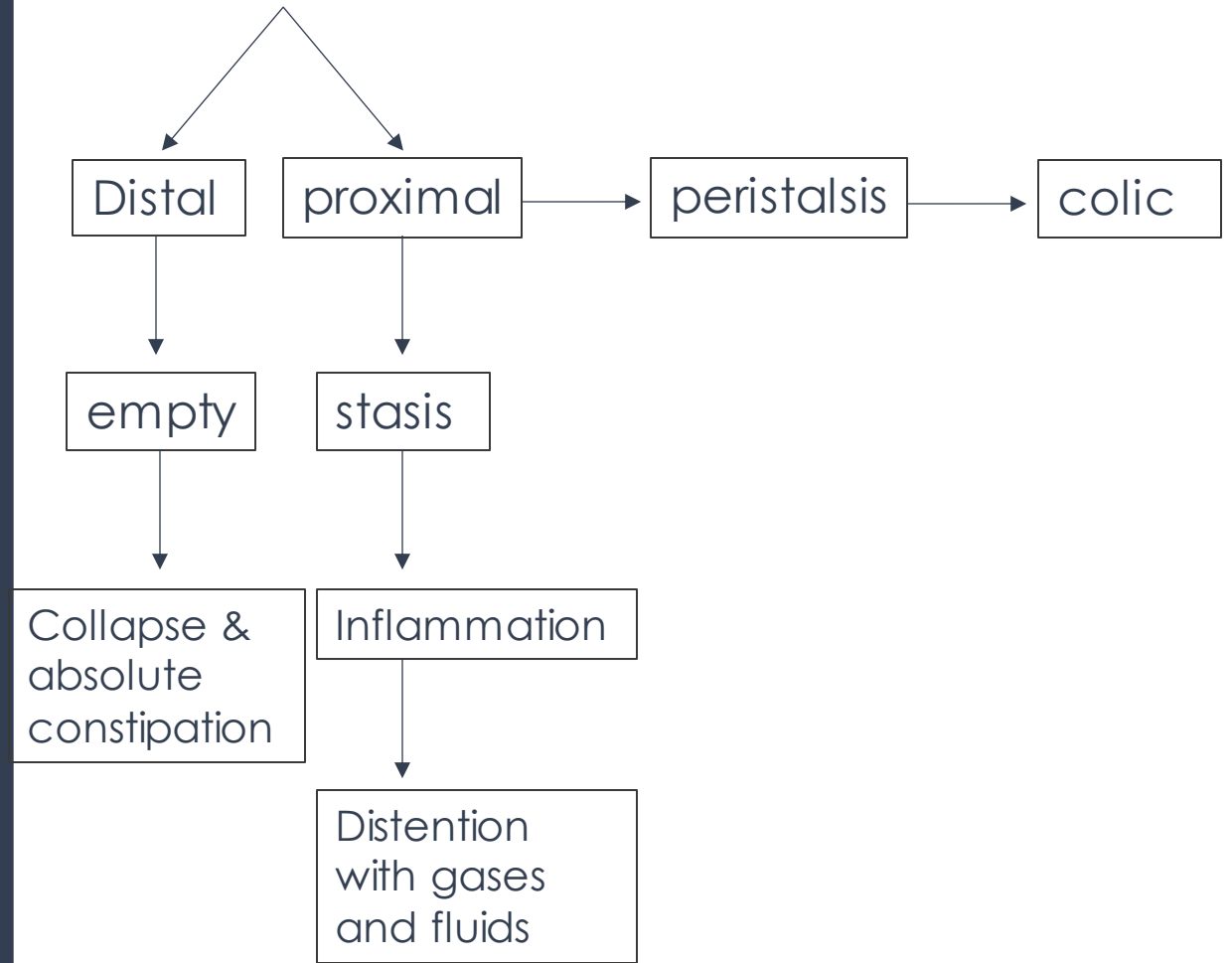


# PATHOLOGY:

strangulation:



## simple occlusion



CAUSES &  
RISK FACTORS



## Summary box 71.1

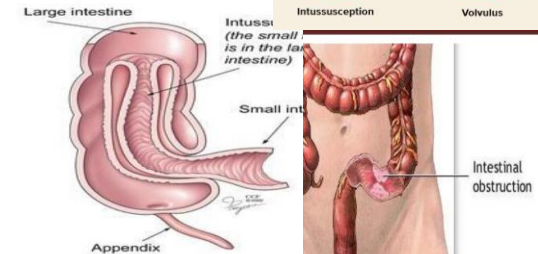
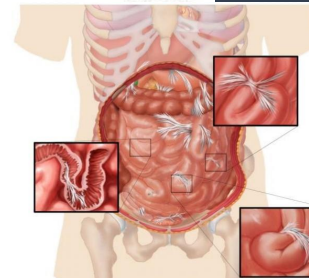
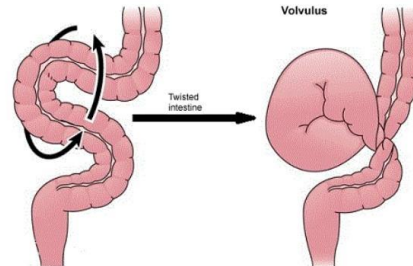
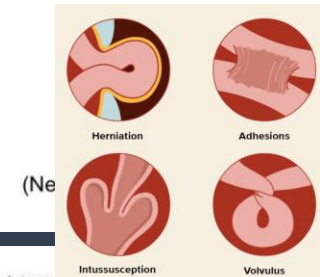
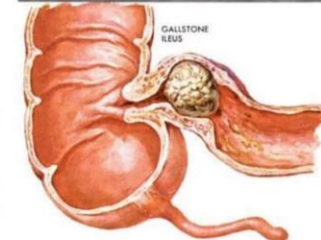
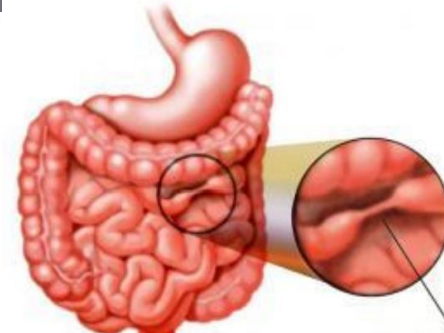
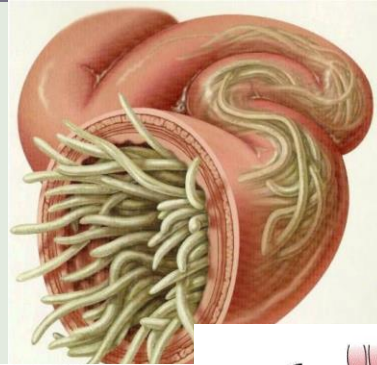
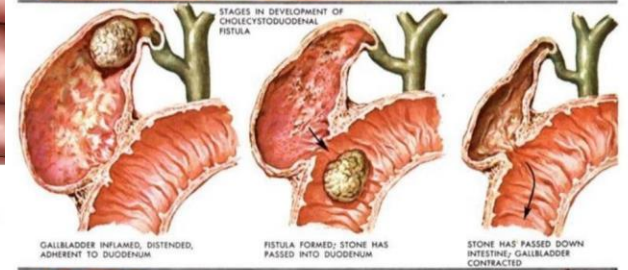
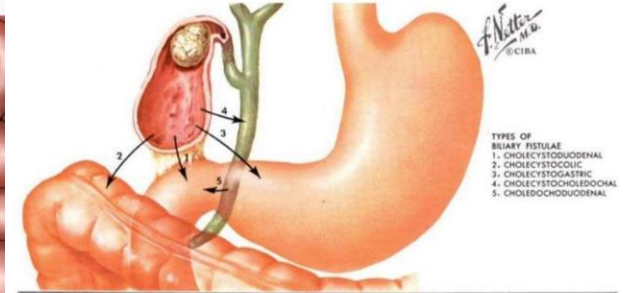
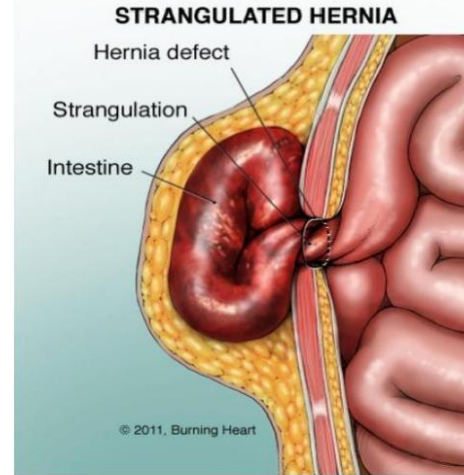
### Causes of intestinal obstruction

#### Dynamic

- Intraluminal
  - Faecal impaction
  - Foreign bodies
  - Bezoars
  - Gallstones
- Intramural
  - Stricture
  - Malignancy
  - Intussusception
  - Volvulus
- Extramural
  - Bands/adhesions
  - Hernia

