

Intestinal
obstruction

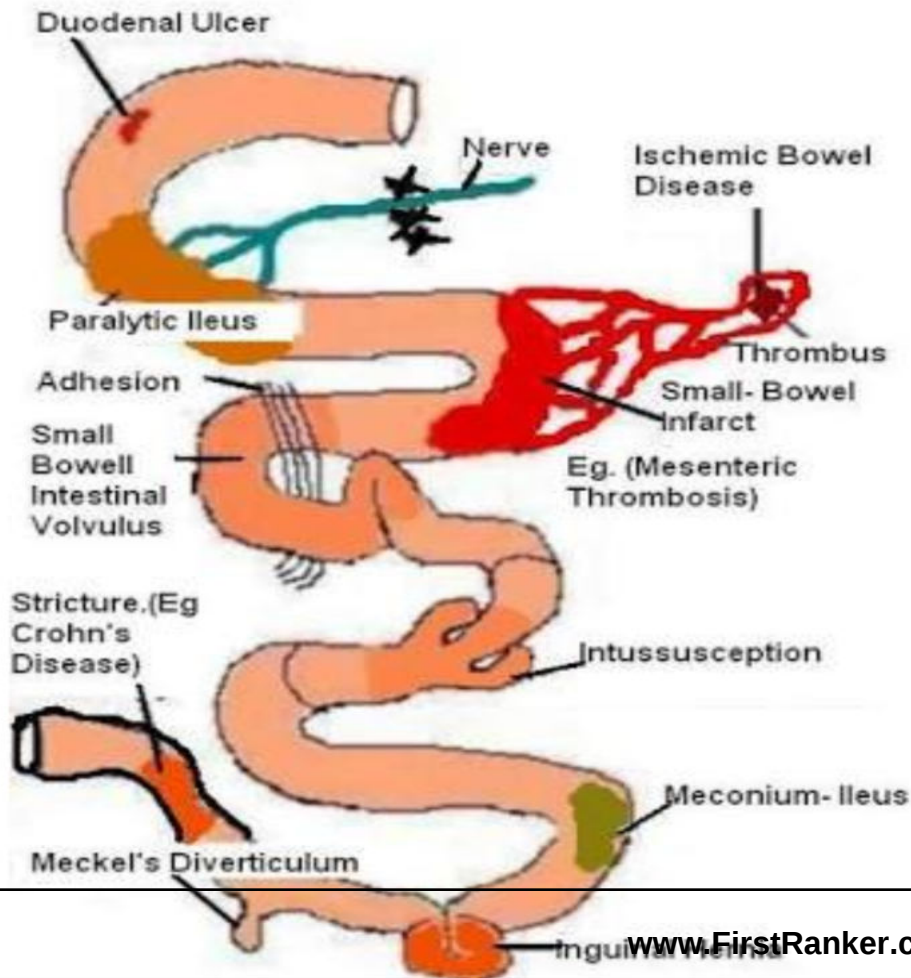


INTESTINAL OBSTRUCTION

- It is the partial or complete blockage of the bowel that prevents contents of the intestine from passing through.
- It is an important cause of acute abdomen accounting upto 5% of emergency admission to surgical services.
- Morbidity and mortality are particularly high in patients who are managed incorrectly or in whom the diagnosis is delayed.

- Aswin. R- Classification and pathophysiology
- Athira CP-Special types of intestinal obstruction
- Athira S Thampi-Clinical features of intestinal obstruction
- Bhagyalakshmi U-Volvulus and Adynamic obstruction
- Aysha Tamanna-Imaging
- Ahallya B.S-Treatment of acute intestinal obstruction
- Balasree V.S-Treatment of acute large bowel obstruction
- Beyona Susan Benny-Chronic large bowel obstruction

CLASSIFICATION



ASWIN R
Roll No:34

I: Aetiopathological Classification

1) Dynamic- mechanical obstruction.

❖ Acute

❖ Chronic

2) Adynamic- paralytic ileus or pseudo-obstruction

Causes of intestinal obstruction

Dynamic

1 Intraluminal

- Faecal impaction
- Foreign bodies / Bezoars
- Gallstones

2 Intramural

- Stricture
- Malignancy
- Intussusception
- Volvulus

3 Extramural

- Bands/adhesions
- Hernia

Adynamic

Paralytic ileus

Pseudo-obstruction

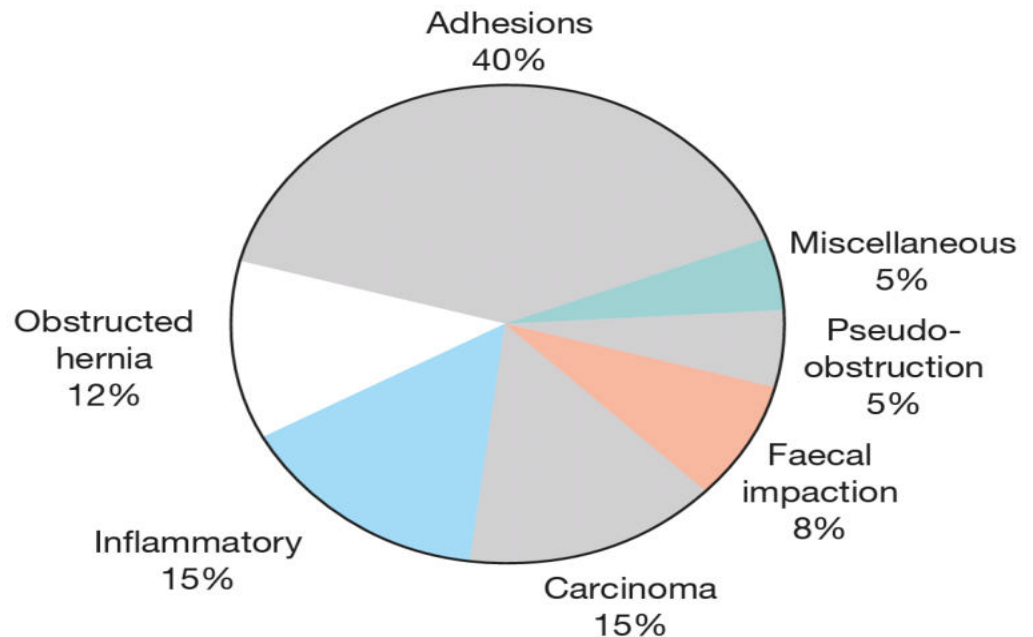


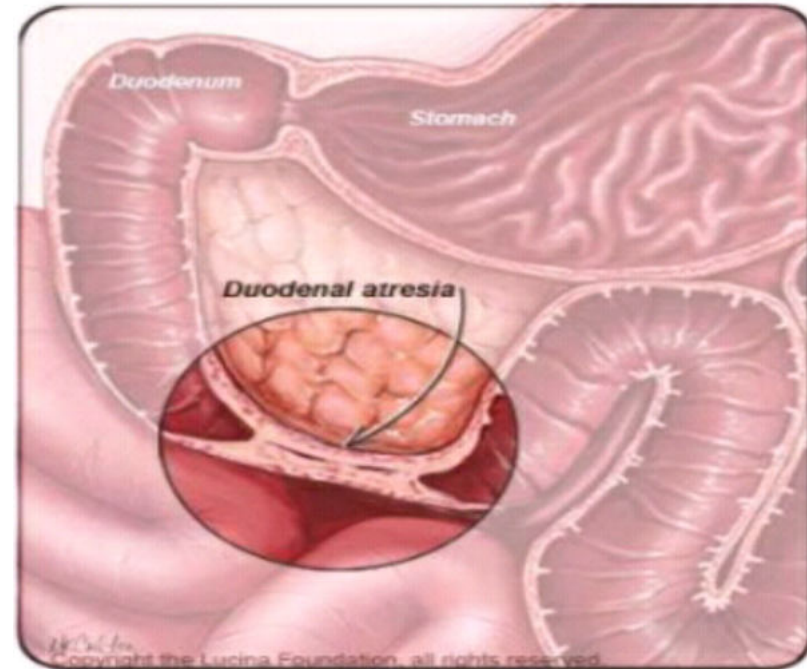
Figure 71.1 Pie chart showing the common causes of intestinal obstruction and their relative frequencies.

II: Depending on Site of Obstruction

	<i>Proximal small bowel</i>	<i>Distal small bowel</i>	<i>Large bowel</i>
<i>Site of obstruction</i>	<i>Duodenum and jejunum</i>	<i>Ileum</i>	<i>Anywhere in large intestine</i>
Causes:	• Congenital • Lipomas • Leiomyomas • Bands • Adhesions	• Tuberculosis strictures • Malignancy • Gallstones • Hernias—common cause • Roundworm	• Malignancy • Tuberculosis stricture • Anorectal malformation • Volvulus • Congenital megacolon • Diverticulitis
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Classification III

<i>Congenital</i>	<i>Acquired</i>
Anorectal malformations Congenital megacolon Duodenal atresia	Hernia (commonest) Roundworm Gallstones Tuberculosis Malignancy



PATHOPHYSIOLOGY

Dynamic obstruction



Changes proximal to the bowel obstruction

Intestinal obstruction



Increased peristalsis



Becomes vigorous &
retrograde peristalsis



Obstruction not relieved



Peristalsis ceases



Flaccid, paralysed, dilated bowel



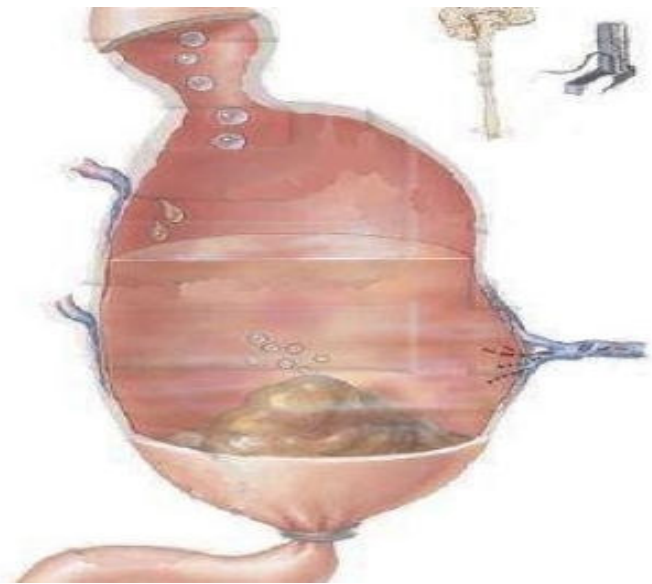
Distension is caused by two factors:

1) Gas:

- ❖ aerobic and anaerobic organisms
- ❖ nitrogen and hydrogen sulphide.

2) Fluid:

- ❖ digestive juices (saliva 500 mL, bile 500 mL, pancreatic secretions 500 mL, gastric secretions 1 litre – all per 24 hours).
- ❖ accumulates in the gut lumen



Changes at the site of obstruction in closed loop obstruction:

Initially venous return is impaired



Congestion, oedema of bowel wall occurs which turns purple.



Later this jeopardizes the arterial supply.



Loss of shininess, blackish discolouration, loss of peristalsis.



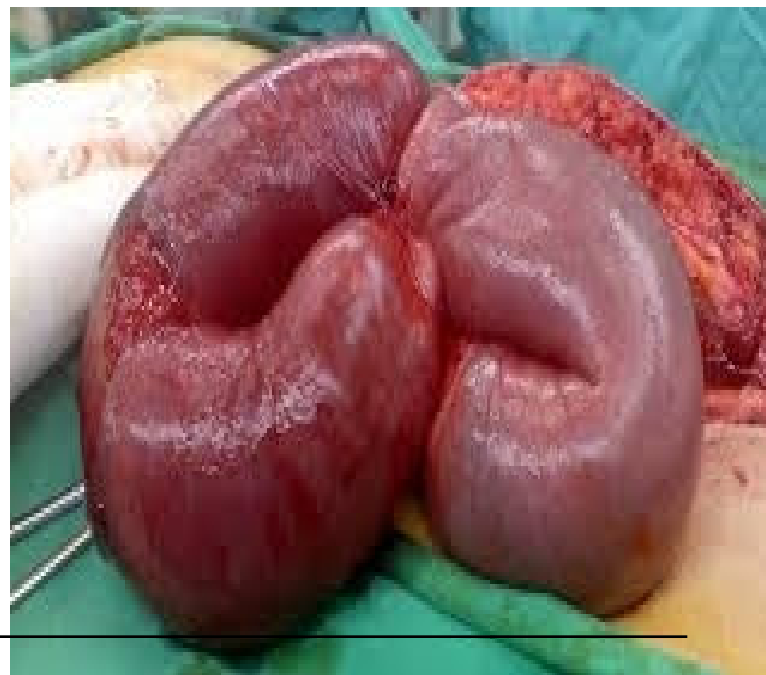
Gangrene.



Perforation occurs.

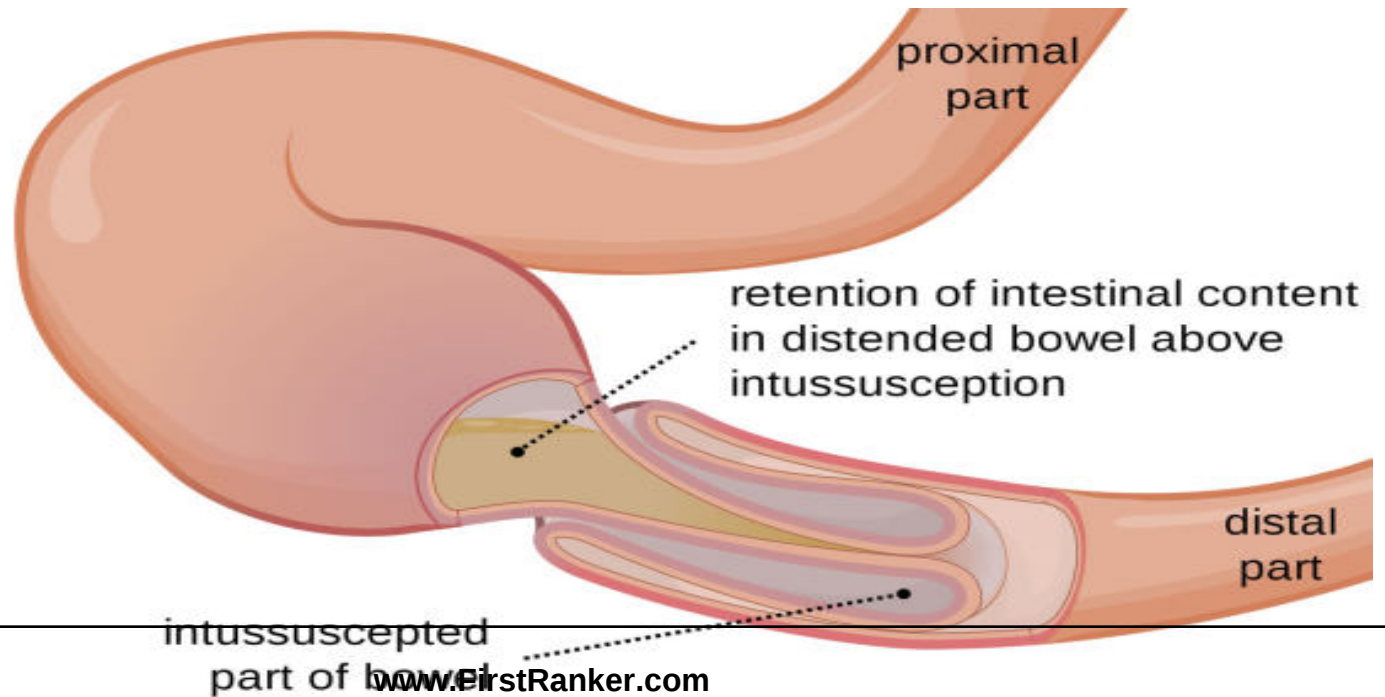


Peritonitis.



Bowel distal to the obstruction

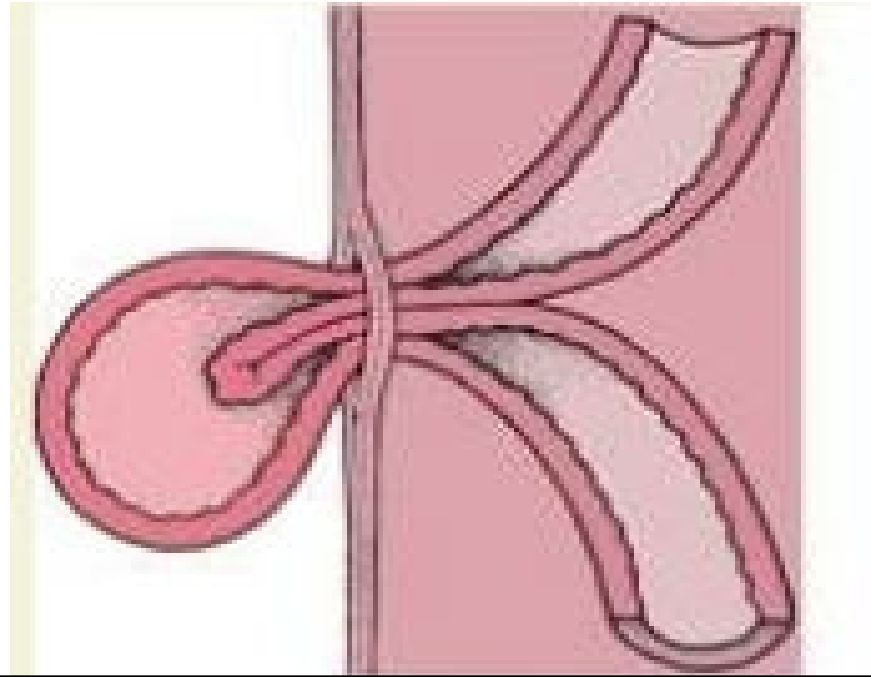
- *is inactive and collapsed*



Dehydration and electrolyte loss are due to:

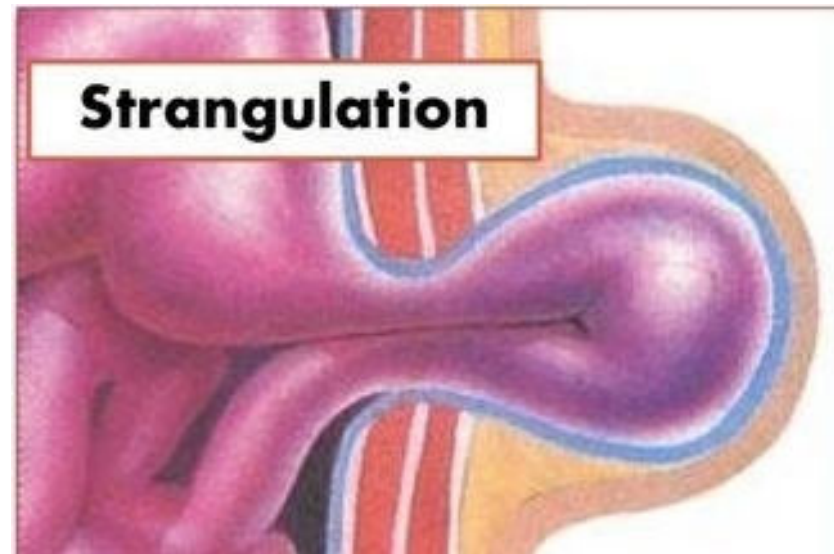
- reduced oral intake
- defective intestinal absorption
- losses as a result of vomiting
- sequestration in the bowel lumen
- transudation of fluid into the peritoneal cavity

STRANGULATION



STRANGULATION

- ❖ When strangulation occurs, the blood supply is compromised and the bowel becomes ischaemic.
- ❖ Intestinal obstruction not immediately life-threatening unless there is superimposed strangulation.



Causes of strangulation

Direct pressure on the bowel wall

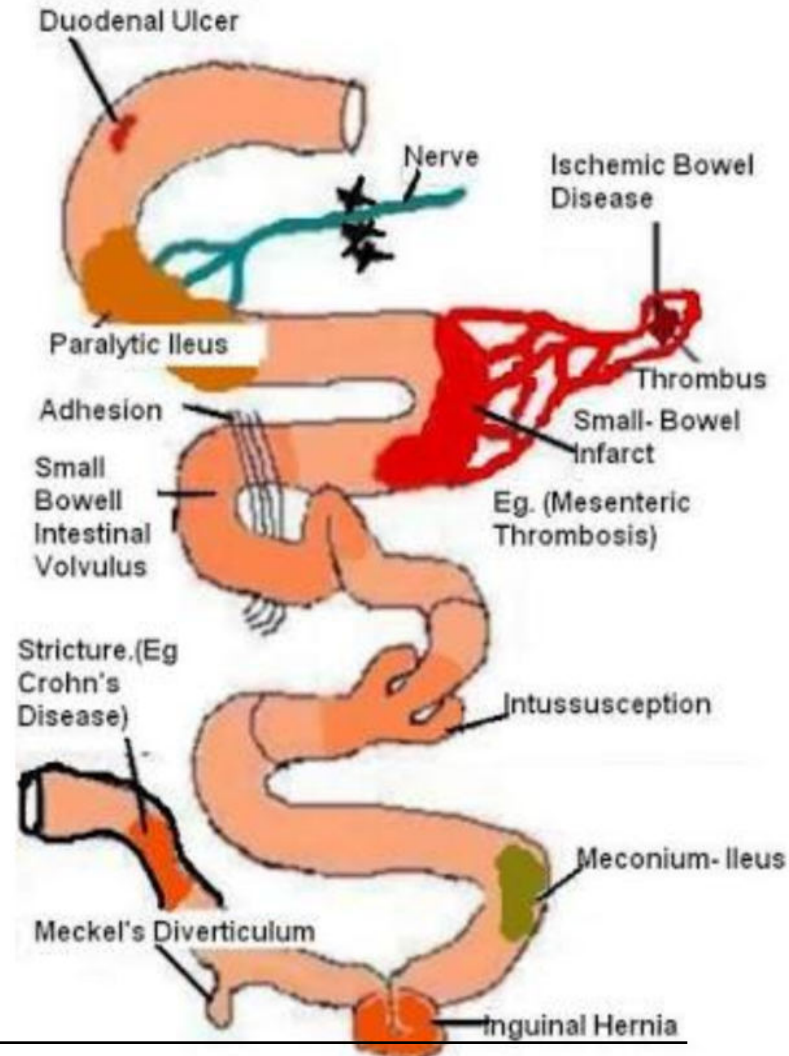
- Hernial orifices
- Adhesions/bands

Interrupted mesenteric blood flow

- Volvulus
- Intussusception

Increased intraluminal pressure

- Closed-loop obstruction



- Distention results in high pressure within the bowel wall.
- Venous return is compromised. The resultant increase in capillary pressure leads to impaired local perfusion
- Once the arterial supply is impaired, haemorrhagic infarction occurs.
- Systemic exposure to anaerobic organisms and endotoxin occurs.

- Morbidity and mortality dependent on the duration of the ischaemia and its extent.
- Elderly patients and those with comorbidities are more vulnerable.



- ❖ Ischaemic bowel can cause systemic effects secondary to sepsis and significant dehydration.
- ❖ When bowel involvement is extensive circulatory failure is common.



Closed-loop obstruction

- Bowel is obstructed at both the proximal and distal points.
- Distention is principally marked in the closed loop.

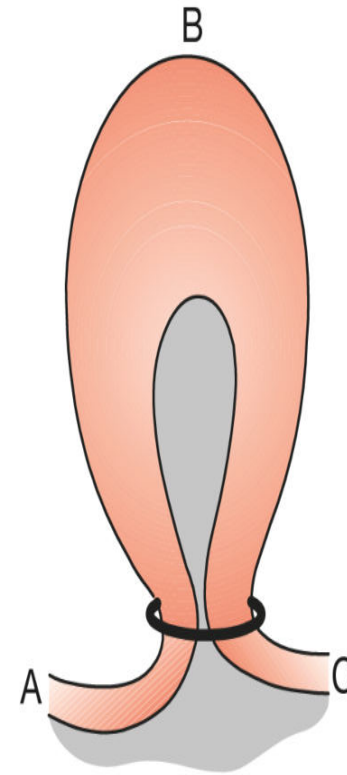
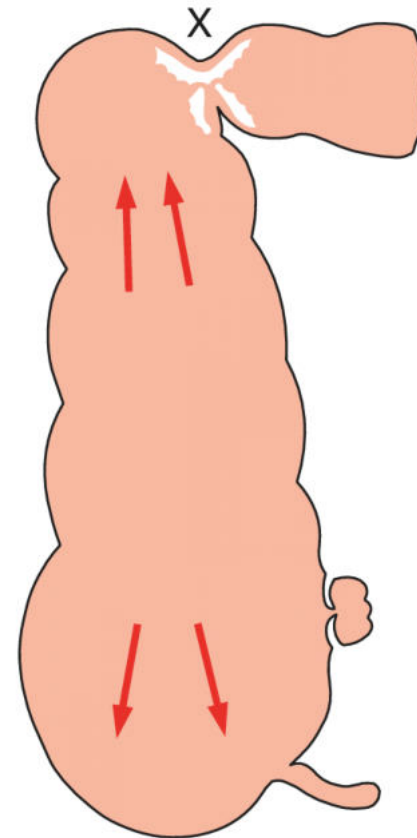
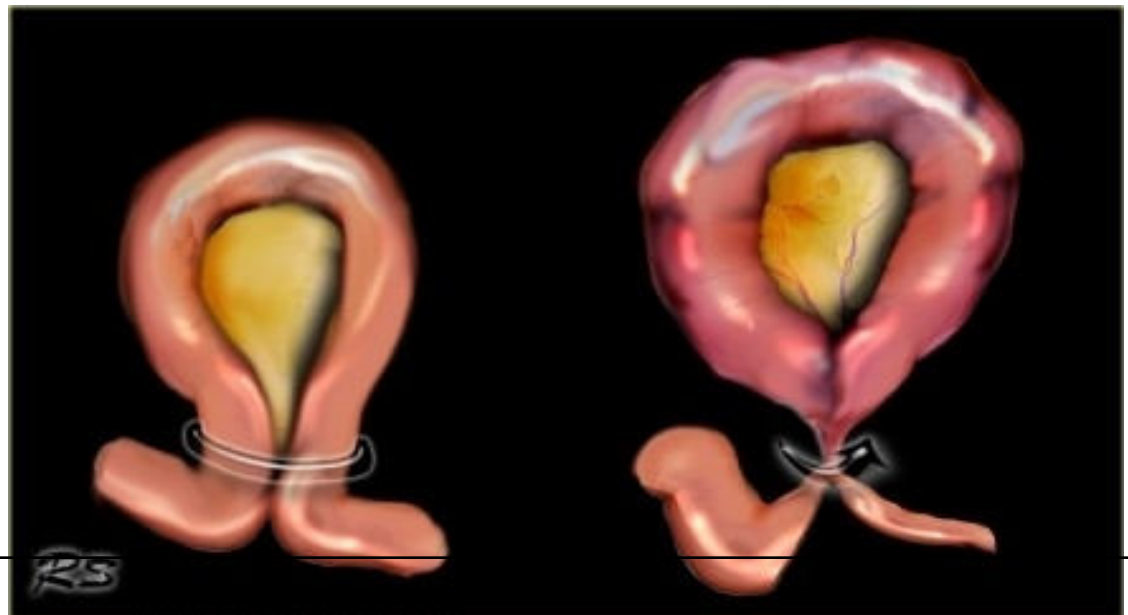


Figure 71.2 Distension. Closed-loop obstruction with no proximal (A) or distal (C) distension and impending strangulation (B).

- A classic form of closed-loop obstruction is seen in **malignant stricture of the colon with a competent ileocaecal valve.**
- It is also seen in Obstructed hernia.



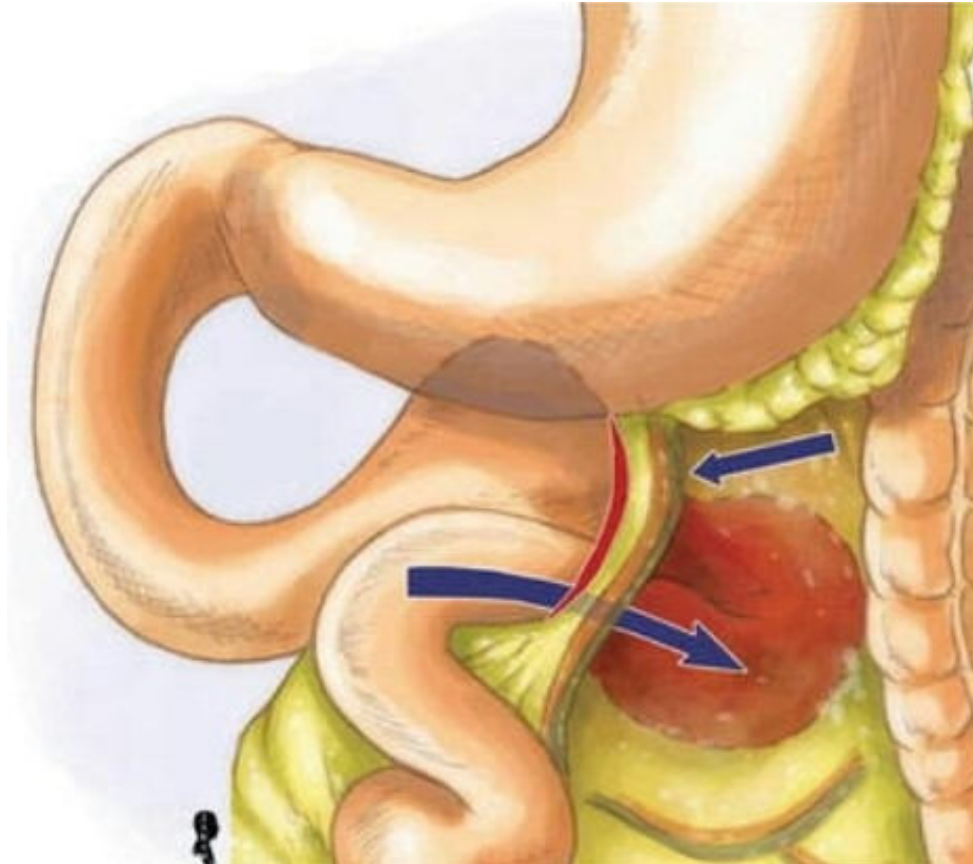
- Increase in luminal pressure, which is greatest at the caecum, with subsequent impairment of blood flow in the wall.
- Unrelieved, this results in necrosis and perforation



SPECIAL TYPES OF MECHANICAL INTESTINAL OBSTRUCTION

ATHIRA C.P

INTERNAL HERNIA



Rare entity

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- When a portion of small intestine become trapped in one of the congenital mesenteric defect or in retroperitoneal fossae



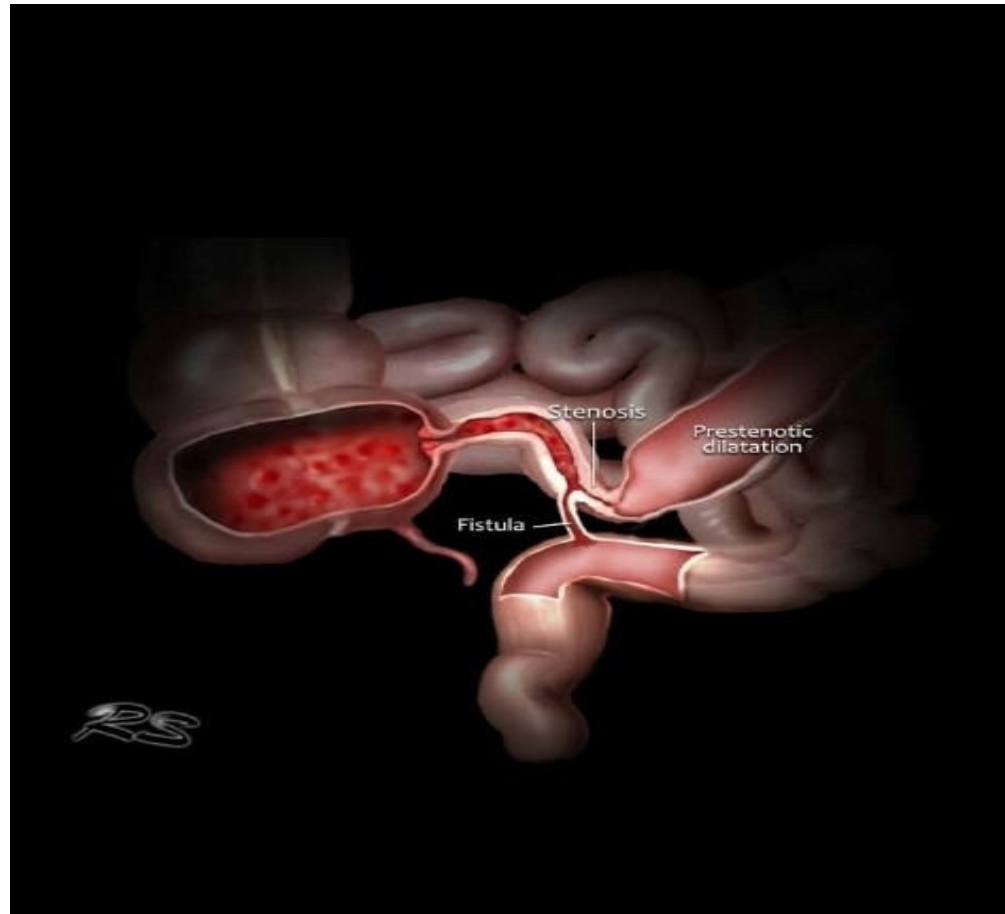
- the foramen of Winslow
- a defect in mesentery
- a defect in transverse colon
- defect in broad ligament
- congenital or acquired diaphragmatic hernia



- duodenal retroperitoneal fossae
- caecal/appendicular retroperitoneal fossae
- intersigmoid fossae

- Usually associated with adhesion.
- Treatement - divide the adhesion or release
constriction