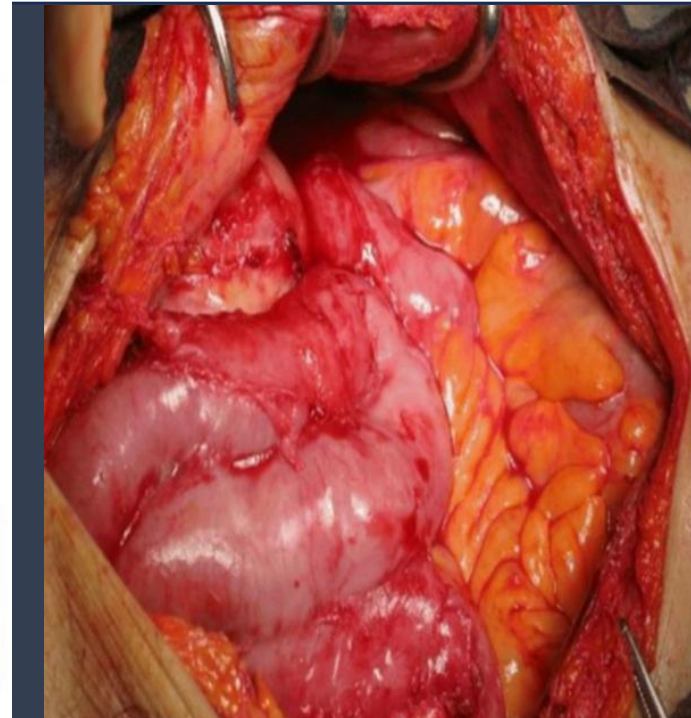
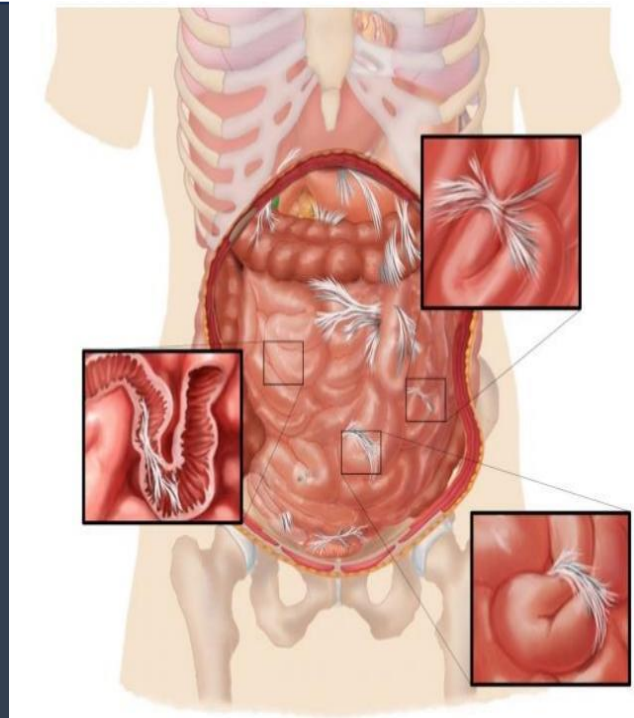
#### Adynamic

- Paralytic ileus
- Pseudo-obstruction

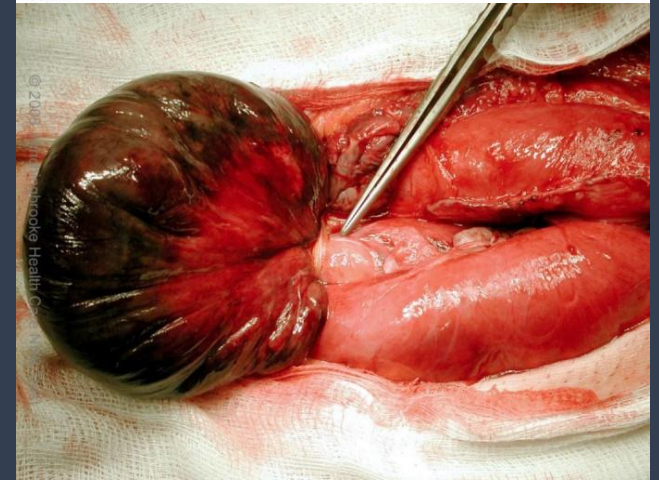
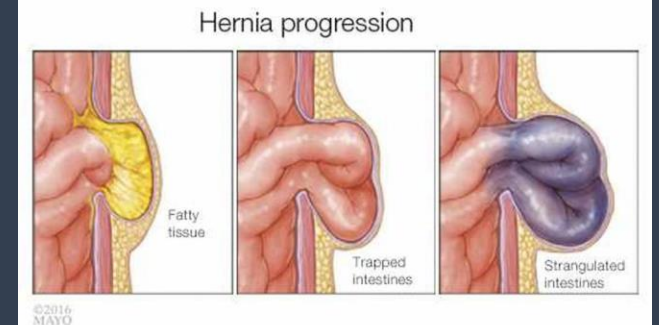
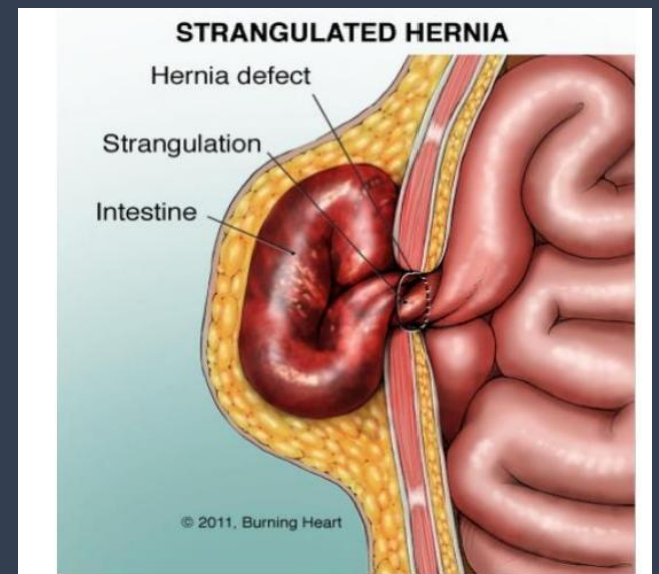




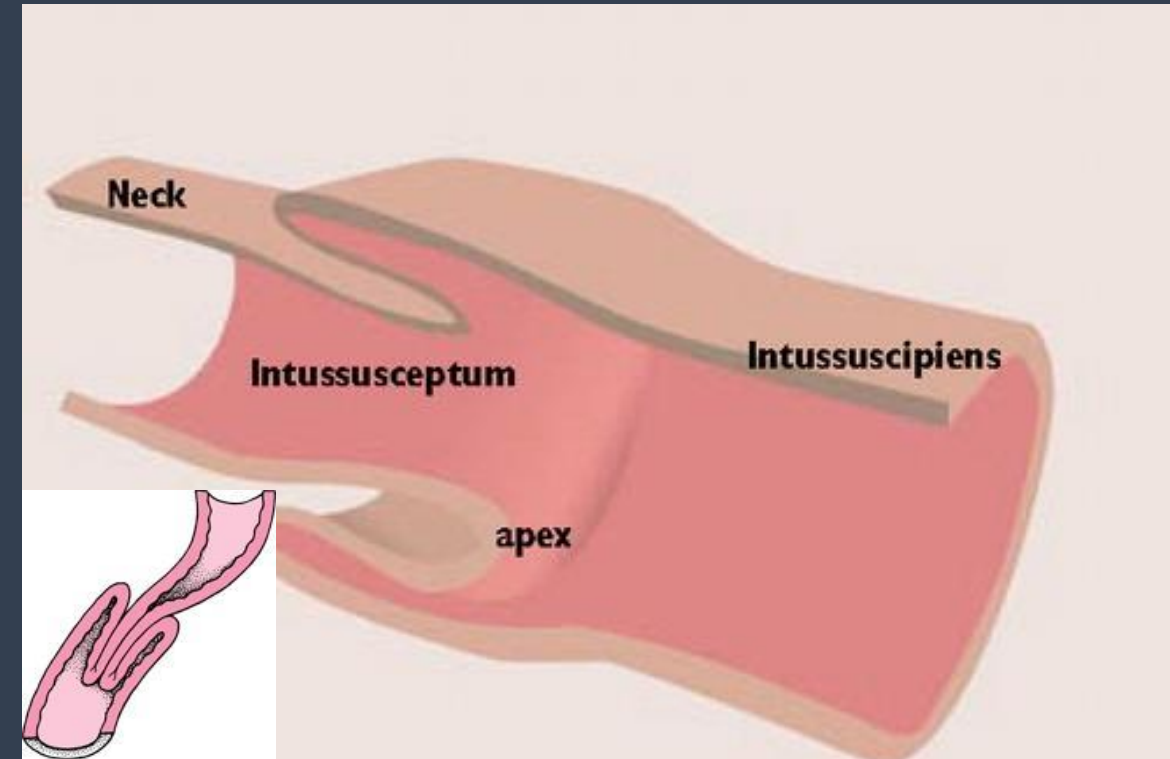
- **Adhesions** the most common cause of SBO in adults, typically due to injury such as prior surgical procedures (gynecological operation / appendectomy) , infection (i.e., peritonitis) or radiation damage.
- Adhesions start to form within hours of abdominal surgery .any source of peritoneal irritation results in local fibrin production , which produces adhesions between apposed surfaces.