ENTERIC STRICTURES

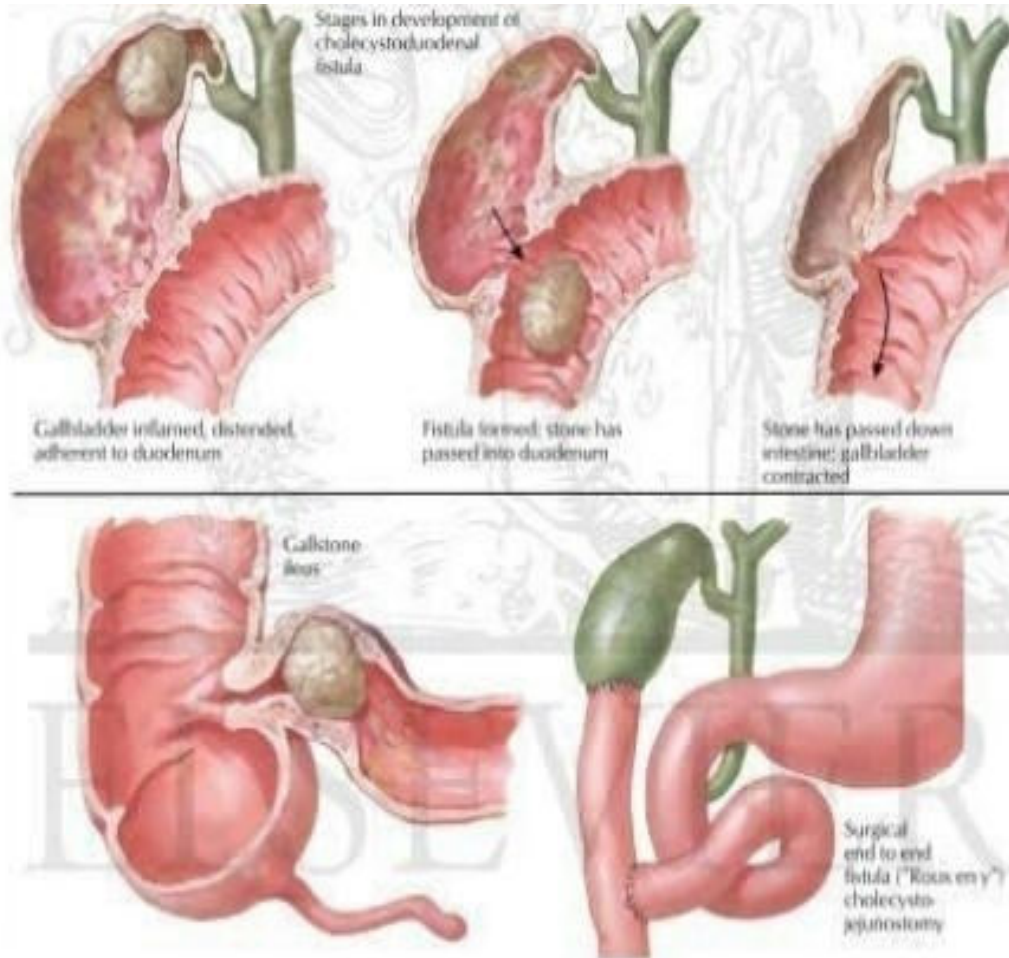


1. BENIGN - TB or crohn's disease
 2. MALIGNANT – lymphoma/carcinoma , sarcoma (GIST) ; (rare)
- Clinical presentation - subacute or chronic.
 - Treatment - Resection & anastomosis
Strictureplasty(crohn's d/s)

BOLUS OBSTRUCTION

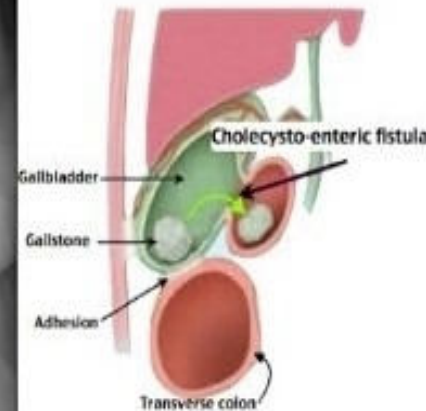
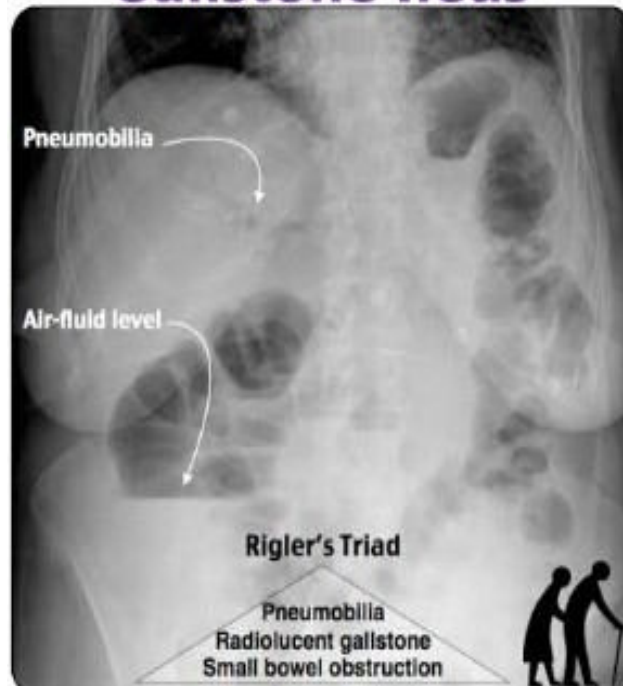
1. gall stones
2. food
3. bezoar
4. worms

GALLSTONE ILEUS



- Erosion of a large gallstone from gallbladder to duodenum.
- Get impacted at 60 cm proximal to ileocaecal valve.
- Acute or Recurrent
- **RIGLER'S TRIAD**

Gallstone Ileus



- Treatment- either crushing the stone or enterotomy from outside

FOOD

After total or partial gastrectomy-unchewed articles can pass directly into small bowel.



Figure: (A) Natural and dried apricot. (B) Swollen apricot which was the cause of obstruction. (C) Unchewed apricot removed from the obstructed segment of the bowel. (D) Chewed apricot which were removed from the bowel of the patient and did not cause obstruction.

BEZOAR



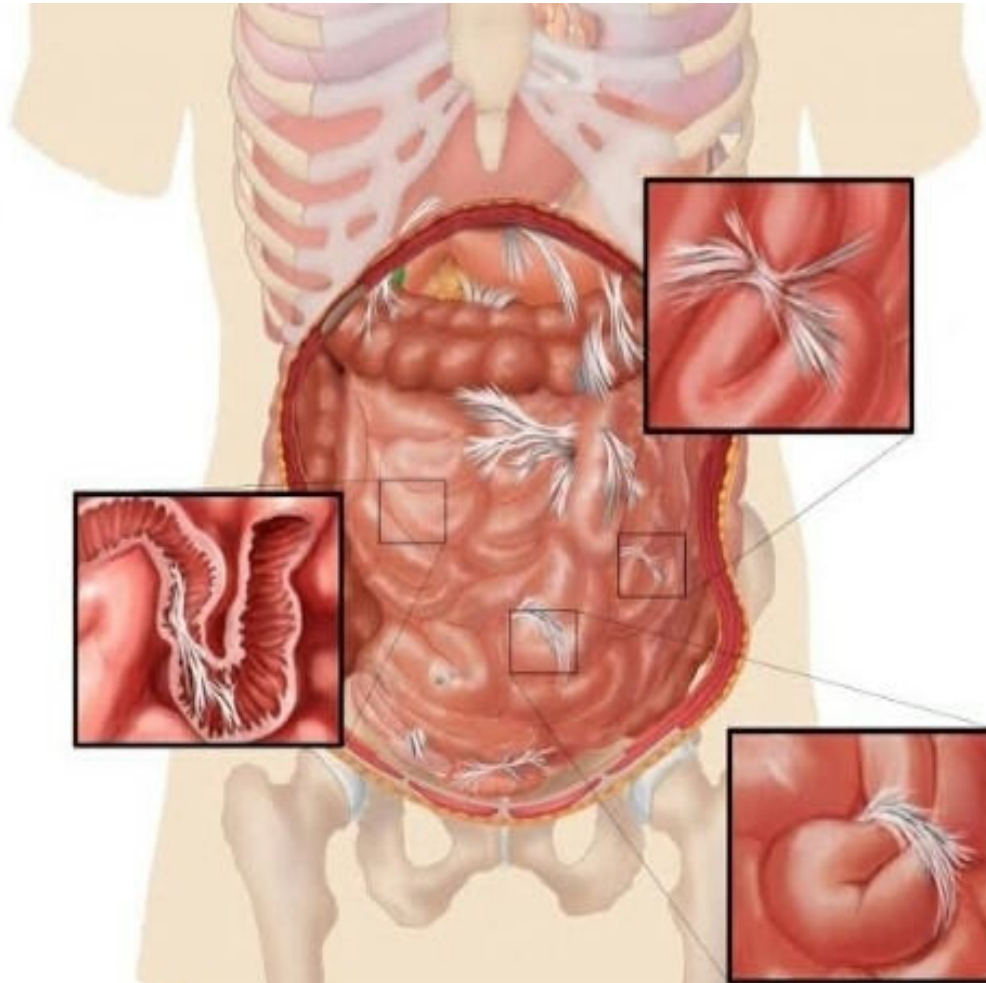
Figure 3: Hairy mass forming a stomach cast as shown post-operatively.

- Firm masses of undigested hair ball & fruit/vegetable fibre.
- Predisposition
 - high fibre intake
 - inadequate chewing
 - previous gastric surgery
 - hypochlorhydria
 - loss of gastric pump mechanism.
- Preoperative dx difficult
- open removal

WORMS



ADHESIONS



- Commonest cause

- Causes –

Foreign material - talc /starch(glove powder), gauze, silk

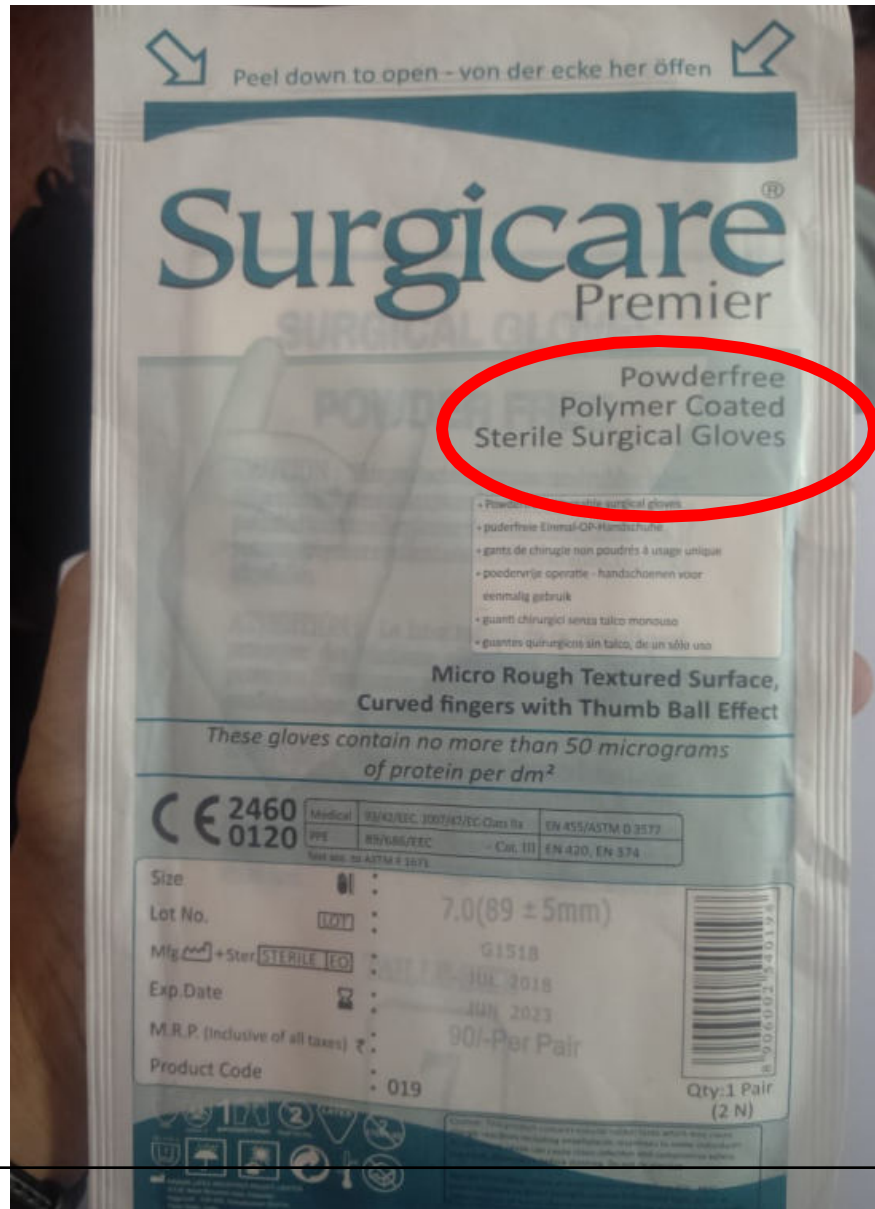
Infection - peritonitis , TB

Inflammatory - crohn's d/s

Radiation enteritis

- How to prevent

- ❖ good surgical technique
 - meticulous surgery
 - avoid bleeding
 - using laparoscopy ie,minimally invasive technique whenever possible
- ❖ peritoneal saline wash to remove clots
- ❖ Use of powder free gloves
- ❖ minimising contact with gauze
- ❖ covering anastomoses &raw peritoneal surface.

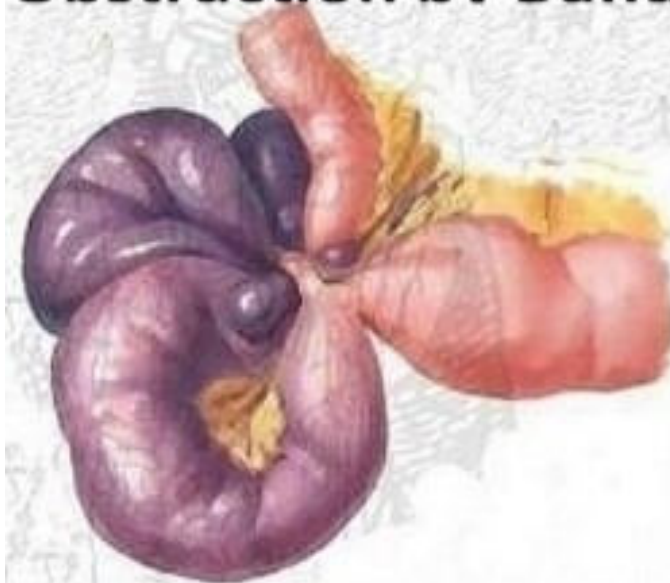


- ***LAPROSCOPIC SURGERY***

contact of peritoneal cavity & foreign material is avoided

BANDS

Obstruction by Band

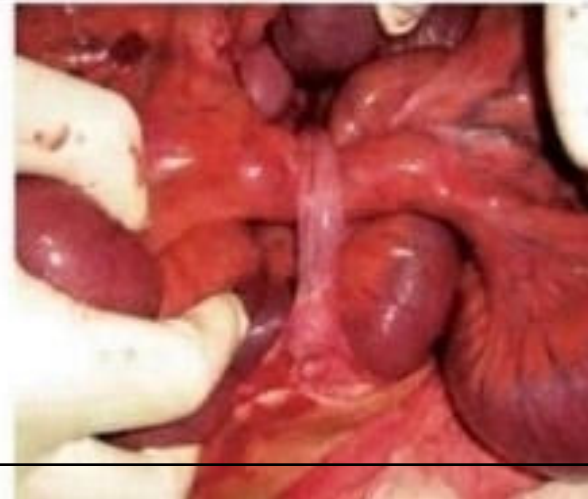


Strangulation of Bowel loops by Knotting Diverticulum

Dense Fibrous String attaching one portion of abdo to other; entrapping intestine into Strangulation

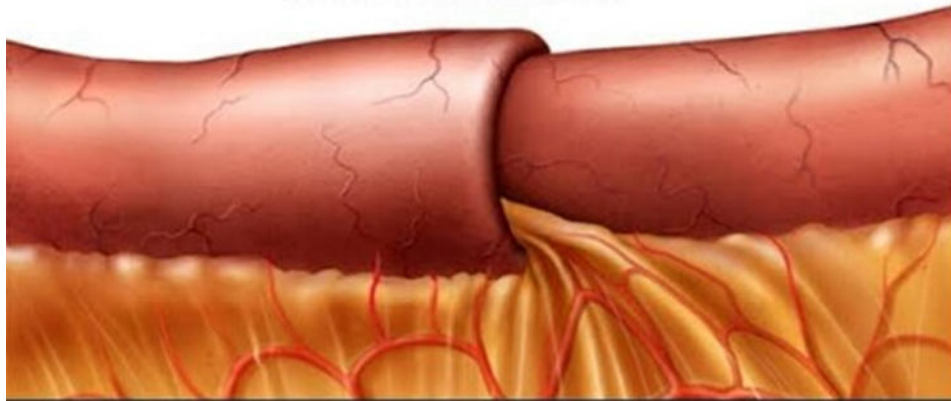
Causes:-

- following previous bacterial peritonitis
- a portion of greater omentum adherent to the parietes.

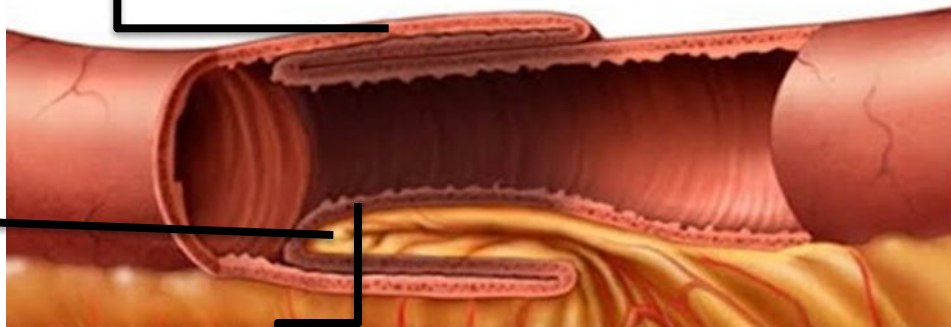


ACUTE INTUSSUSCEPTION

Small intestine with intussusception



Intussusception (cross section view)



Intussusciens

Apex

Intussusceptum

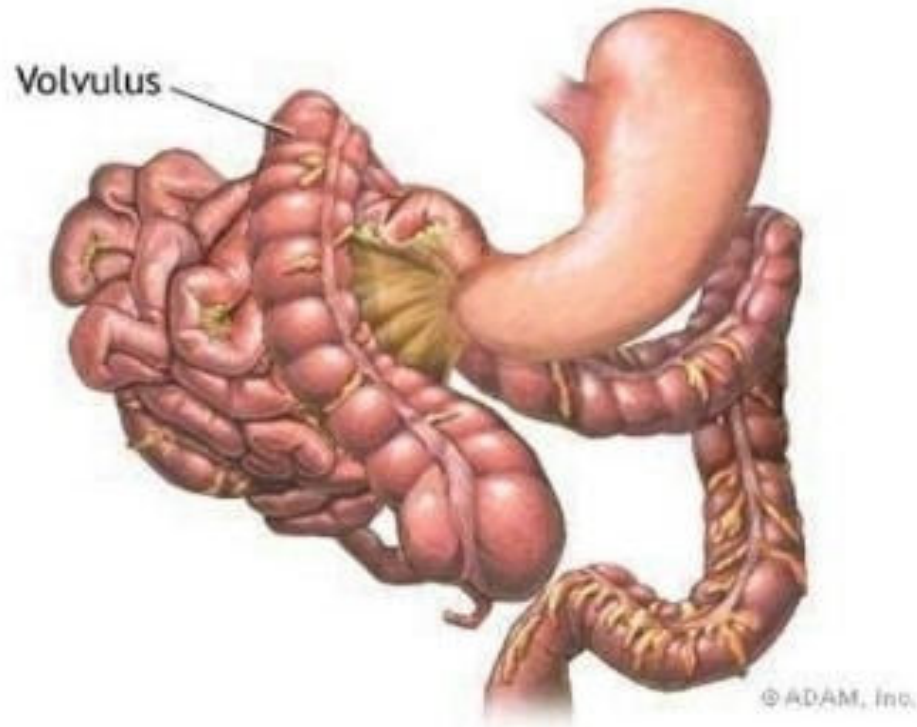
- Telescoping of one bowel to neighbouring bowel.
- Types – Antegrade(most common)
Retrograde(jejunogastric – post GJ)
- Children – most common, weaning period
Hyperplasia of Peyer's patches in the terminal ileum
- Adults- intraluminal mass, lipoma, polyp
carcinoma, Meckel's diverticulum

- Commonest sites
 Children- ileocolic
 Adults –colocolic
- Classical radiological sign- **CLAW SIGN** (Barium enema)



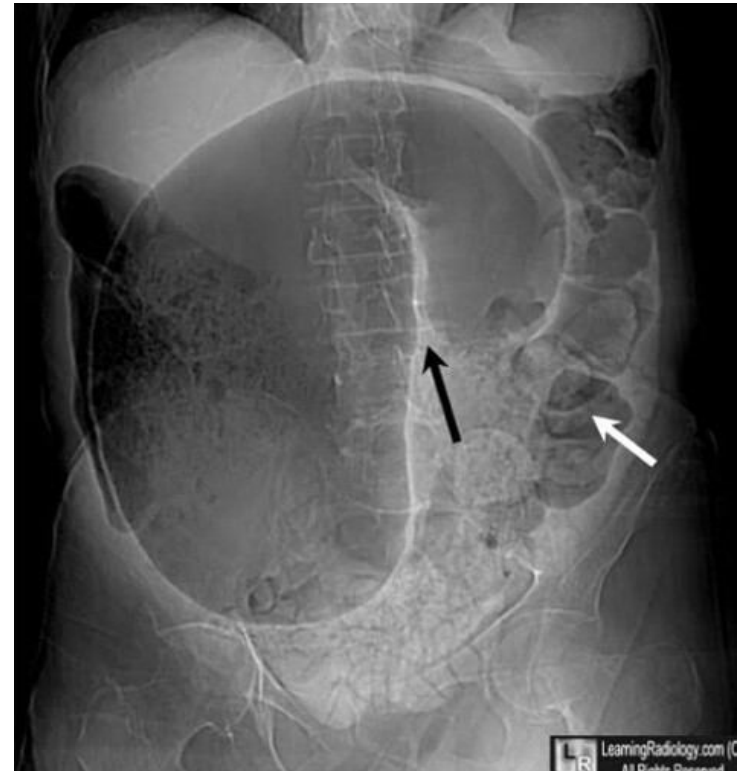
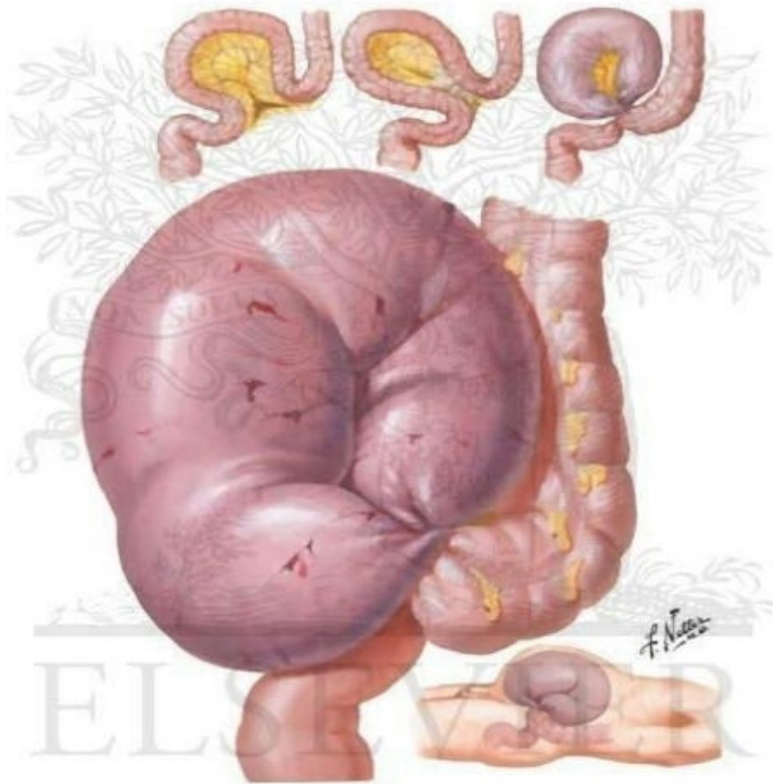
- Treatment- saline reduction using ultrasound(children)
or
surgical reduction(adults or failed saline
reduction in children)

VOLVULUS



- Twisting or axial rotation of a portion of bowel about its mesentery.
- Types – sigmoid (most common)
 - caecal(rare)
 - compound(extremely rare)
 - volvulus neonatorum

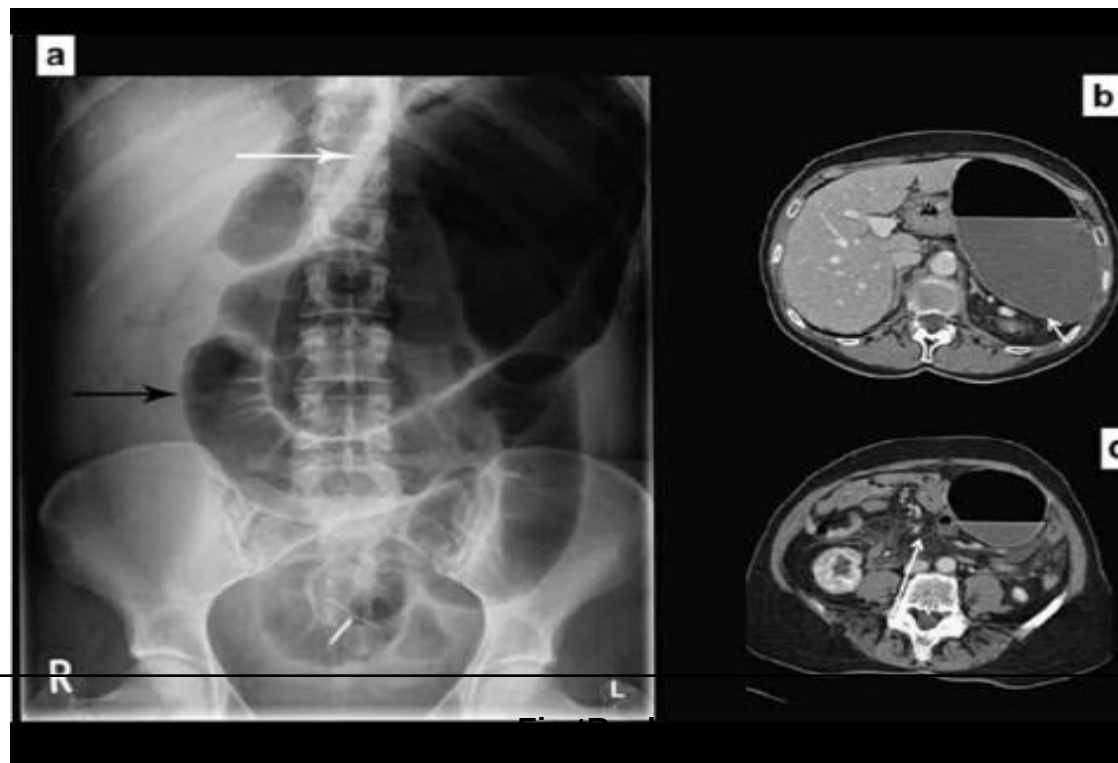
SIGMOID VOLVULUS



CAECAL VOLVULUS

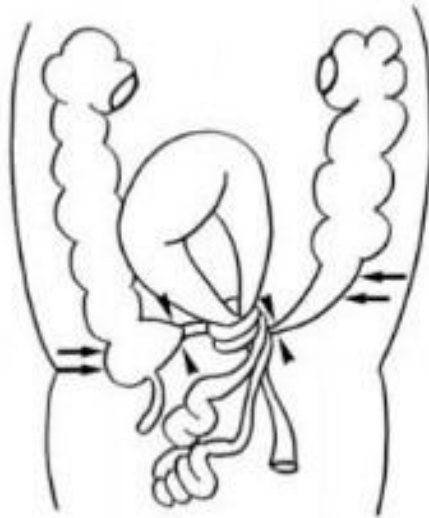


- Second common site
- Commonest cause of large bowel obstruction in pregnancy
- Caecum markedly distended & found in centre of abdomen (lack of fixation- mobile caecum)
- X ray-round gas shadow in Rt iliac region
- Treatment – resection & anastomosis



COMPOUND VOLVULUS

- Also known as ileosigmoidal knotting



- Long pelvic mesocolon allows ileum to twist around sigmoid colon, resulting in gangrene of either or both segments of bowel
- Presentation- a/c intestinal obstruction, distension is mild
- Plain radiography- distended ileal loops in distended sigmoid colon
- Treatment – resection & anastomosis

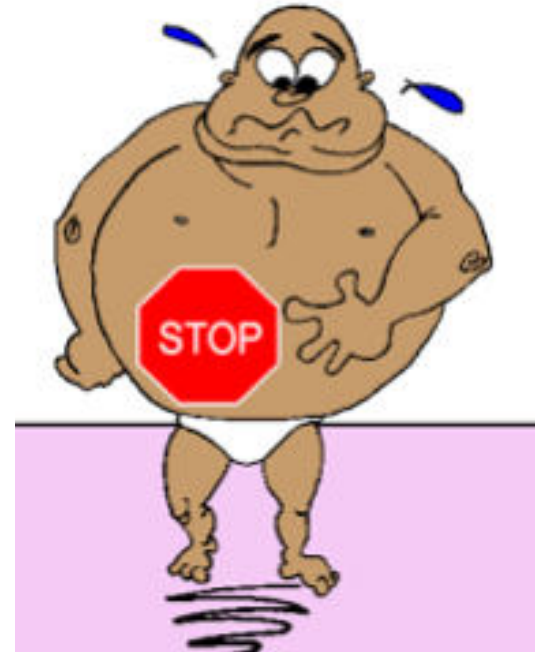
CLINICAL FEATURES OF INTESTINAL OBSTRUCTION

ATHIRA. S. THAMPI

DYNAMIC OBSTRUCTION

4 CARDINAL FEATURES :

- Abdominal pain
- Distension
- Vomiting
- Absolute constipation



CLINICAL CLASSIFICATION

- Small bowel obstruction
- Large bowel obstruction

- Complete
- Incomplete

- Simple
- Strangulation

1.Small bowel obstruction

i) High :

- Vomiting occurs early
- Distension is minimal.
- Little evidence of dilated small bowel loops on radiography.

ii) Low :

- Pain predominant with central distension.
- Vomiting delayed.
- Multiple dilated small bowel loops seen on radiography.

2.Large bowel obstruction

- Distension pronounced(flanks)
- Pain less severe
- Vomiting and dehydration later features
- Colon proximal to obstruction-distended on radiography.

1)Complete:

- Small bowel obstruction - all cardinal features.
- Large bowel obstruction- delayed presentation of symptoms.

2)Incomplete [partial or subacute]:

- Symptoms are mild and intermittent.

1)Simple:

Blood supply **intact**

2)Strangulation:

Interference to blood flow
[Closed loop obstruction]

Clinical features vary according to:

- Location of obstruction: proximal & distal
- Duration of obstruction: acute & chronic
- Underlying pathology
- Presence or absence of intestinal ischemia

PAIN



- Sudden and severe.
- Colicky
- Centered on umbilicus (mid gut) or lower abdomen(hind gut).
- Severe(continuous)pain- presence of strangulation

VOMITING

- If proximal: occurs earlier;
If distal: occurs late



proximal duodenal obstruction : stomach contents

- Contents: small bowel obstruction : bilious
colonic obstruction : faeculent
- As obstruction progresses: digested food to
faeculent material.

DISTENSION



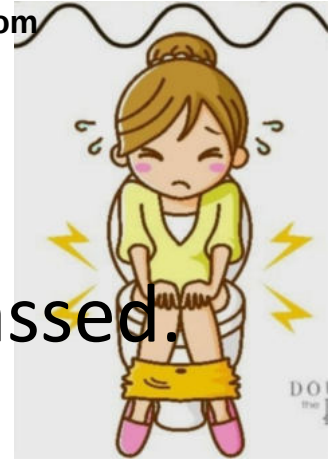
- **Small bowel obstruction:** central distension; more pronounced in distal ileal obstruction.
- **Colonic obstruction:** distension is an early feature; occur in flanks.
- Visible peristalsis- demonstrated by *flicking* the abdominal wall.
[Step Ladder pattern]

Visible peristalsis-

Step ladder pattern



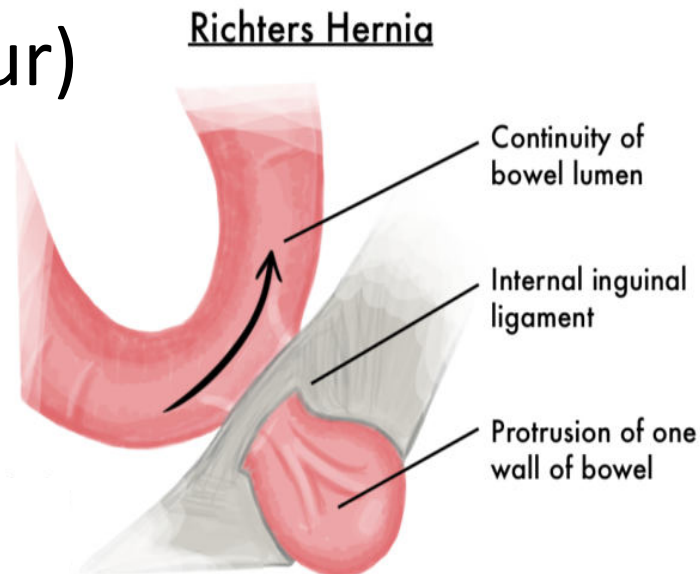
CONSTIPATION



- Absolute: Neither faeces nor flatus is passed.
Relative: Only flatus is passed.
- **Absolute constipation**-cardinal feature of complete intestinal obstruction
- Small bowel: late feature
Large bowel: early feature
- Administration of enemas should be avoided in cases of suspected obstruction.

Absolute constipation may not be present in:

- Richter's hernia
- mesenteric vascular occlusion
- all cases of partial obstruction (in which diarrhoea may occur)



Other manifestations

1) Dehydration:

- Common feature
- Results from:
 - i. Vomiting
 - ii. Sequestration of fluid within bowel & peritoneal cavity
 - iii. Decreased intake

2) Hypokalaemia:

- Not a common feature
- Increase in serum potassium may be associated with the presence of strangulation.

3)Fever:

Indicate:

- onset of ischaemia
- intestinal perforation
- inflammation or abscess associated with the obstructing disease.

Hypothermia:septic shock

4) Abdominal tenderness

- Localised tenderness: impending or established ischaemia.
- Diffused tenderness: peritonitis (infarction or perforation).

5) Bowel sounds

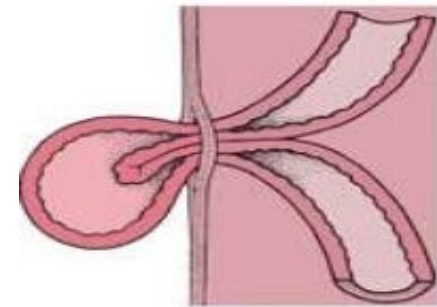
- **Mechanical obstruction**: High pitched & high frequency (small bowel).
- **Paralytic ileus**: Non propulsive **tinkling sounds** *like bells at evening pealing*
- Bowel sounds may be scanty or absent, if obstruction is longstanding and if small bowel has become inactive.