- **Obstructed and strangulated hernia** is the commonest cause for SBO in children and the 2<sup>nd</sup> common cause in adults , occurs when intestinal loops protrude through any weakness or defect in the wall of the peritoneal cavity (Inguinal, femoral, umbilicus and sites of surgical scarring ).
- This might cause pressure at the neck of the herniated loops and result in venous drainage impairment.
- Over time, if pressure increases , this might lead to venous and arterial compromise and eventually infarction ( strangulation).



- **Intussusception** Is derived from the Latin word intus (within), it occurs when one segment of the gastrointestinal tract (intussusceptum) telescopes into the lumen of a distal segment of the gastrointestinal tract ( intussusciens).
- Iliocolic more common in children
- Ileocolic: an ileoileal intussusception that extends through the ileocaecal valve into the colon ;this the most common sort (75%)
- In adults, colocolic intussusception is more common .
- It is the most common cause of intestinal obstruction in children <2 years.



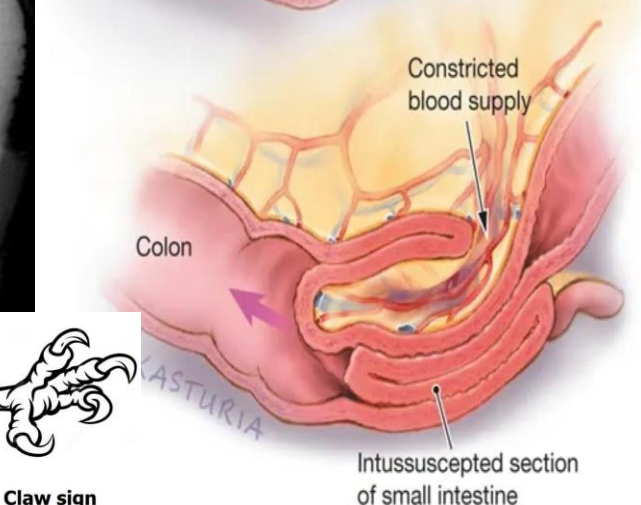
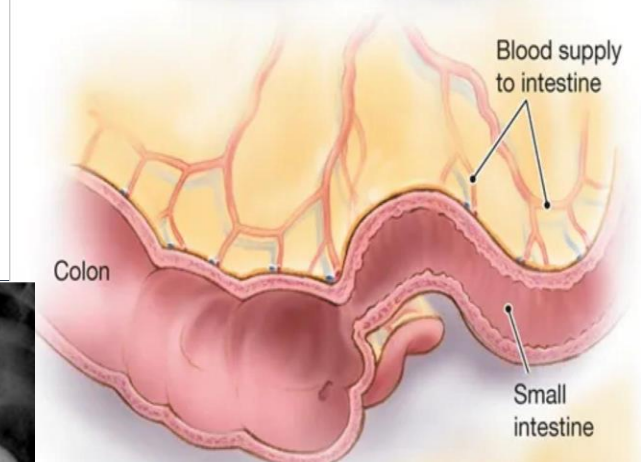
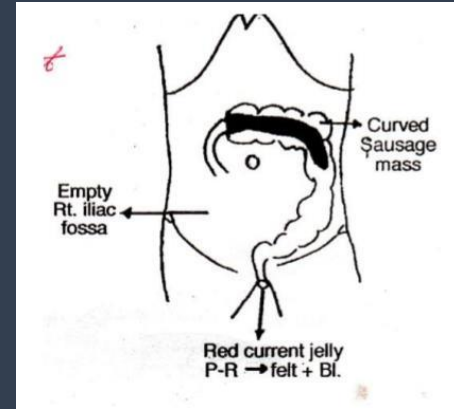
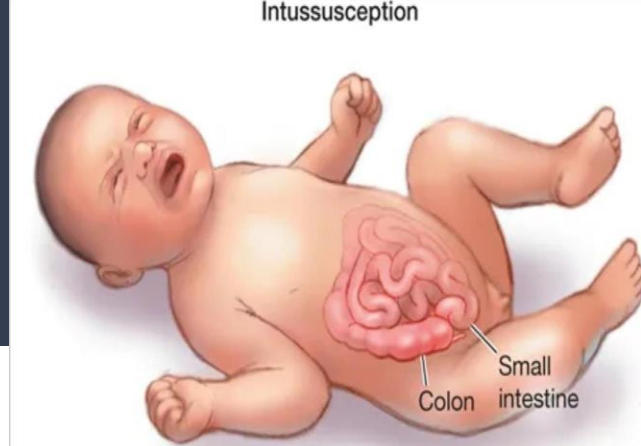
### Summary box 71.4

#### Intussusception

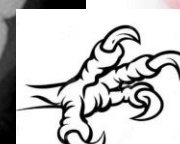
- Most common in children
- Adult cases are secondary to intestinal pathology, e.g. polyp, Meckel's diverticulum
- Ileocolic is the commonest variety
- Can lead to an ischaemic segment
- Radiological reduction is indicated in most paediatric cases
- Adults require surgery



- Children present with red currant jelly stool ;congestion of intussusceptum will lead to ruptured venules and excessive mucous production.
- Any infant having colicky abdominal pain with passage of blood stained mucous per rectum should be suspected to have **intussusception**.

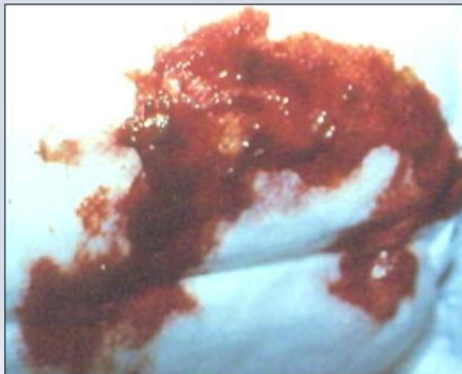


**COIL SPRING SIGN**



Claw sign

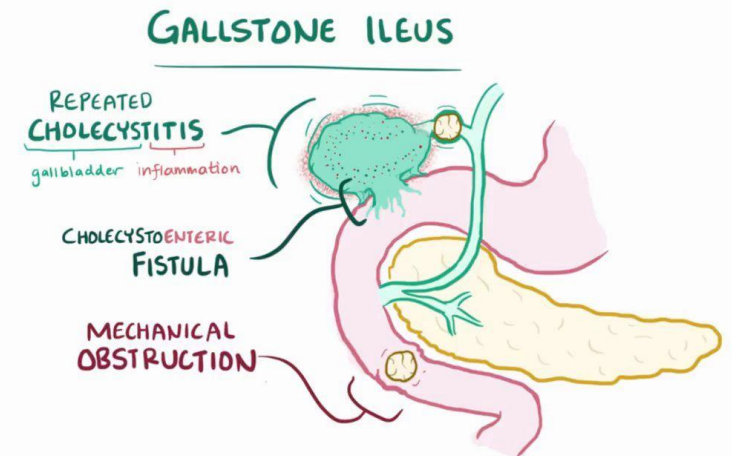
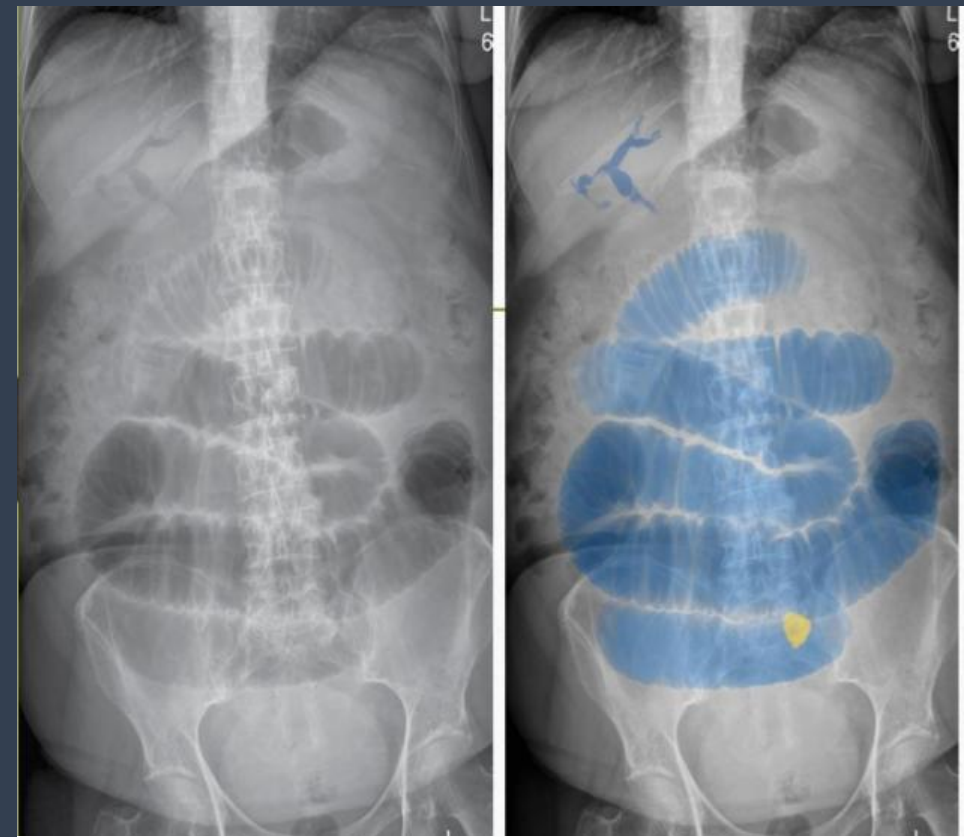
“Currant jelly” stools: mixture of mucus, sloughed mucosa, & blood



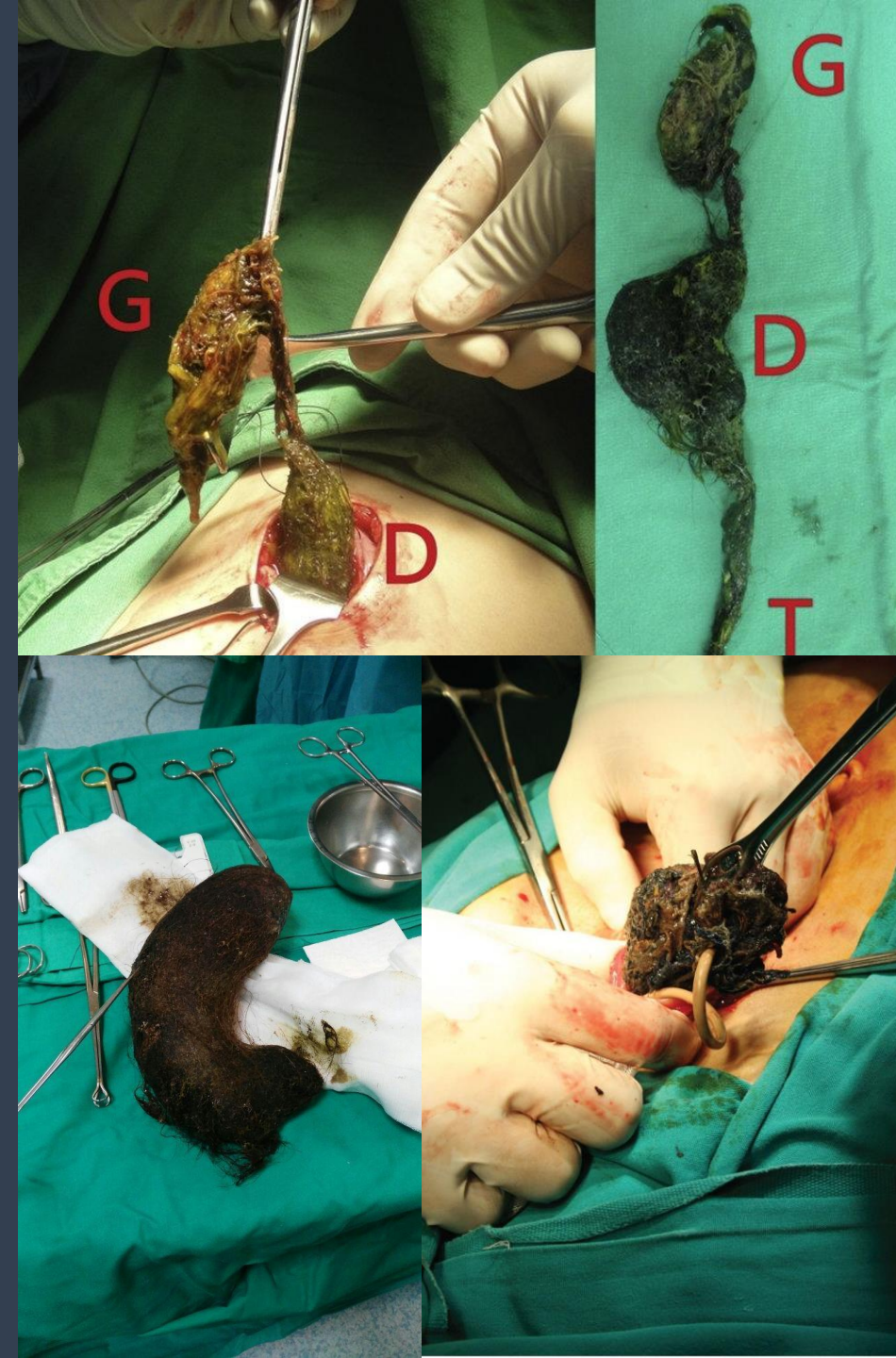


# Bolus obstruction gallstones

- Gallstone ileus secondary to erosion of a large gallstone directly through the gall bladder into the duodenum.
- Classically, there is impaction about 60 cm proximal to the ileocecal valve.
- The characteristic radiological sign of gallstone ileus is Rigler's triad, comprising: small bowel obstruction, pneumobilia and an atypical mineral shadow on radiographs of the abdomen .
- Elderly patient mostly.
- Treatment is surgery.

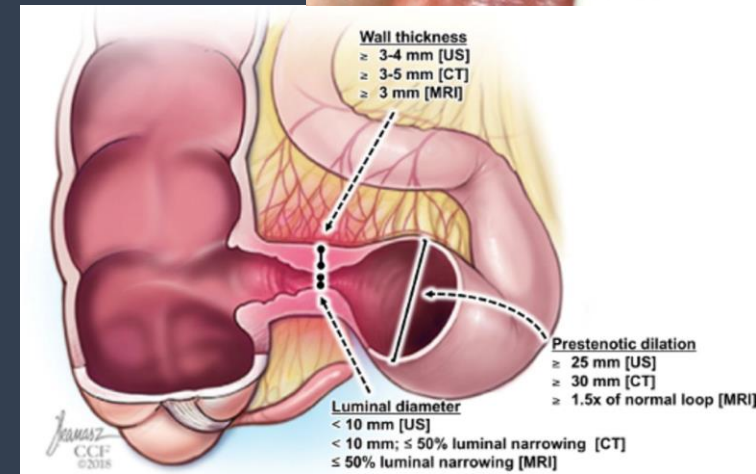
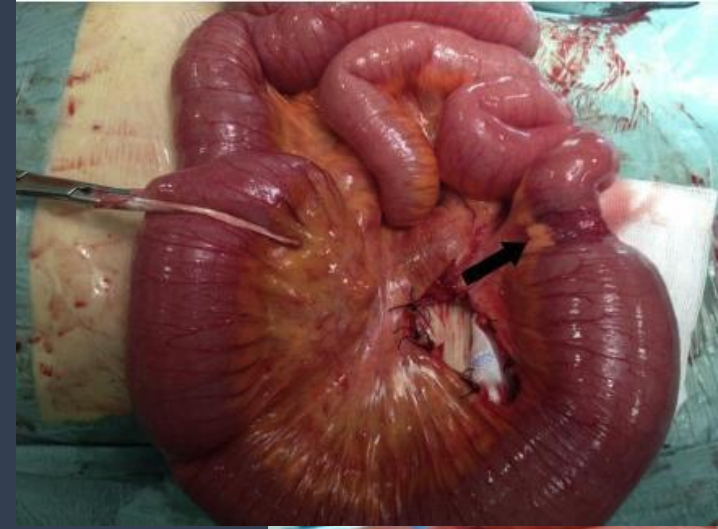


- **Bezoar** is a ball of swallowed foreign material most often composed of hair or fiber.
- Chewing on or eating hair or fuzzy materials (or indigestible materials such as plastic bags) can lead to the formation of a bezoar. The rate is very low. The risk is greater among people with intellectual disability or emotionally disturbed children. Generally, bezoars are mostly seen in females aged 10 to 19
- Phytobezoars (most common) can occur in adult patients as a postoperative complication after gastric bypass or partial gastrectomy, especially when partial gastrectomy is accompanied by vagotomy.
- Trichobezoars most commonly occur in young females with psychiatric disorders who chew and swallow their own hair.
- Lactobezoars can occur in milk-fed infants, composed of milk proteins





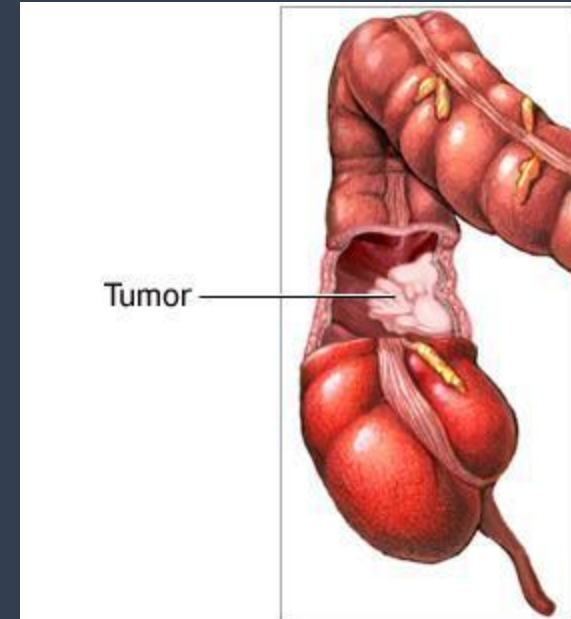
- Enteric stricture, is an area of narrowing in the intestines. After repeated cycles of continued inflammation and healing in the lining of the intestine, scar tissue can replace the normal cells. As a result, this scar tissue may result in narrowing of the gastrointestinal tract. Occasionally, this narrowing can get so severe that it can cause bowel obstruction.
- The most common locations for these strictures are the ileum and ileocecal valve, it can also be seen in the upper gastrointestinal tract, colon, rectum, or anus.
- Small bowel strictures usually occur secondary to Crohn's disease.