CLINICAL FEATURES

- Strangulation
- Intussusception

CLINICAL FEATURES OF STRANGULATION

Case of surgical emergency.
Diagnosis is almost entirely clinical.



Strangulated Hernia

- **Constant,severe pain:**Indicate strangulation
- **Tenderness with rigidity:**Indicate need for early laparotomy
- **Shock:**Indicate underlying ischaemia

■ Things to be noted:

- Patient appears listless.
- Suspect strangulation if pain persist despite conservative management.
- Suspect strangulation in a hernia if lump is:
 - i. Tense
 - ii. Tender
 - iii. Irreducible
 - iv. No expansile cough impulse
 - v. Skin blebs

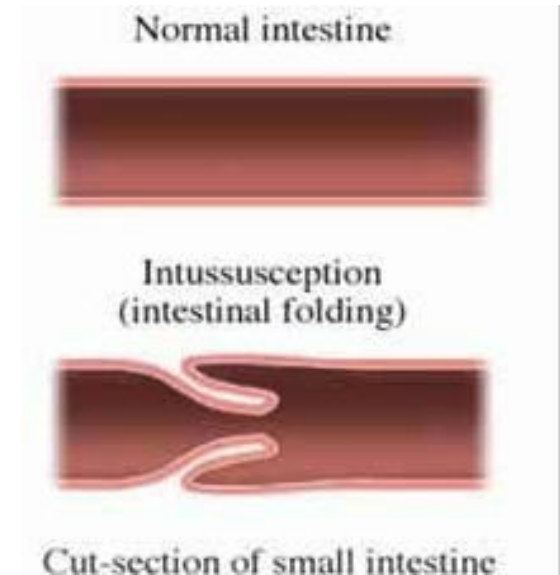
CLINICAL FEATURES OF INTUSSUSCEPTION

Episodes of screaming and drawing up of legs in a previously well male infant. The attacks last for few minutes and recur repeatedly.

During attacks the child appears pale; between episodes he may be listless.

Vomiting becomes conspicuous and bile-stained.

Stool is mixed with blood and mucus-
redcurrant jelly stool.



Redcurrant jelly stool



■ Examination:

- A lump that hardens on palpation seen in 60% of cases.
- Feeling of emptiness in the right iliac fossa-*sign of Dance*.
- On rectal examination, blood-stained mucus found on the finger.
- In extensive ileocolic or colocolic intussusception, the apex may be palpable or may protrude from the anus.

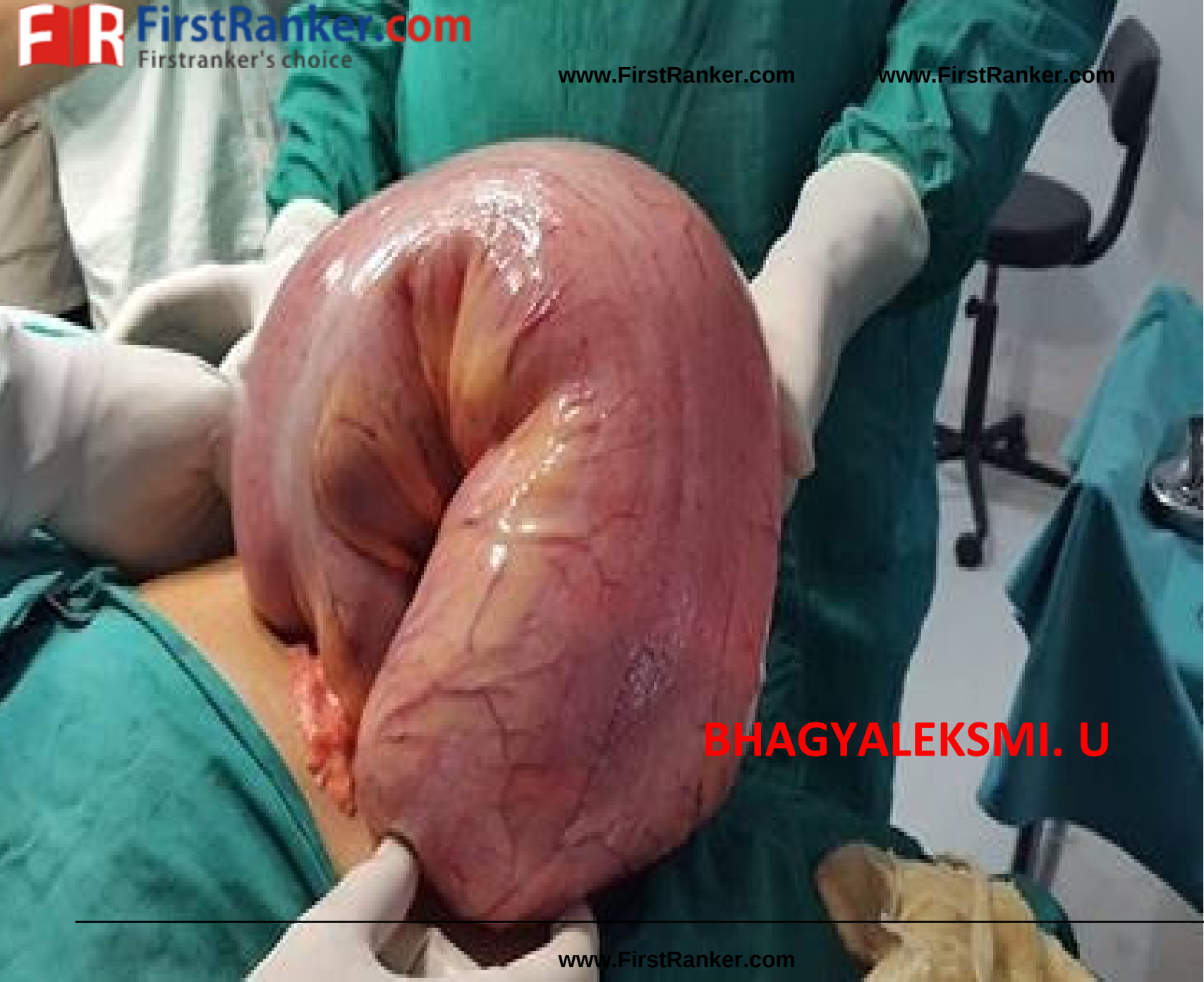
Intussusception protruding from anus



If unrelieved, progressive dehydration and abdominal distension will occur, followed by peritonitis secondary to gangrene.

➤ **Differential diagnosis**

- Acute gastroenteritis
- Henoch–Schönlein purpura
- Rectal prolapse



BHAGYALEKSMI. U

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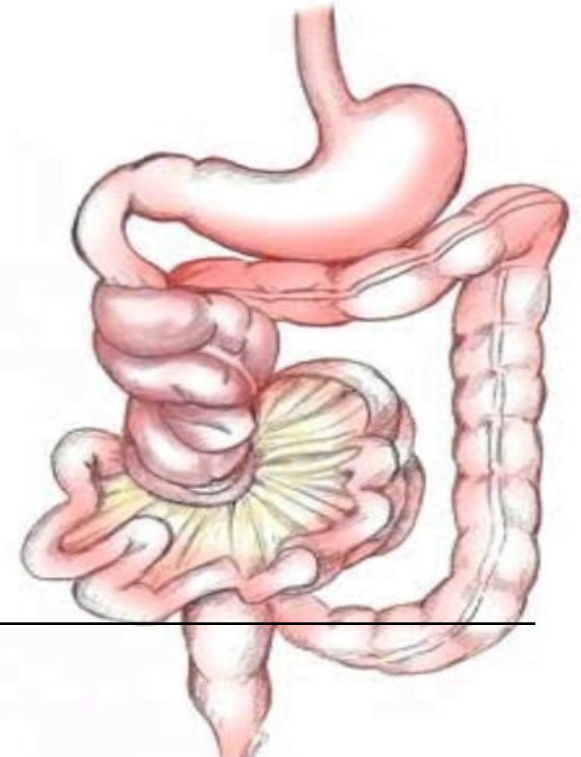
Volvulus

- Twisting or axial rotation of a portion of bowel about its mesentery .
- May involve the small intestine, caecum or sigmoid colon.
- $>180^\circ$ torsion- obstruction of lumen.
- $>360^\circ$ torsion-vascular occlusion of mesentery---
>thrombosis--->ischemia.

- Bacterial fermentation → distention

Increased intraluminal
pressure → impaired
capillary perfusion

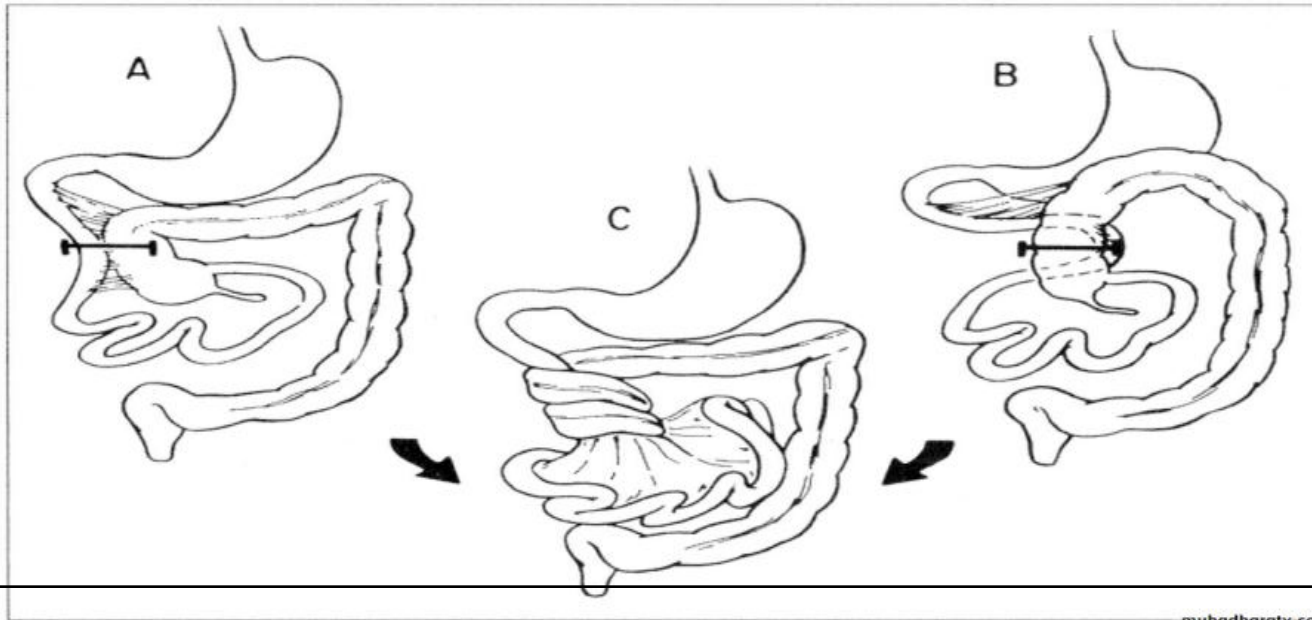
- Neonatal midgut volvulus secondary to midgut malrotation is life threatening.



- Primary or secondary
- Primary--due to congenital malrotation of the gut, abnormal mesenteric attachments or congenital bands.
- Ex: volvulus neonatorum
 - Caecal volvulus
 - Sigmoid volvulus
- secondary-- most common
 - Due to rotation of segment of bowel around an acquired adhesion or stoma

VOLVULUS NEONATORUM

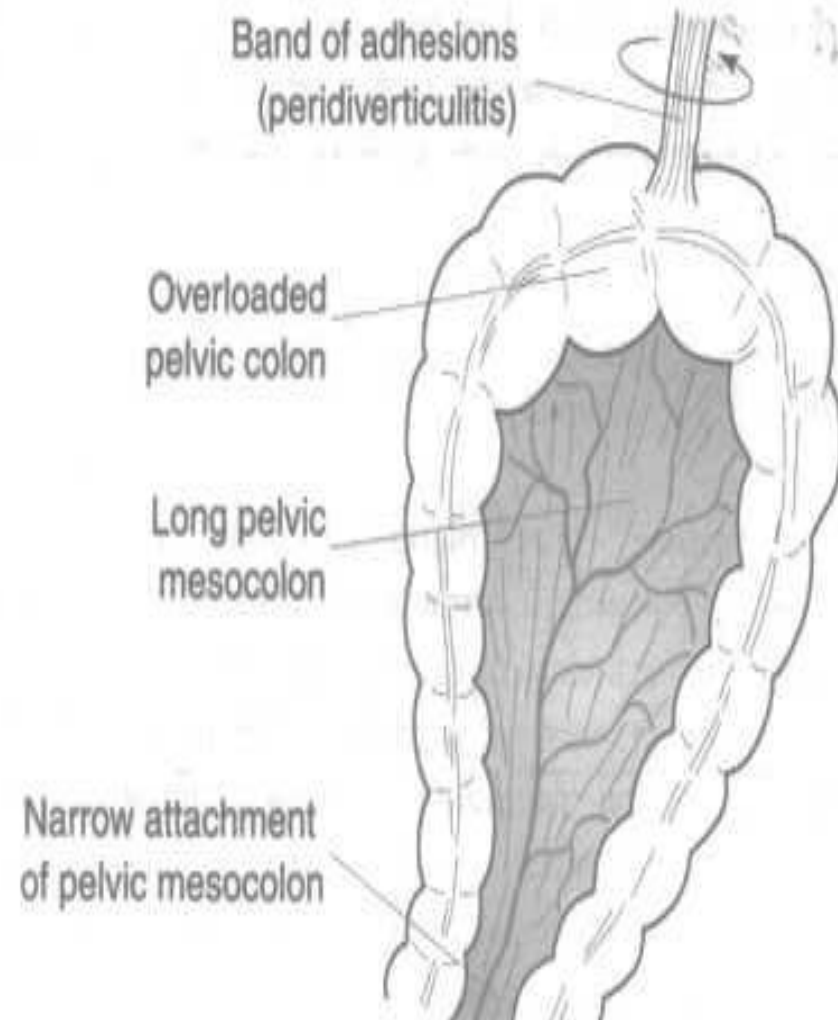
- This occurs secondary to intestinal malrotations.
- Potentially catastrophic.



SIGMOID VOLVULUS

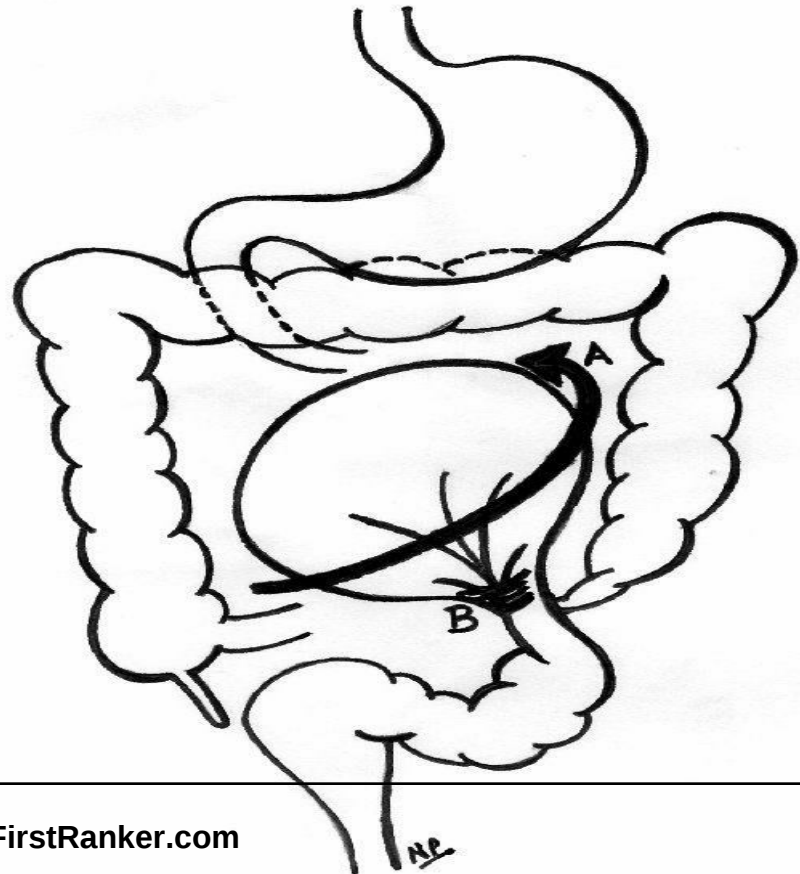
- Rotation-Anticlock wise direction
- Comorbidities - chronic psychotropic drug use
- Prognosis inversely related to duration of symptoms.

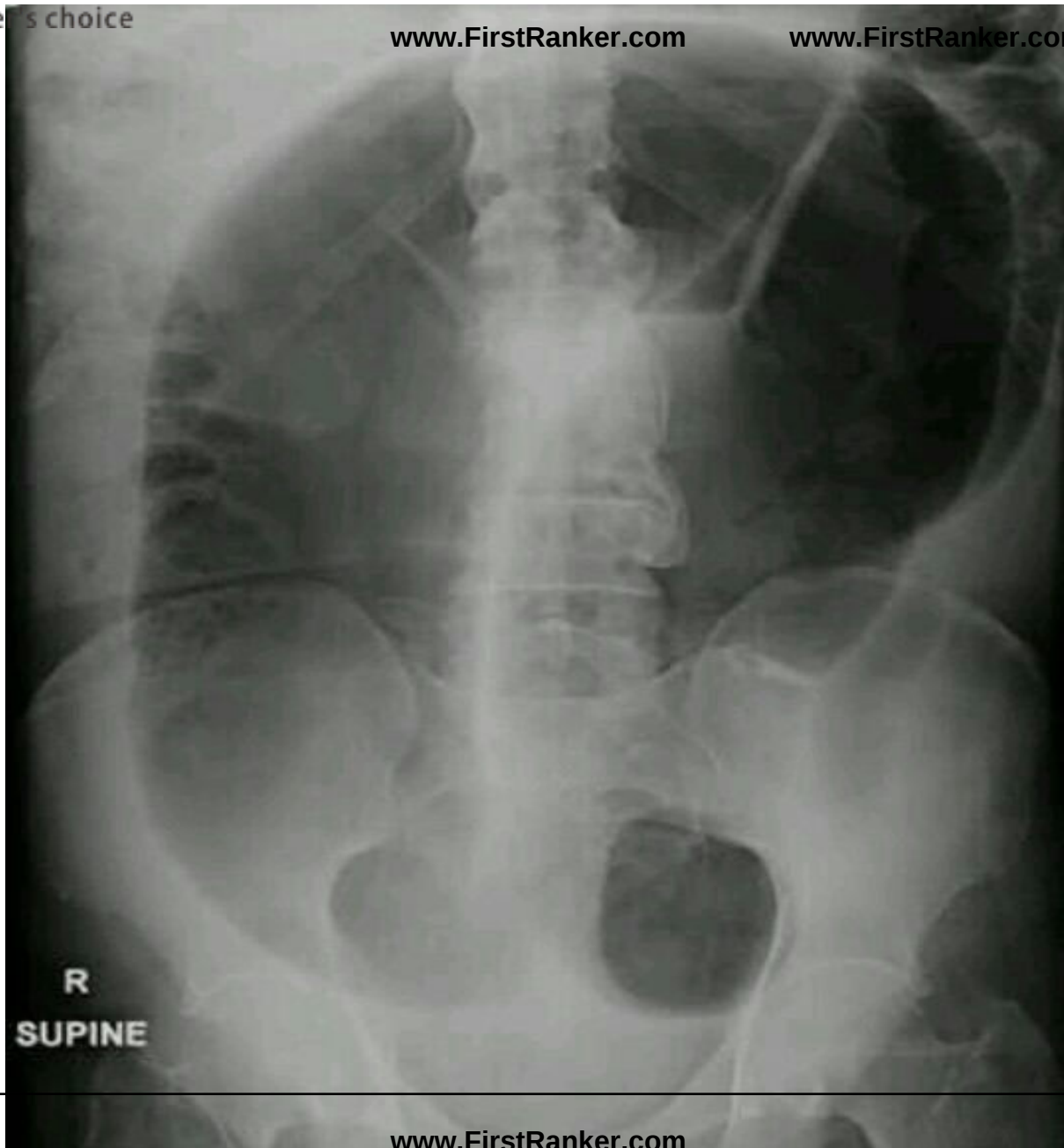
- **Predisposing factors.**
- and also high residue diet and constipation.



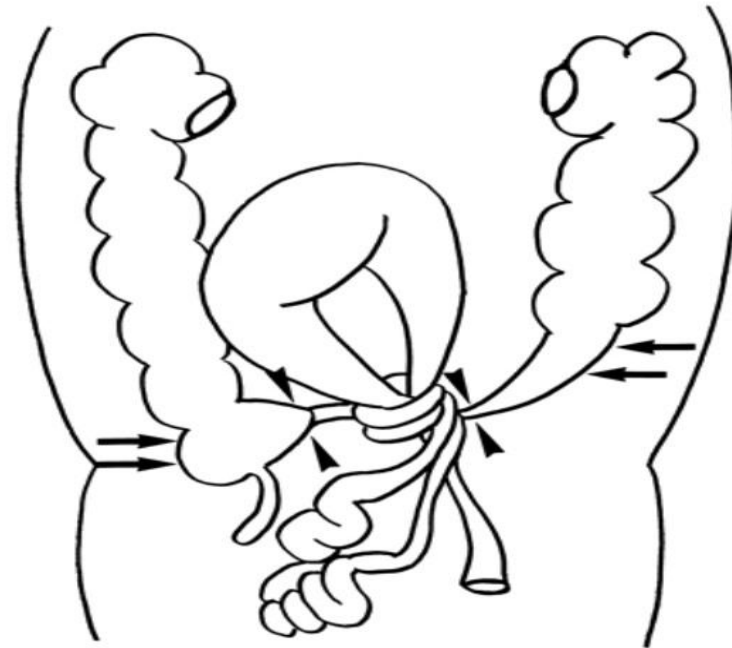
- Presentation can be ,
 - 1.fulminant: sudden onset
 - Severe pain
 - Early vomiting
 - Rapidly deteriorating
 - 2.Indolent: Insidious onset
 - Slow progressive
 - Less pain
 - Late vomiting

- Sigmoid volvulus. (A) Counterclockwise torsion at base of mesentery. (B) Adhesions at base of sigmoid mesocolon leading to formation of fixed omega loop that is susceptible to reperi-





COMPOUND VOLVULUS



- Ileosigmoid knitting.
- rare condition.

- ileum twist around the Sigmoid colon-->gangrene of either or both segment of bowel
- Distension is comparatively mild.
- Plain radiography- distended ileal loops in a distended Sigmoid colon.

Clinical features

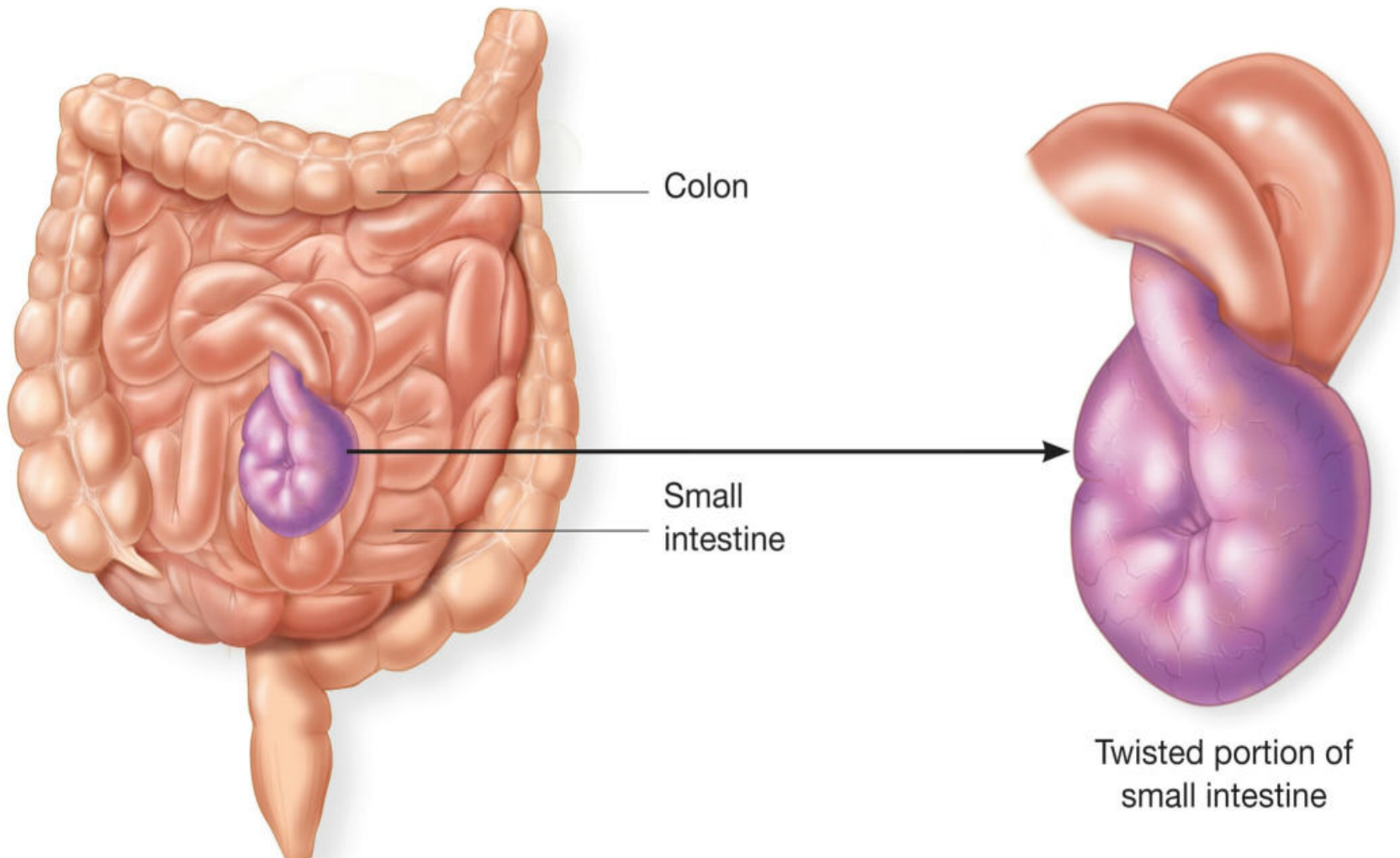
Volvulus of small intestine

- Primary or secondary
- Usually occurs in the lower ileum
- Predisposing factors- consumption of large amount of vegetables

- secondary to

adhesions

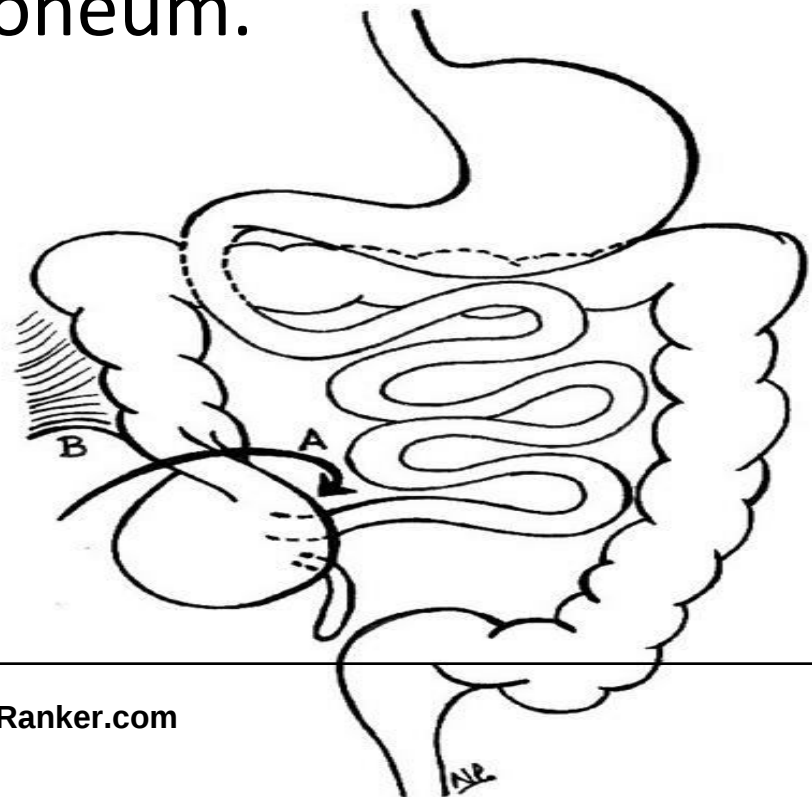
passing to the parietes or female
pelvic organs



Caecal volvulus

- Occurs as part of volvulus neonatorum or denovo
- clock wise twist
- more common in females in the 4th and 5th decades
- presents acutely with classic features of obstruction , ischemic is common
- commonly felt as palpable tympanic swelling in the midline or left side of the abdomen.

- Cecal volvulus. (A) Clockwise torsion of mesentery of cecum, ascending colon, and terminal ileum. (B) Absence of dorsal mesenteric attachments of cecum and proximal ascending colon, leading to lack of fixation to retroperitoneum.





- The radiograph shows a markedly distended loop of bowel 15-cm in diameter with its axis running from the right lower quadrant to the mid abdomen. This loop of bowel represent a twisted cecum with the caput cecum directed medially (arrows). The haustra within the cecum (C) are effaced.



Sigmoid volvulus

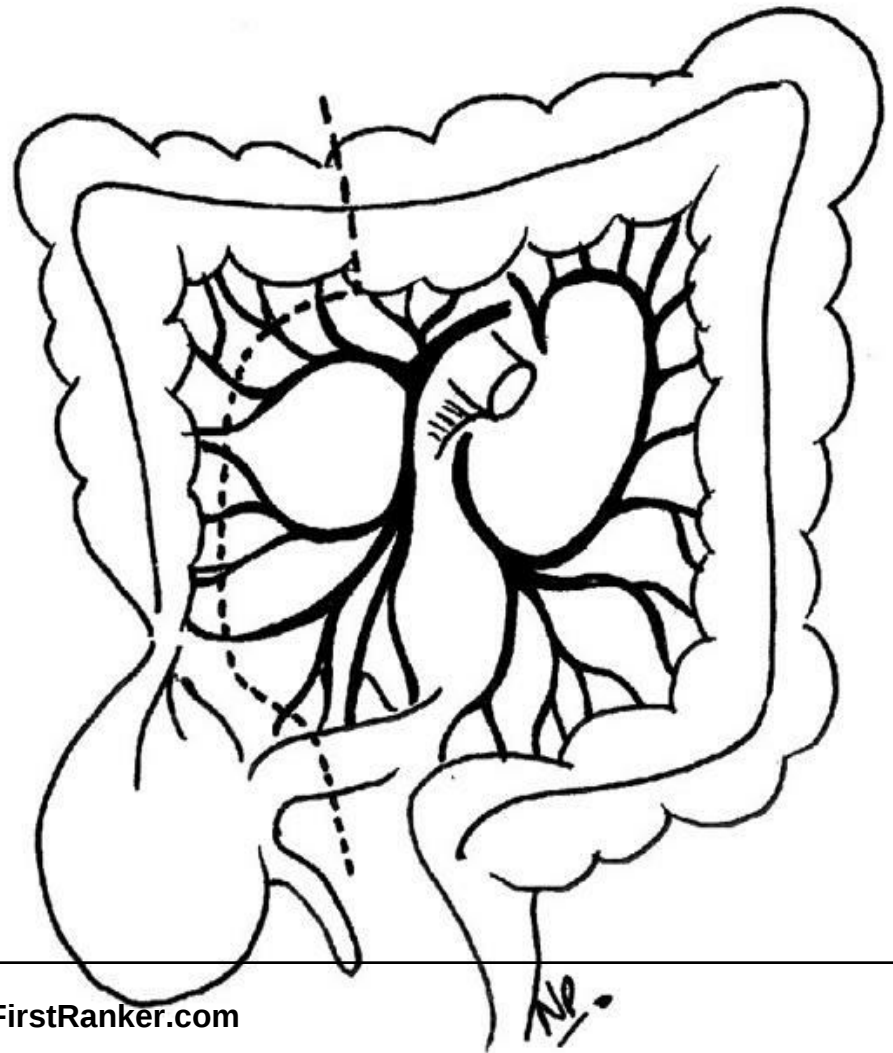
- Large bowel obstruction.
- Presentation varies in severity and acuteness.
- abdominal distension is an early progressive sign.
- associated with hiccough and retching.
- absolute constipation.
- in some patients, the grossly distended left colon is visible through the abdominal wall.

Treatment

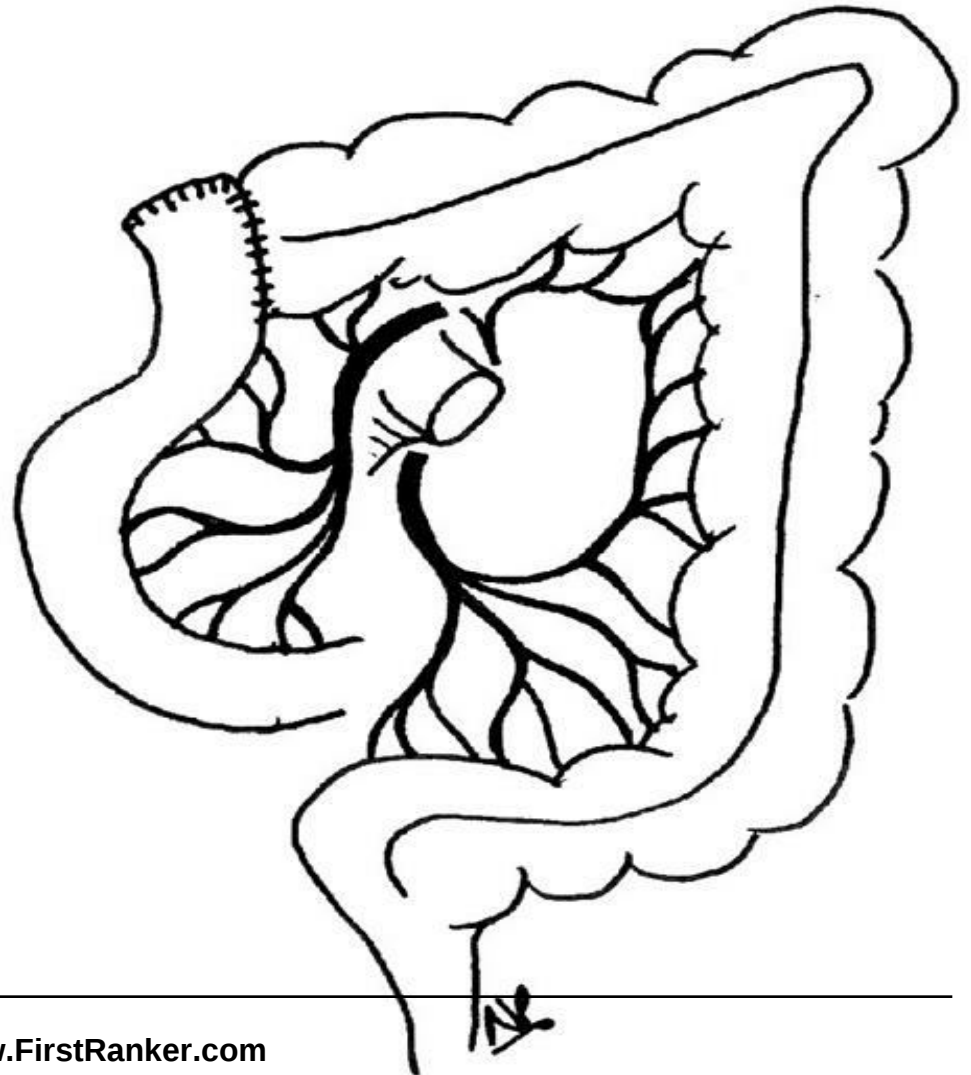
Caecal volvulus

- Decompression- needle
- ischemic- need resection
- viable- should be reduced
- Further management-caecopexy(fixation of caecum to right iliac fossa)
- Caecostomy
- Right Hemicolectomy

- Extent of resection for cecal volvulus is similar to that in right hemicolectomy for benign disease.