# LARGE BOWEL OBSTRUCTIONS

## Colorectal cancer

- The most common cause of large bowel obstruction is an underlying colorectal malignancy.
- Approximately 40% of colorectal cancer presents as emergencies and large bowel obstruction is the most common presentation.
- 90% of cases are diagnosed in individuals 50 years of age and older .





# Volvulus:

twisting of a loop of bowel around its mesenteric axis which results in obstruction of loop and occlusion of the main vessels at the base of the involved mesentery.

Types :

- 1-Volvulus of sigmoid colon (the commonest)
- 2-Volvulus of caecum
- 3-Volvulus of small intestine
- 4-Volvulus of neonatorum
- 5-Volvulus of stomach



# Sigmoid Volvulus:

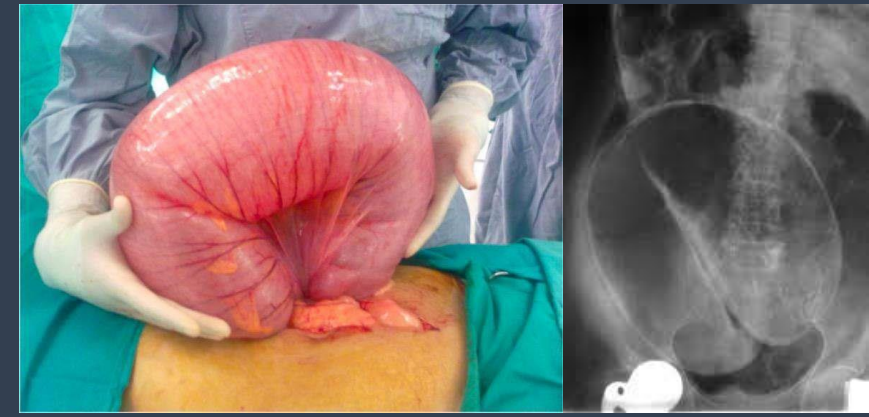
This occurs usually in elderly above 50 years and it is four times more common in men than in women.

The most important predisposing factors chronic constipation , too long sigmoid colon , narrow attachment of sigmoid mesocolon and adhesion between the apex of sigmoid and anterior abdominal wall

Occurs when the upper loop usually falls in front of the lower so that the twist is almost always anti clockwise direction >> closed loop obstruction which leading to :  
distension of colon and sigmoid with gas which gives coffee bean like appearance with its base point to left iliac fossa and rectum below collapsed.

The pressure inside the closed loop rises rapidly with sever pressure on the wall leads to strangulation and perforation follows with rapid peritonitis.

The risk increases with chronic constipation , too long sigmoid colon , narrow attachment of sigmoid mesocolon and adhesions between the apex of sigmoid colon and anterior abdominal wall .



# Caecal volvulus:

- Occurs in younger population.
- it usually associated with congenital malformations, the caecum and proximal ascending colon rotate beyond the right iliac fossa during development so that , instead of being fixed to right iliac fossa, it has persistent mesentery.
- The dilation in caecum gives “stack of coins“ appearance



# ADYNAMIC OBSTRUCTION

- ✓ paralysis of intestinal movements.

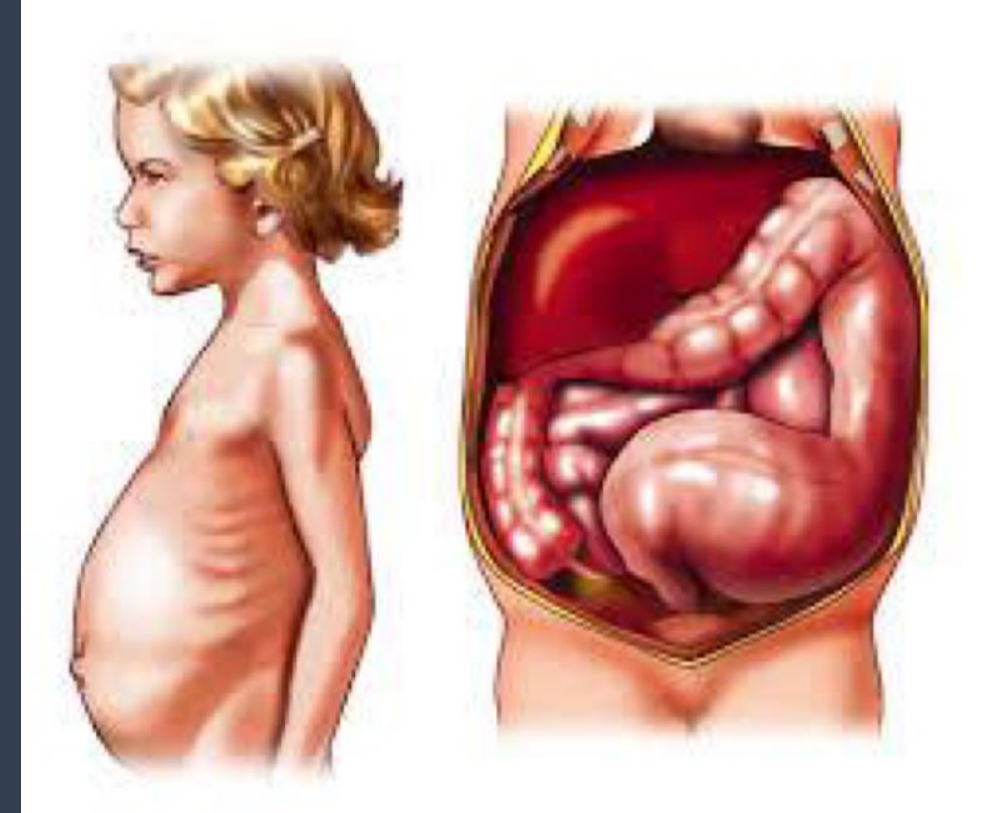
Paralytic ileus.

Pseudo-obstruction.

Acute mesenteric vascular occlusion.

## (1) Paralytic ileus

- loss of intestinal peristalsis & tone due to failure of **neuromuscular** transmission in the intestine.
- Causes:
  1. Surgical causes:
    - ✓ pre-operative: bad preparation; full stomach.
    - ✓ operative: prolonged exposure of intestine and rough manipulation.
    - ✓ post-operative (most common): neglect **suction**, early oral feeding, leaking intestinal anastomosis and peritonitis. → **colon** is more affected than small intestine.
- Normal reflex bowel atony occur following abdominal surgery for 24-48 hours. The duration of postoperative reflex atony depends on bowel manipulation.





## 2. Trauma:

- Fracture of spine / femur / pelvis → sympathetic overtone → inhibition of intestinal movements.
- Obstructed labour.
- Retroperitoneal hemorrhage.

## 3. Toxins:

- Toxemia, septicemia.
- Septic peritonitis.

## 4. Metabolic causes:

- hypokalemia, diabetic ketoacidosis, uremia.

## 5. Drugs:

- anticholinergics, TCAs.

## (2) Pseudo-obstruction

- also known as adynamic ileus or Ogilvie's syndrome.
- mainly affects the large bowel (cecum & ascending colon).
- Acute dilatation of colon **without** any mechanical obstruction.
- Functional rather than mechanical obstruction.
- More likely in elderly, hospitalized, immobile patients.
- it results from interruption of autonomic nervous supply to colon.
- contrast CT scan of abdomen and pelvis: dilatation of colon, exclude mechanical obstruction.