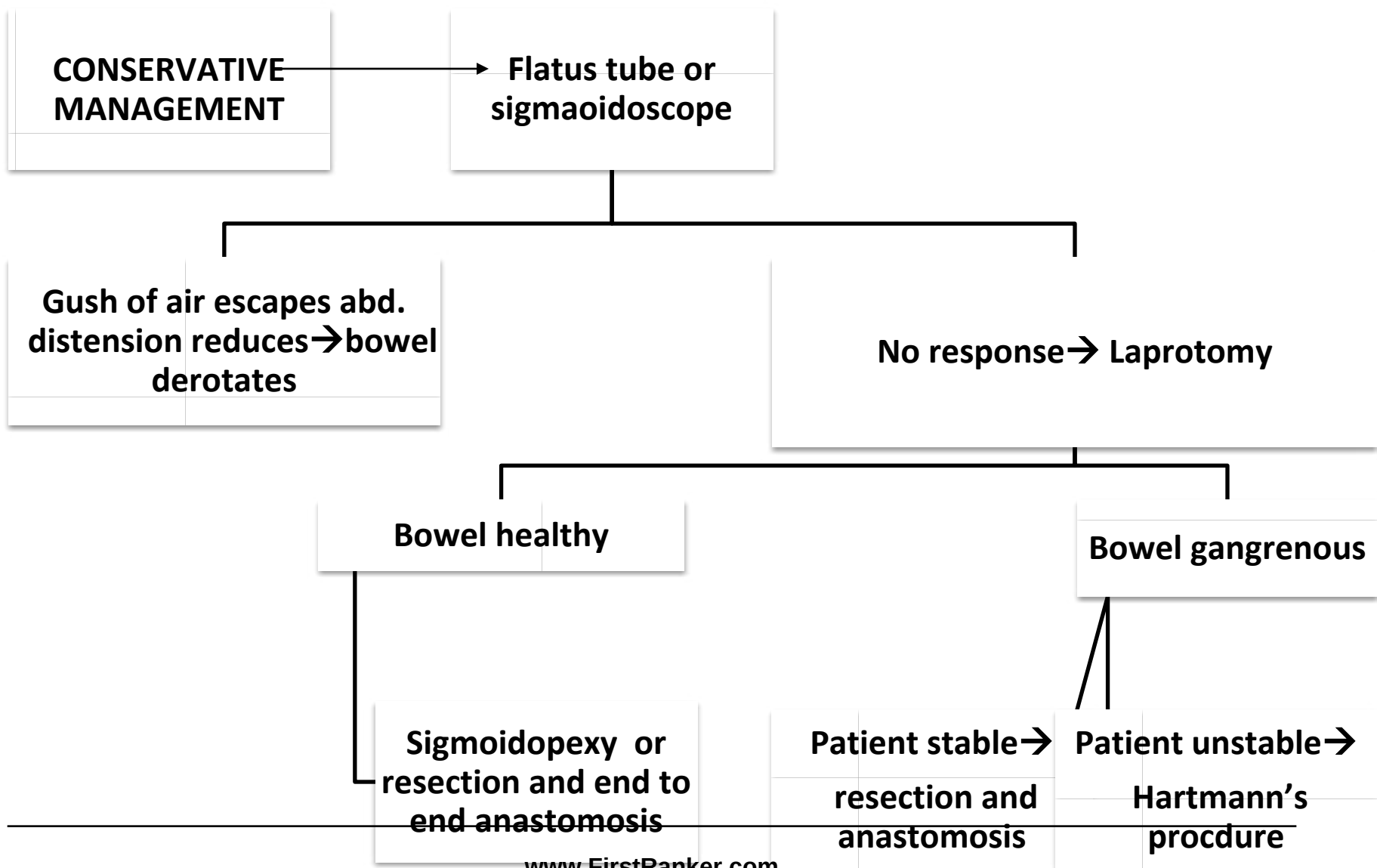
- Terminal ileum is anastomosed to transverse colon in reconstruction after right hemicolectomy



SIGMOID VOLVULUS

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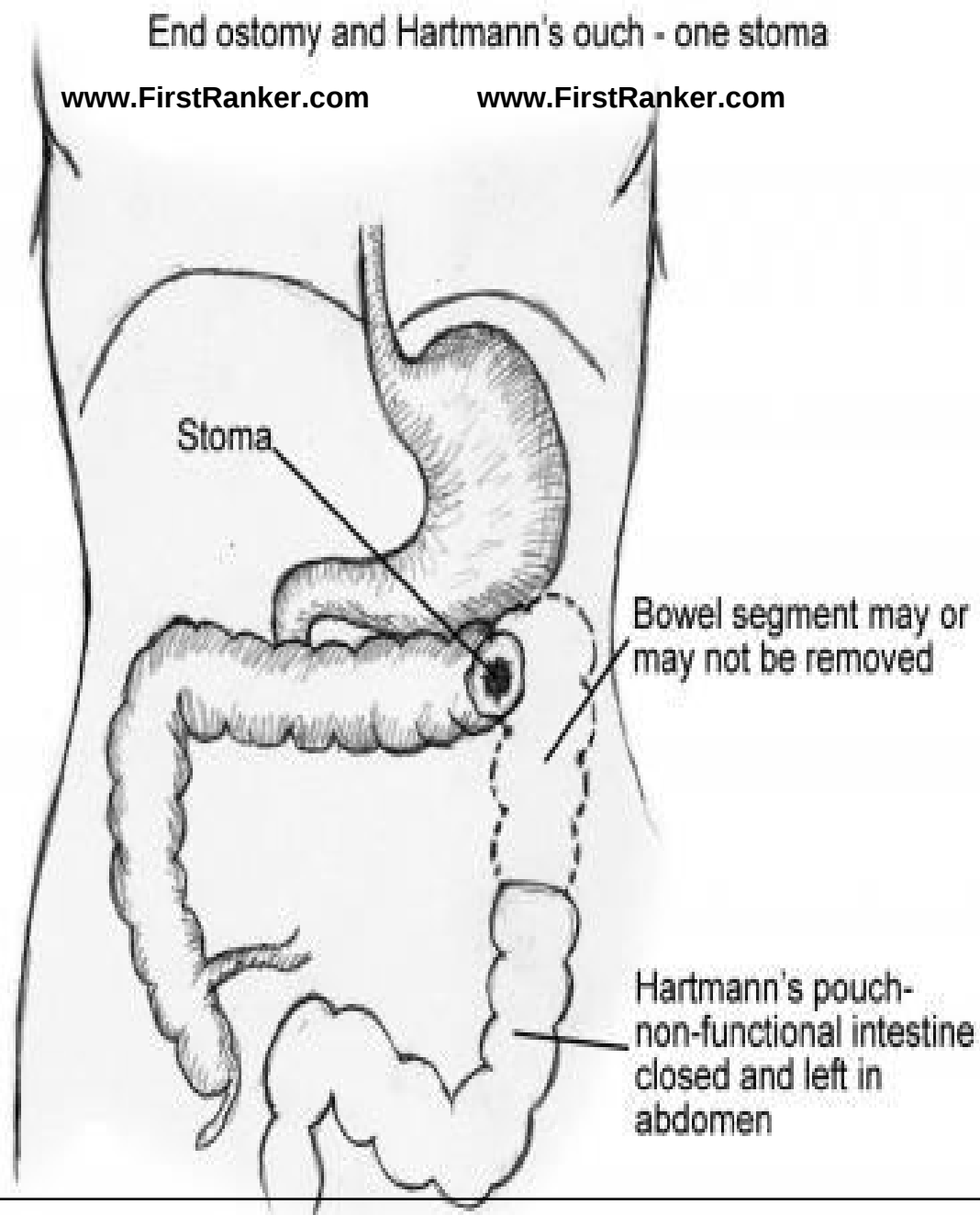




End ostomy and Hartmann's pouch - one stoma

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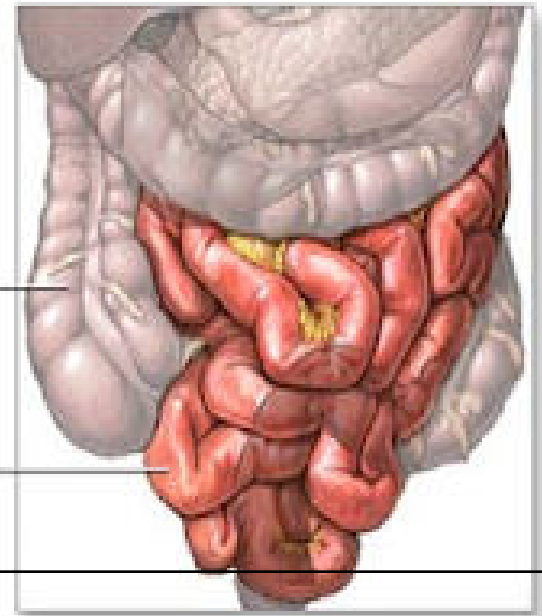
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ADYNAMIC OBSTRUCTION

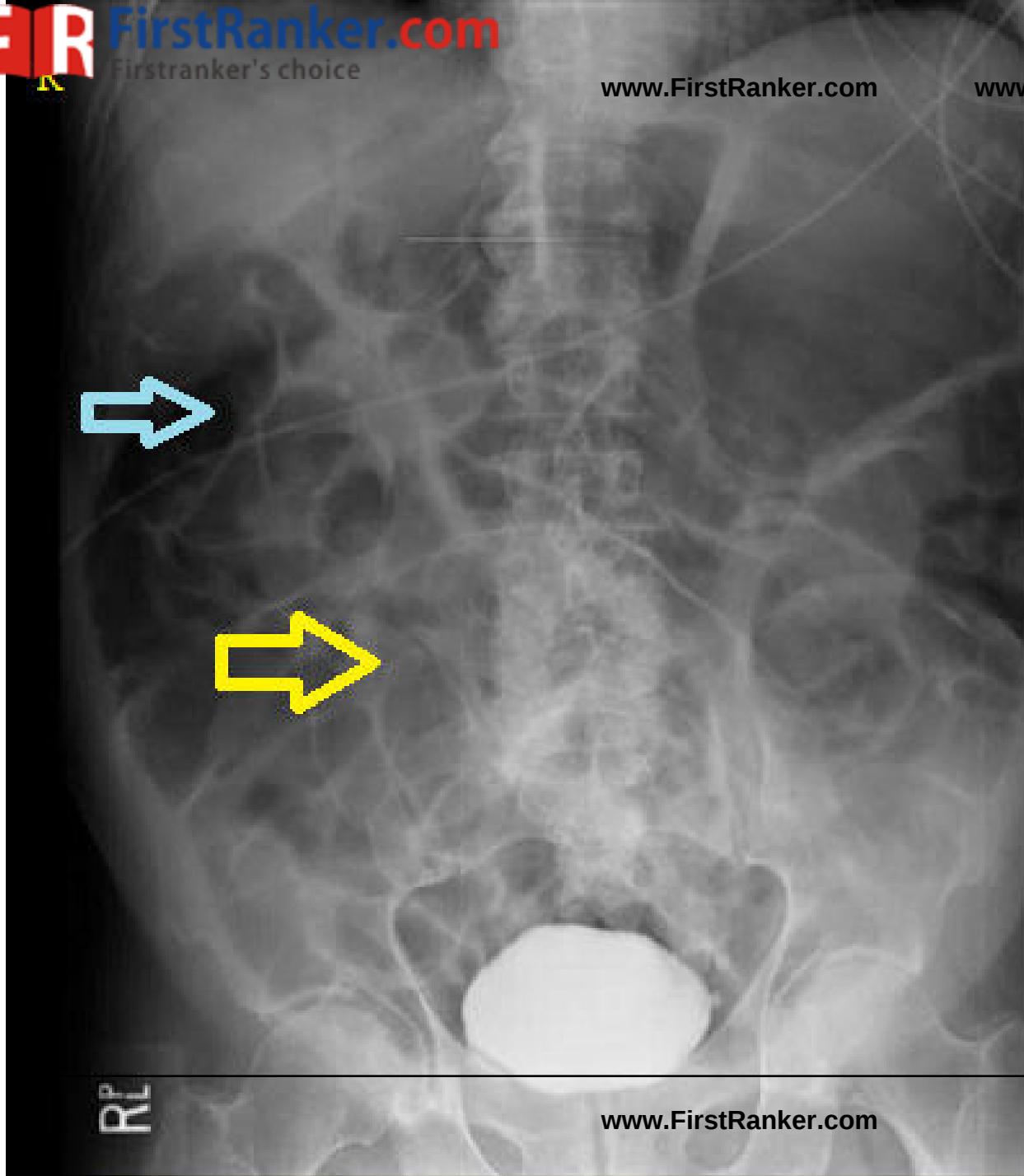
Large intestine

Small intestine



Paralytic ileus

- A state in which there is failure of transmission of peristaltic waves due to neuromuscular failure.
- It may be localised or generalised
- The resultant stasis leads to accumulation of fluid and gas with in the bowel, with associated distension, vomiting, absence of bowel sounds and absolute constipation.



Note: (1) The generalized distension of small & large intestine (yellow arrow)
(2) Multiple air fluid levels (blue arrow)

VARIETIES

- **Post operative:** usually self limiting ,with a variable duration of 24-72 hours.May be prolonged in the presence of hypoproteinaemia or metabolic abnormality.
- **Infection:** Intra abdominal sepsis may give rise to localised or generalised ileus .

- **Reflex ileus:** this may occur following fractures of the spine or ribs ,retroperitoneal haemorrhage or even the application of plaster jacket.
- **Metabolic :** uraemia and hypokalaemia are the most common contributory factors.

Clinical features

History

- No passing flatus and feces.
- vomiting(copious).
- dull abdominal pain.
- Respiratory distress due to pressure over the diaphragm.
- **On examination**
 - Dehydration,tachycardia
 - tympanic
 - High pitched tinkling note '*like bells at evening pealing*'

Investigations

- Lab: serum electrolytes, RFT
- X ray abdomen.
- USG abdomen to find out the possible causes of ileus, eg ;sepsis.
- CT (diagnostic in prolonged cases)

Treatment

- Primary cause must to be treated.
- bowel rest and nasogastric decompression.
- IV fluids
- Electrolyte management
- Catheterisation and urine output measurement

- Do not stimulate the peristalsis(*'don't flog a tired horse'*)
- Measurement of abdominal girth is necessary to see whether patient is recovering or not.
- Most often patient recovers in 3 days
- In prolonged, life threatening paralytic ileus, laparotomy is done.

PSEUDO OBSTRUCTION

- Colon is usually affected.
- No mechanical cause.
- Associated with a variety of syndromes .
- With underlying neuropathy and or/myopathy .



Small intestinal pseudo obstruction

- primary or secondary
- recurrent subacute obstruction.
- Diagnosis: exclusion of a mechanical cause.
- Treatment :initial correction of any underlying disorder.
- Metoclopramide and erythromycin may be of use.



Colonic pseudo obstruction

- Acute or a chronic form
- **Ogilvie's syndrome** :presents as acute large bowel obstruction and dilation of colon in the absence of any mechanical obstruction.
- Complication: caecal perforation
- Abdominal radiographs show evidence of colonic obstruction ,with marked caecal distention .
- Confirmation by colonoscopy or a single contrast water soluble barium enema or CT.



Treatment

- Treatment of any identifiable cause.
- IV neostigmine (1mg), with a further 1mg given IV within a few minutes if the first dose is ineffective.
- ECG monitoring while giving neostigmine ,and atropine should be available.
- If not effective COLONOSCOPIC DECOMPRESSION should be performed.

IMAGING

AYSHA TAMANNA

2015 BATCH

Imaging indicates

- location
- degree
- cause of an obstruction
- and assess for the presence of ischemia.