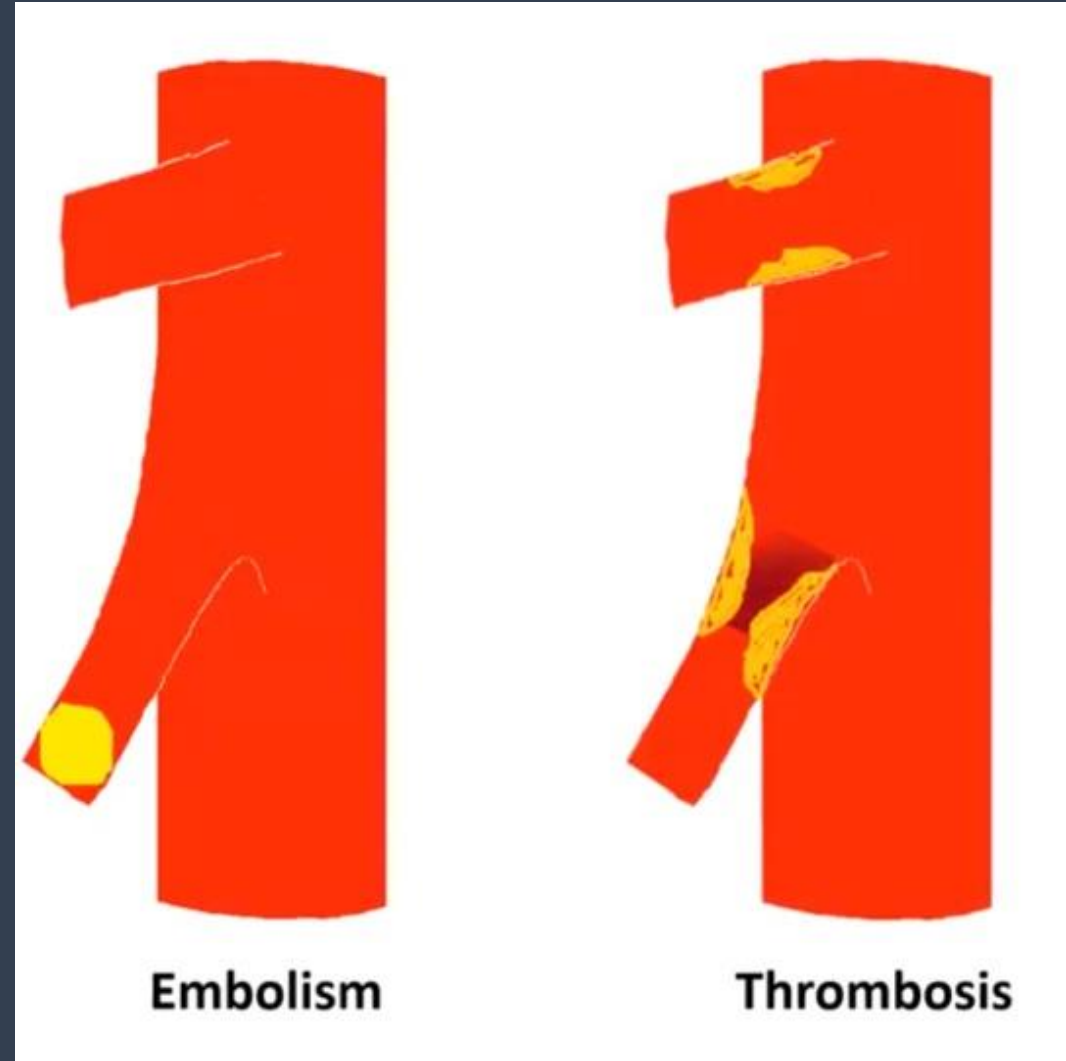
## Factors associated with pseudo-obstruction

- Metabolic
  - Diabetes
  - Hypokalaemia
  - Uraemia
  - Myxodoema
  - Intermittent porphyria
- Severe trauma (especially to the lumbar spine and pelvis)
- Shock
  - Burns
  - Myocardial infarction
  - Stroke
- Idiopathic
- Septicaemia
- Postoperative (for example fractured neck of femur)
- Retroperitoneal irritation
  - Blood
  - Urine
  - Enzymes (pancreatitis)
  - Tumour
- Drugs
  - Tricyclic antidepressants
  - Phenothiazines
  - Laxatives
- Secondary gastrointestinal involvement
  - Scleroderma
  - Chagas' disease



### (3) Acute mesenteric vascular occlusion

- Interruption of **mesenteric supply** to the intestines.
- The two major causes are:
  - Mesenteric arterial embolism
  - Mesenteric arterial thrombosis





**CLINICAL  
PRESENTATION**

# Diagnosis of acute intestinal obstruction (C/P & investigation) :

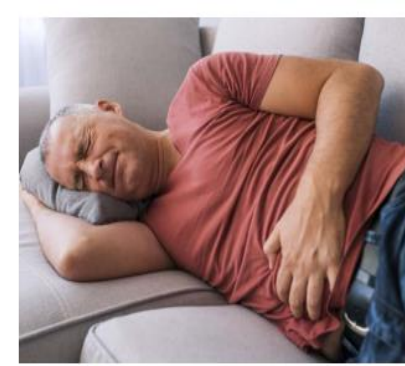
## A. Symptoms:

### 1. Abdominal Pain: (earliest presentation)

- Present in all cases except paralytic ileus.
- Pain is colicky (hyperperistalsis) and intermittent ( due to the fatigue) .

### 2. Vomiting:

- It is persistent and projectile (except paralytic ileus).
- Early in high small intestinal obstruction and late or absent in large intestinal obstruction .
- First clear, then bile stained and finally black offensive (faeculent, not fecal vomiting). True vomiting of faeces only occurs in patients with gastrocolic fistula





### 3. Absolute constipation:

- There is failure to pass feces & flatus.
- It is early symptom in large intestinal obstruction and late in high small intestinal obstruction .

4. Abdominal distension: occurs in advanced cases particularly marked in chronic large bowel also in volvulus of the sigmoid colon in a high intestinal obstruction, there may only be a short segment of bowel proximal to the obstruction, and distension will not then be marked

It is important to note that not all of these four features need necessarily be present in a case of intestinal obstruction. The sequence of onset of symptoms will help localize the obstruction to the upper or lower intestine

1) diagnosis of the cause according to age

2) Diagnosis of obstruction level

3) Diagnosis of pathological type

	Small intestine	Large intestine
1) pain	periumbilical	more suprapubic
2) Vomiting	early	late
3) distension	Minimal to moderate (central)	Marked (peripheral)
4) Absolute constipation	late	early

	simple occlusion	Strangulation	Paralytic ileus
1) Pain	Colicky, intermittent	Sever, persistent	No Pain
2) Palpation	-ve	Tenderness, rebound tenderness & rigidity	-ve
3) Auscultation	Loud exaggerated intestinal sounds	First exaggerated sound then disappears	Dead silent abdomen
4) suction	Relieves pain	No effect on pain	Relieve distension

## History :

- cardinal symptoms(Colicky abdominal pain, constipation & Vomiting)
- ask about previous abdominal surgery, previous colonoscopy or irradiation.
- ask about previous attacks of bowel obstruction , history of hernia .
- ask about blood per rectum, weight loss, family history of colon cancer.
- the site of the pain and the distension, The timing of symptoms development like constipation and vomiting can be indicative of the level of obstruction.

# -Physical Examination:

## A. General examination:

- ✓ The pts looks in pain and may be rolling about with colic , with signs of dehydration (dry skin, sunken eyes, oliguria, poor venous filling).
- ✓ The pulse is usually elevated, but the temperature is frequently normal.
- ✓ A raised temperature and a tachycardia suggest strangulation.

## B. Abdominal examination:

### 1. Inspection :

Look for :

- The abdomen distension or asymmetry -visible peristalsis may be present (visible peristalsis can be normal if the abdominal wall is very thin)
- Swelling, Scars or surgical incisions (ask the pts to cough to exclude incisional hernia)
- borborygmi (mechanical obstruction)

### 2. Palpation :

May show :

- Tenderness, rebound tenderness, rigidity & gaurding over the affected loop.
- Abdominal mass (tumour or intussusception).
- Strangulated hernia (tense, tender with no impulse on cough).

### 3. Percussion :

Abdomen normally tympanic but in intestinal obstruction, it's resonant anterior aspect but dull towards the flanks.



4. Auscultation:  
may show

- 1) Loud exaggerated intestinal sounds in mechanical obstruction.
- 2) Dead silent abdomen in adynamic intestinal obstruction.

5. Digital rectal examination :

May show Obstructing mass in pouch of Douglas, apex of intussusception, fecal impaction.

- In all cases of suspected intestinal obstruction, the hernial orifices must be examined.

	simple occlusion	Strangulation	Paralytic ileus
1)Pain	Colicky, intermittent	Sever, persistent	No Pain
2)Palpation	-ve	Tenderness, rebound tenderness & rigidity	-ve
3)Auscultation	Loud exaggerated intestinal sounds	First exaggerated sound then disappears	Dead silent abdomen
4)suction	Relieves pain	No effect on pain	Relieve distension

COMPLICATIONS

Untreated, intestinal obstruction can cause serious, life-threatening complications, including:

- 1- Strangulation : when the intraluminal pressure is still high and obstruction not relieved this High pressure reduce the intestinal microvascular perfusion leading to ischemia and necrosis. As the viability of the bowel is compromised, translocation and systemic exposure to anaerobic organisms and endotoxin occurs.
- 2- neurogenic shock from pain.
- 3- hypovolaemic shock due to Fluid and electrolytes imbalance ( because of vomiting).
- 4- toxic shock due to toxic absorption from the retained fluid.
- 5- Perforation: Increased pressure from the obstruction can cause the intestinal wall to rupture, leading to the leakage of intestinal contents into the abdominal cavity(peritonitis).

**INVESTIGATION**



## We want to:

- Confirm diagnosis of intestinal obstruction.
- diagnosis of cause & level of obstruction.
- estimate the severity of fluid & electrolyte imbalance.

## Labs:

- CBC: Leukocytosis indicates strangulation , rises of haematocrite.
- Serum electrolytes: acidosis, hypokalaemia, hyponatraemia.
- Coagulation test.
- Serum amylase.
- Urine analysis.

# images:

## abdominal X-ray :

- Erect position: multiple fluid level in a dilated loops confirm the diagnosis.
- Supine position: The level of obstruction is diagnosed by dilated proximal loops which give characteristic gas shadow as follow:
  - Jejunum loops are central with characterised by valvulae conniventes & concertina appearance crossing from one side of the lumen to the other .
  - Ileum loops are central and appear as structureless tubes.
  - Colon is peripheral and shows haustrations( do not reach the other side of the lumen

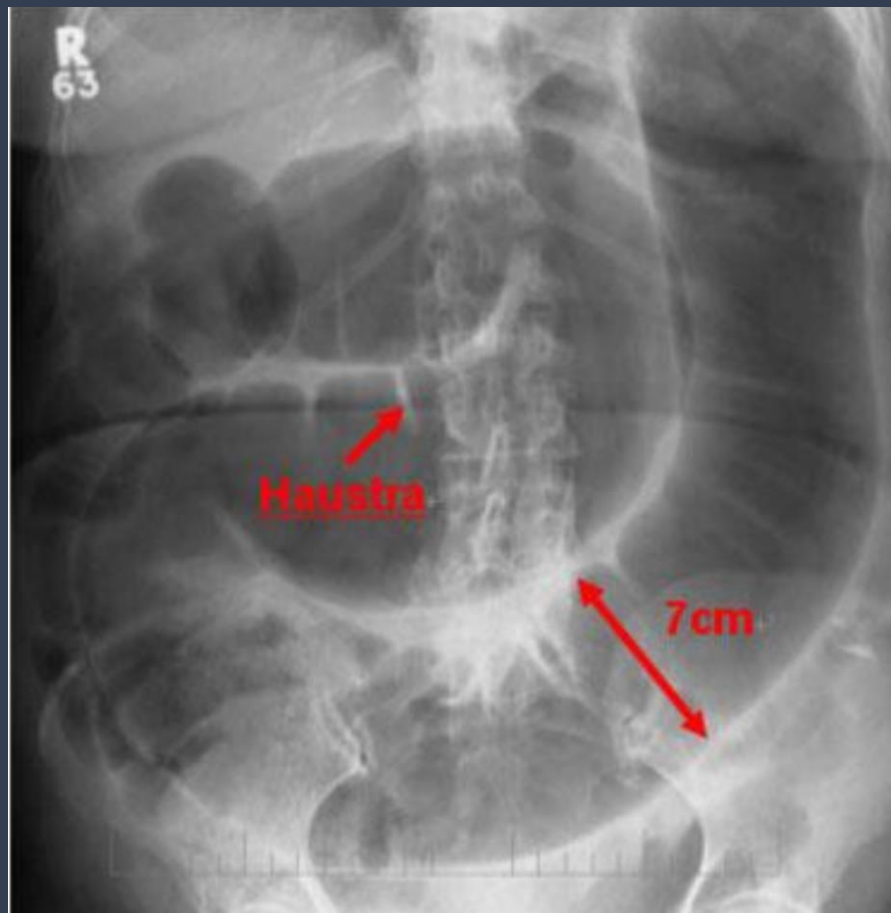
Erect  
position



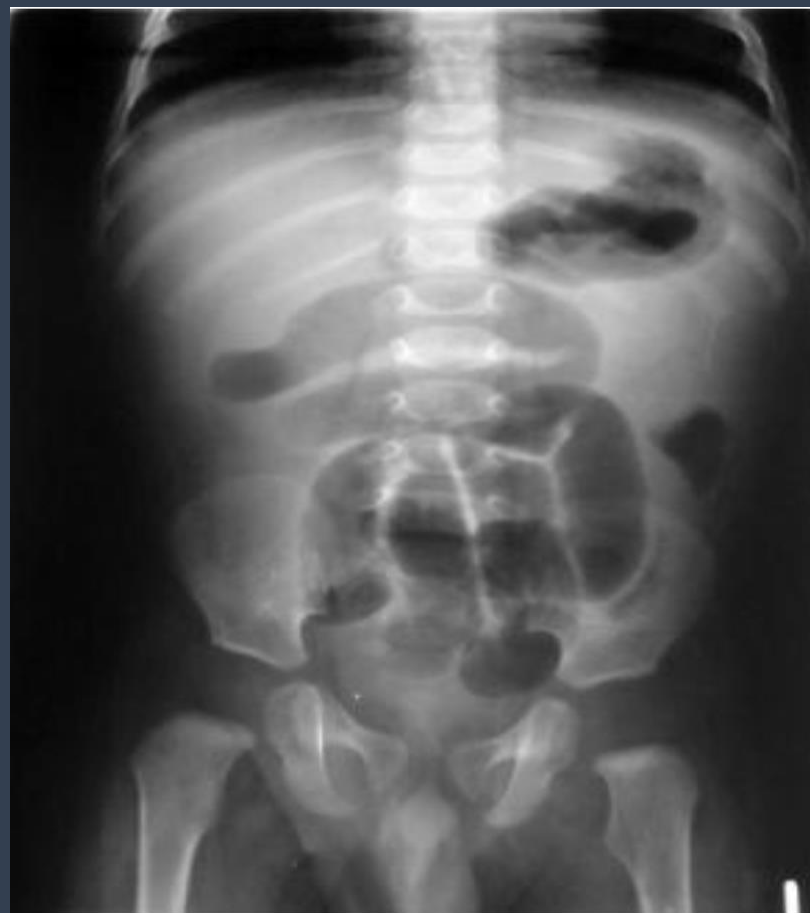
supine  
position  
(jejunum  
loops)



Supine position (colon)



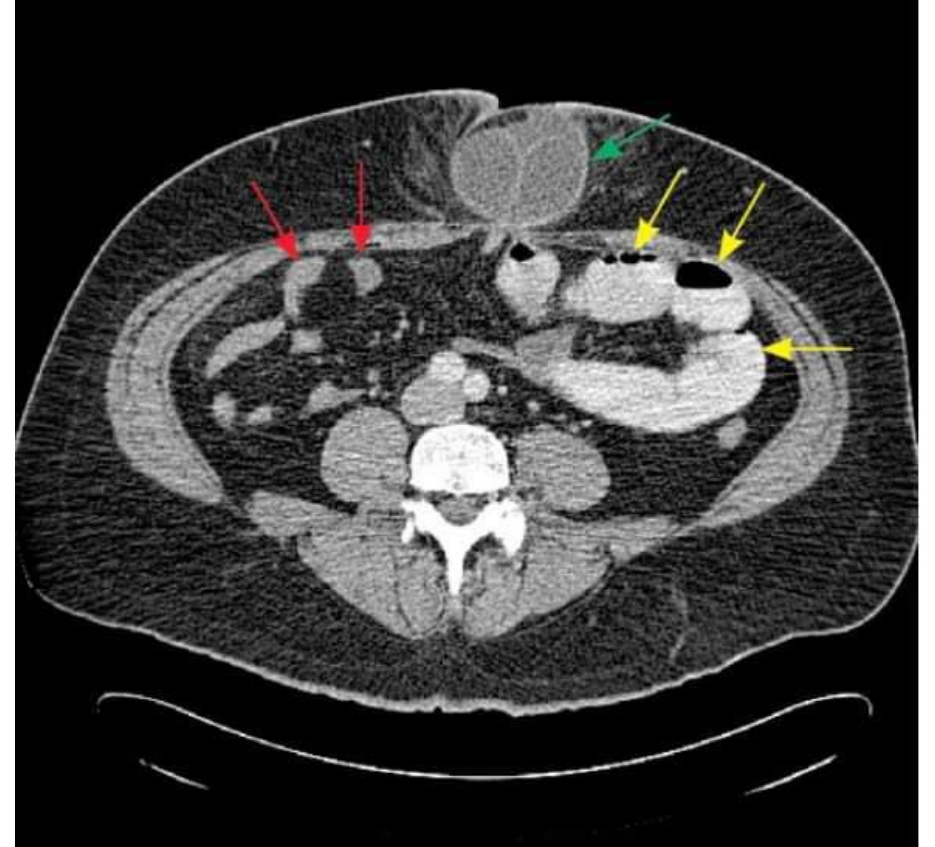
Supine position (ileum)



# CT Scan:

with contrast is 90% sensitive in the diagnosis

- The picture showing:
- dilated, contrast-filled loops of bowel on the patient's left (yellow arrows), with decompressed distal small bowel on the patient's right (red arrows).
- The cause of obstruction, an incarcerated umbilical hernia, can also be seen (green arrow), with proximally dilated bowel entering the hernia and decompressed bowel exiting the hernia.





# Barium enema:

to detect any colonic obstruction.

## Findings:

- Complete bowel obstruction: contrast would not be visible beyond obstruction.
- partial bowel obstruction: a trickle of contrast would be visible beyond obstruction.
- Bird beak sign seen in volvulus.
- Apple core sign seen in colonic malignancy.

**TREATMENT**

The Three General Principles In Treating Obstruction Are:

1. Preoperative Preparation.
2. Surgical Treatment.
3. Conservative Treatment.

# Preoperative Preparation

- The Patient Should Be Administered In Hospital And Get Rest.
- The Patient Should Be Prevented From Oral Feeding.
- The (Suck And Drip) Method, That Includes The Following;
  1. Gastric Aspiration/Nasogastric Suction
    - To Decompress The Bowels  
(Reduces Pain, Reduces Strangulation, Reduces Postoperative Paralytic Ileus)
    - To Reduce The Risk Of Gastric Inhalation During The Induction Of Anesthesia.
  2. IV Fluids And Electrolytes Replacement To Replace All The Fluids That Have Been Lost In Vomiting.
    - Hartmann's Fluid (Contains NaCl, KCl) Or Normal Saline Are Given.
    - Plasma Expanders (Like Dextran) Are Given In Shock Patients.
  3. Blood Transfusion  
In The Case Of Strangulation.
  4. Antibiotics  
In The Case Of Strangulation.
  5. Apply Foley Catheter  
To Check The Urine Output Every Hour And To Determine Whether The Volume Of Given Fluids Is Enough Or Not,  
Should Be (0.5 ml/kg/hour)
  6. Observation  
Always Check The Pulse, Blood Pressure, Temperature, Pain Site And Severity.



# Surgical Treatment

1. A Lower Right Paramedian Incision Is Made To Observe The Ileocecal Area.

If The Cecum Is Collapsed, Indication Of Small IO.

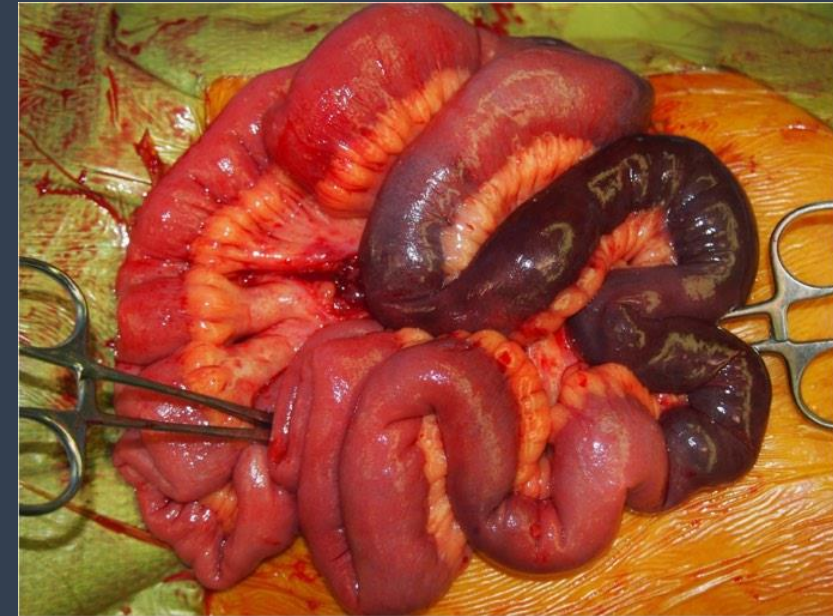
If The Cecum Is Enlarged, Indication Of Large IO.

2. Look At The Junction Between The Large And Collapsed Areas And Treat The Underlying Cause (Repair Hernia Or Remove Adhesions Or Untwist The Volvulus).

3. The Affected bowel Is Carefully Inspected For Its Viability.

-The 6 Signs Of A Non-Viable Tissue:

1. The Absence Of Intestinal Luster (Sheen)
2. The Brownish-Green/ Blackish Color.
3. The Absence Of Mesenteric Pulse.
4. The Absence Of Intestinal Peristalsis.
5. The Floppy Consistency Of The Wall.
6. The Absence Of Bleeding If Injured.



-Some Of The Surgical Options Depending On Viability:

### 1. Viable Tissue

Reduction To The Abdomen

### 2. Non-Viable Tissue

#### **Small Intestines**

Resection With Primary Anastomosis.

#### **Right, Large Intestines**

Reaction With Ileocecal Anastomosis.

This Is Done Due To The Great Blood Supply And Low Bacterial Amounts.

#### **Left, Large Intestines**

1. Exteriorization Resection

2. Hartmann's Procedure

3. Proximal Colectomy With Mucous Fistula

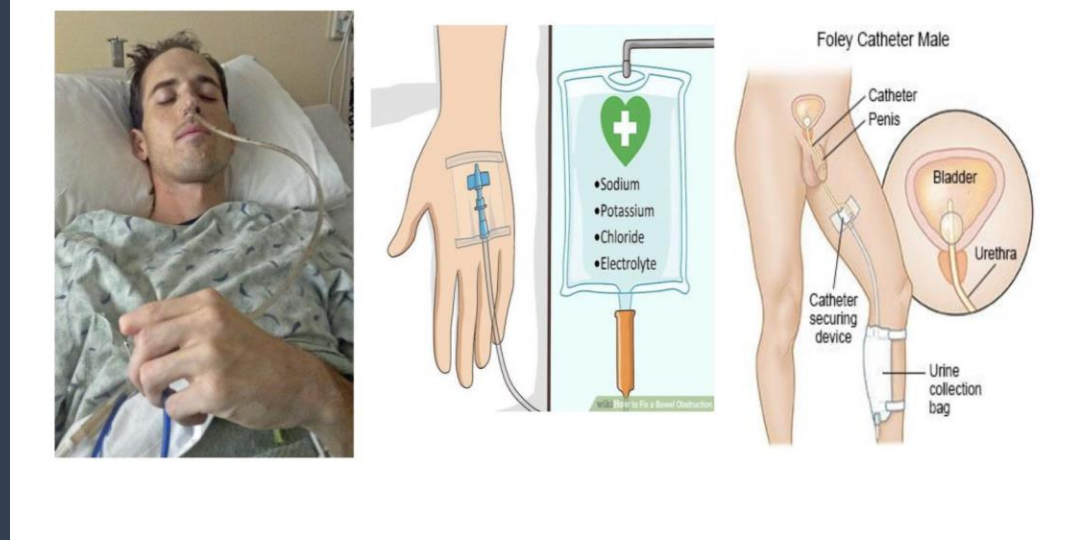
This Is Done Due To The Low Blood Supply And High Bacterial Amounts.

### 3. Doubtful Tissue

Apply Hot Saline Packs Over The Intestines (3 X 15 Minutes) And Put The Patient In A Positive O2 Ventilator Machine.

This Helps In Vasodilation, Thus Moving The Circulation, And After This We Have To Observe And Look For Viability Signs.

### 4. Drainage



## Conservative Treatment

### It's Used When:

1. Early Management.
2. No Signs Of Strangulation (No Complications).
3. Distinction From Postoperative Paralytic Ileus Is Uncertain.
4. Obstruction Due To Repeated Episodes Of Adhesions.

### Examples:

#### 1. Ileocecal Intussusception

The High Hydrostatic Pressure Of The Barium Will Reduce The Intussusception And Is Monitored Radiologically Until Appendix Is Seen.

#### 2. Sigmoid Volvulus

A Rectal Tube Is Inserted Through A Sigmoidoscope Leading To Untwisting Of The Volvulus.

#### 3. Adhesive Obstruction

It's Only Monitored By The Nasogastric Suction Tube (Ryle's Tube) And IV Fluid Dripping.

#### 4. Fecal Impaction

Enema Is Inserted To Dissolve The Hard Fecal Mass.

## Case scenario:

A 58-year-old female presents to the emergency department with acute crampy abdominal pain. She has a medical history of hypertension, dyslipidemia, and diabetes. She has surgical history of open cholecystectomy at the age of 48 and cesarean section at the age of 40. The patient reports that she has not passed stool or gas for 48 hrs. On physical exam vitals are T 98.4 F, Heart Rate 100 bpm, BP 140/90 mmHg, Respiratory rate 16, abdominal exam is notable for distension, tympany to percussion, and tenderness to palpation without rebound or guarding. Abdominal radiograph is given below. What is the next best step in management?

- 1) Sigmoidoscopy, attempted derotation and rectal tube placement
- 2) Start IV fluids, NPO and decompress by nasogastric suction
- 3) Broad spectrum antibiotics
- 4) Start Neostigmine

**Answer is 2**



THANK YOU