TYPES OF IMAGING

- CONVENTIONAL RADIOGRAPHY
- BARIUM STUDIES
- SONOGRAPHY
- CT
- MRI

CONVENTIONAL RADIOGRAPHY

- Diagnosis is best made on supine films.
- In erect film the air fluid level occurs only late.
- Triad of small bowel obstruction
 1. Dilated small bowel loops >3 cm-on a supine view
 2. Multiple air fluid level –on erect view
 3. Paucity of air in colon

CHARACTERISTIC FEATURES ON X-RAY

- **Jejunum**-valvulae conniventes giving a concertina effect.
- **Ileum**-featureless
- **Large bowel**-haustral folds, folds are widely spaced, folds on the opposite wall do not meet.
- **Caecum**-rounded gas shadow in the right iliac fossa.
- **Pneumobilia**(gas in biliary tree)due to gall-stone ileus.

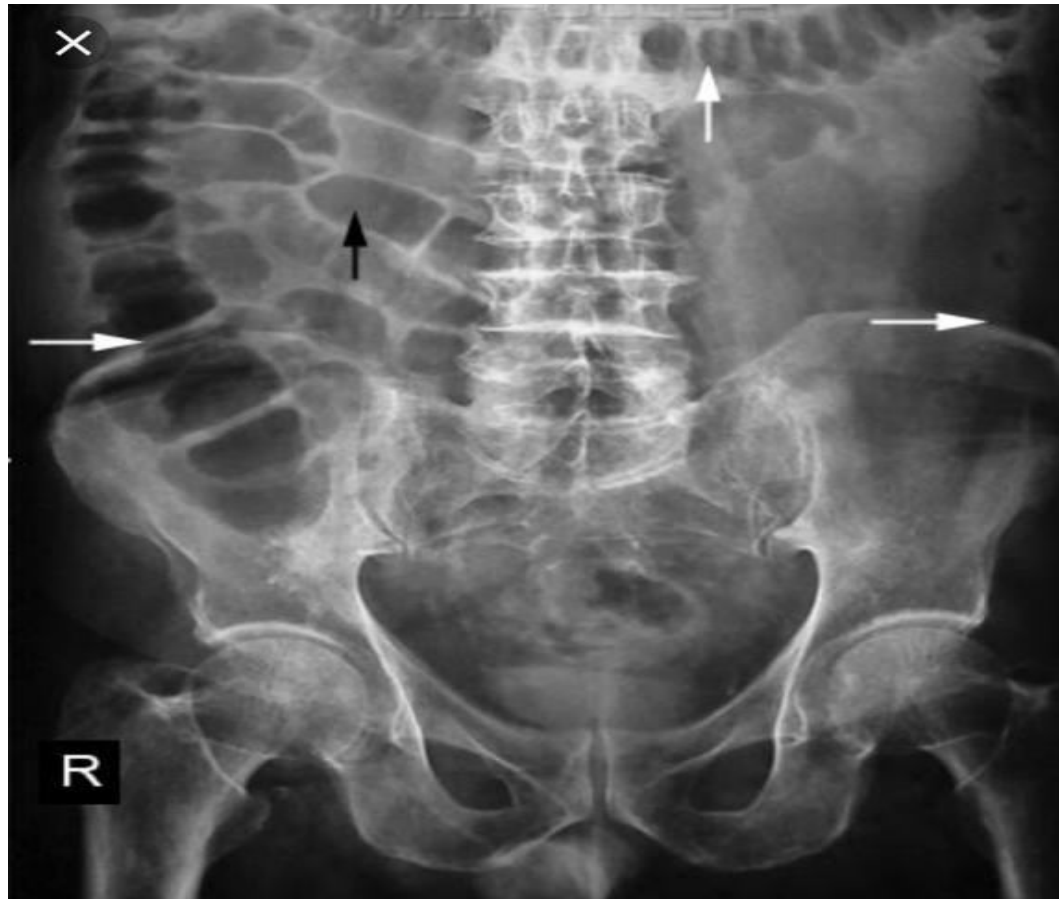
JEJUNUM-valvulae conniventes



ILEUM-Featureless



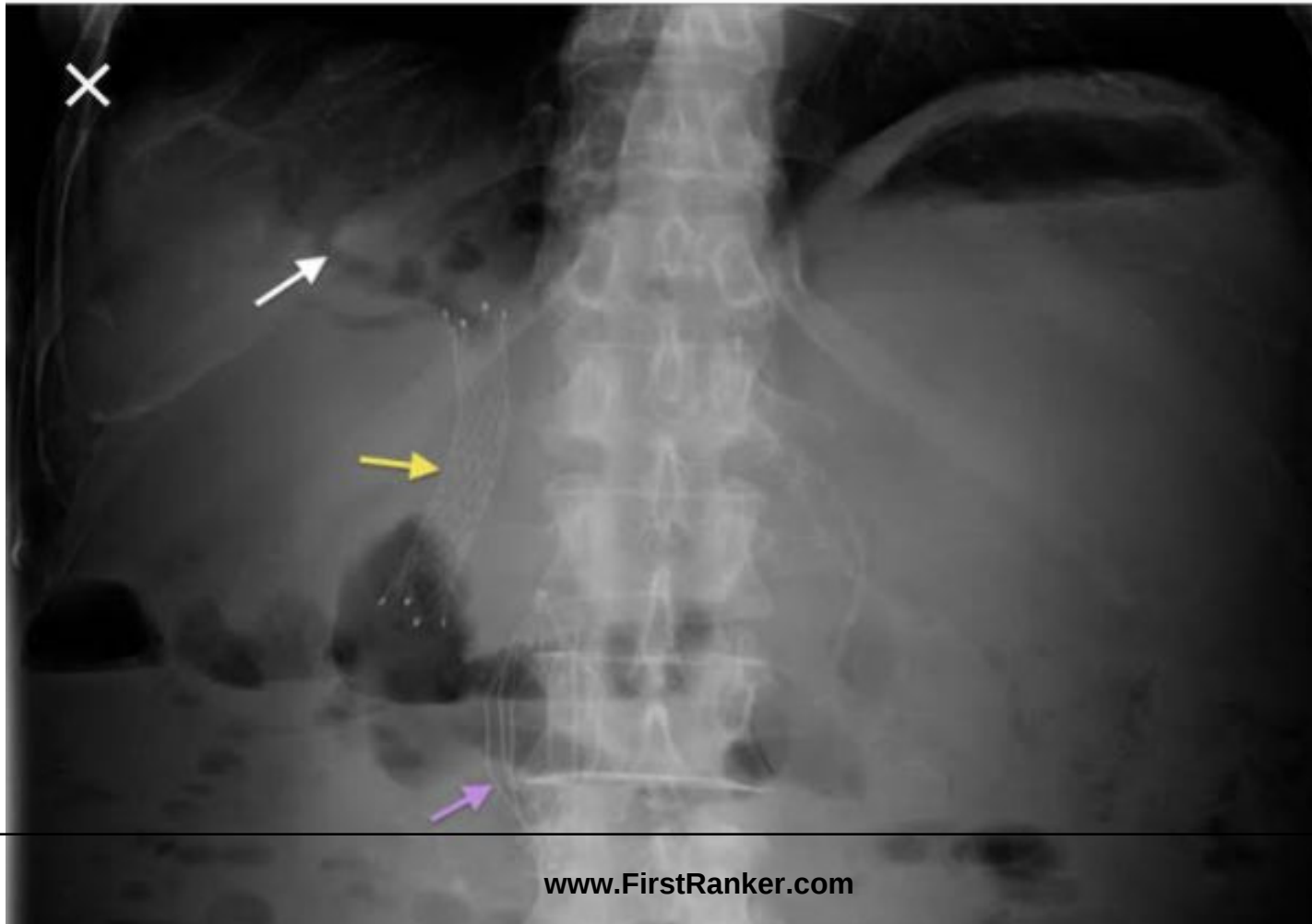
LARGE BOWEL-Haustral folds



CAECUM-Gas shadow in the right ileac fossa



PNEUMOBILIA-gas in the biliary tree



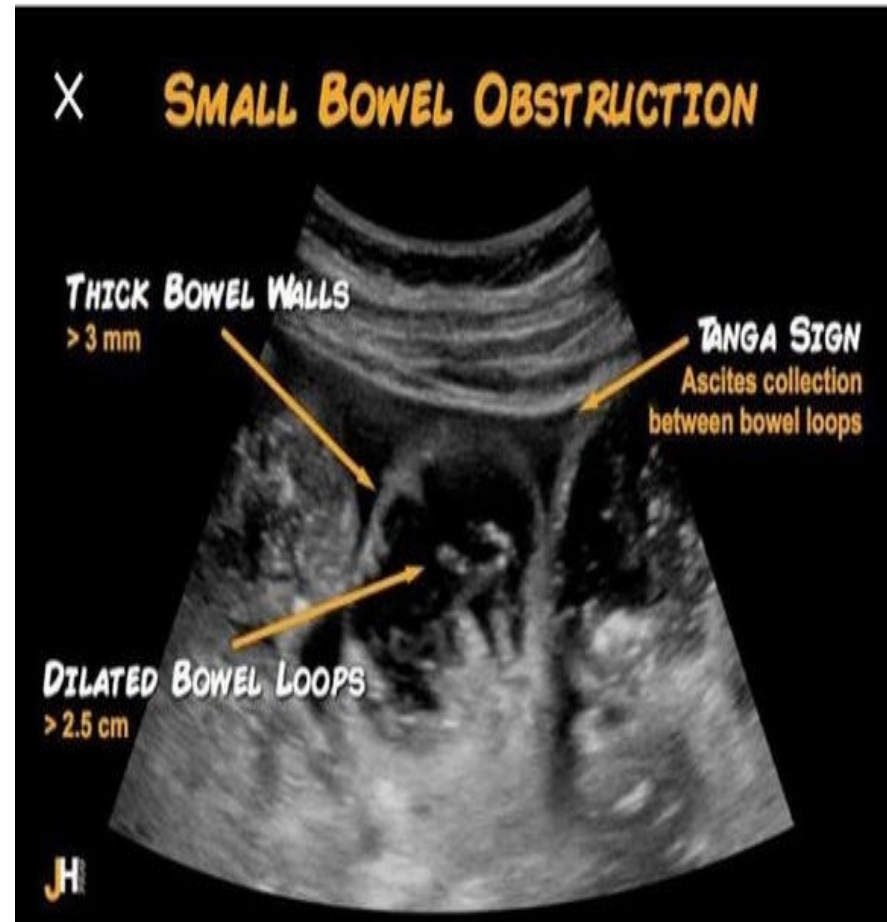
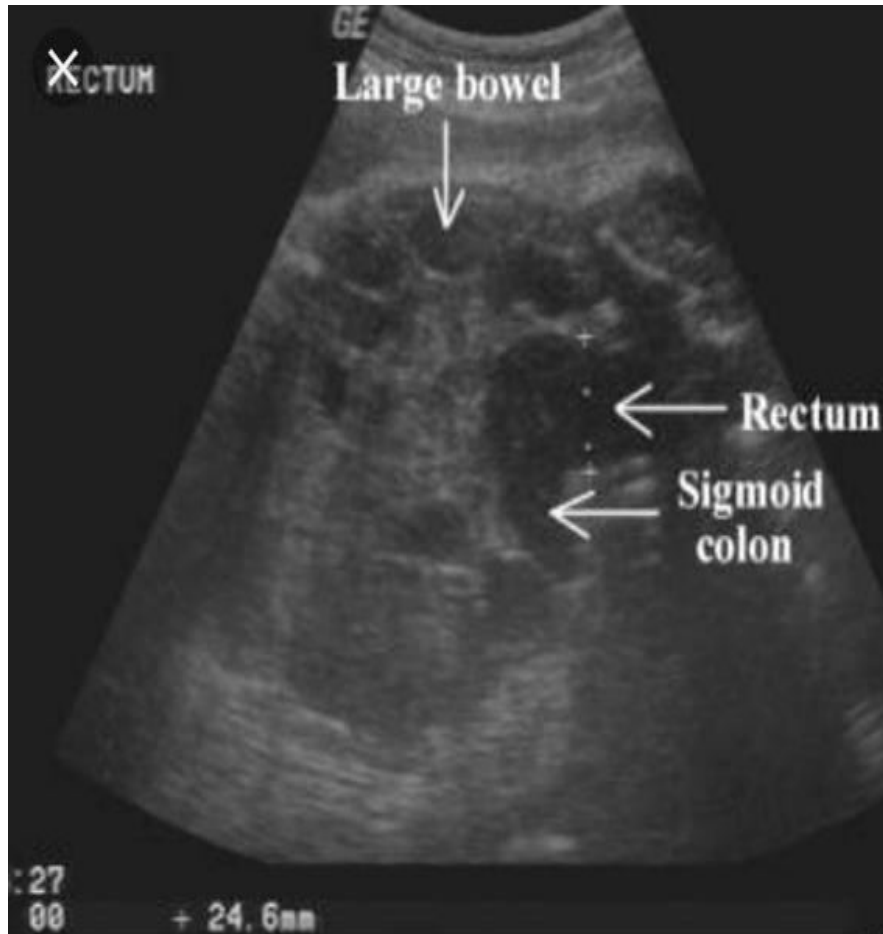
BARIUM STUDIES

- Limited use in acute setting
- Useful in recurrent and chronic obstruction



SONOGRAPHY

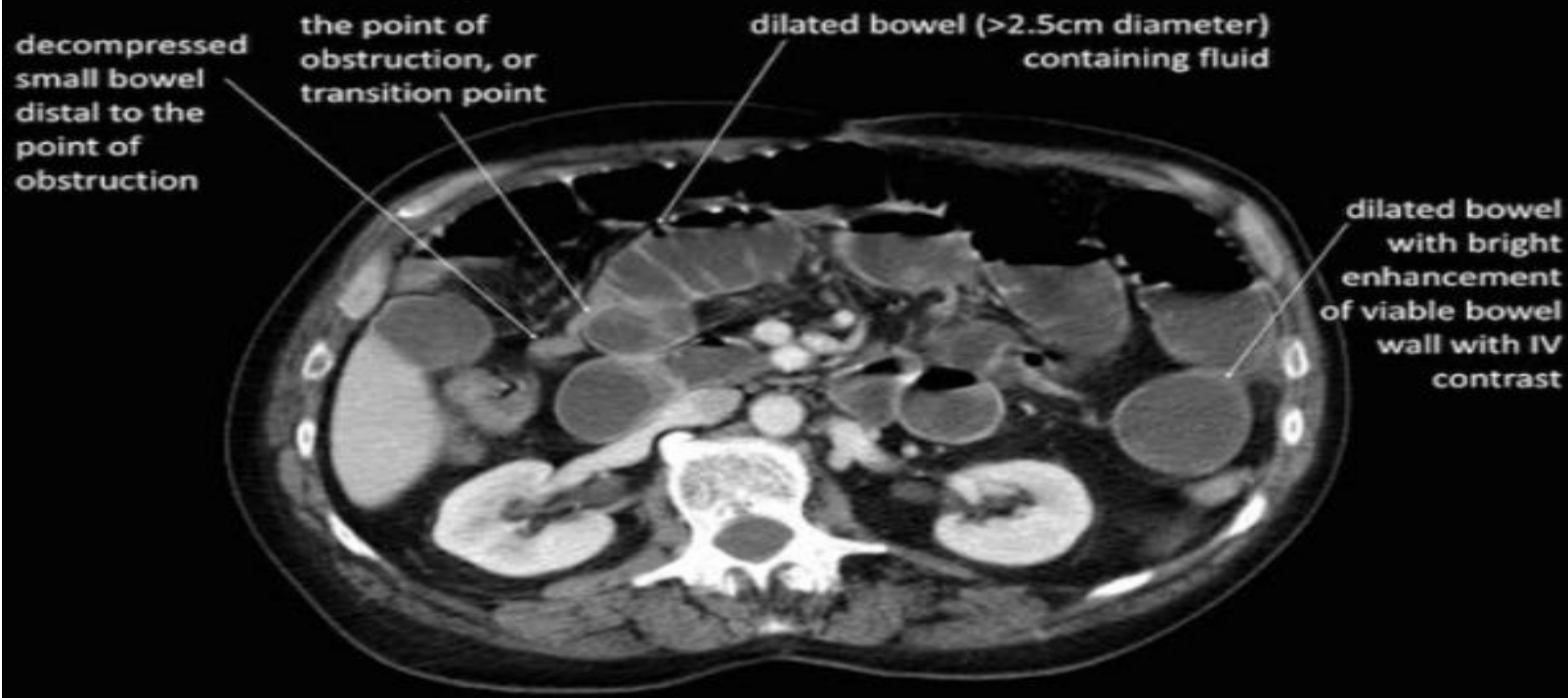
- Limited use in intestinal obstruction(due to excessive gas that reflects ultra sound waves
- The warning signs of ischaemia
 - 1.ascites
 - 2.bowel wall thickness of more than 4mm
 - 3.absence of peristalsis



ROLE OF CT

- Use triple contrast(IV ,oral,rectal)
- Can detect pathology in the
 - i. Bowel wall
 - ii. Mesentery
 - iii. Peritoneum
- It can
 - i. Localise the obstruction
 - ii. Detect ischemia
 - a. Reduced vascularity to bowel wall
 - b. Free fluid
 - i. Some times the etiology(volvulus,hernia,bowel mass

Figure 2. Small bowel obstruction, CT with intravenous contrast only. Without orally administered contrast, fluid and air within the small bowel provide inherent contrast. IV contrast assists in recognition of bowel viability.



ROLE OF MRI

- MRI is a useful adjunct in obstetric setting

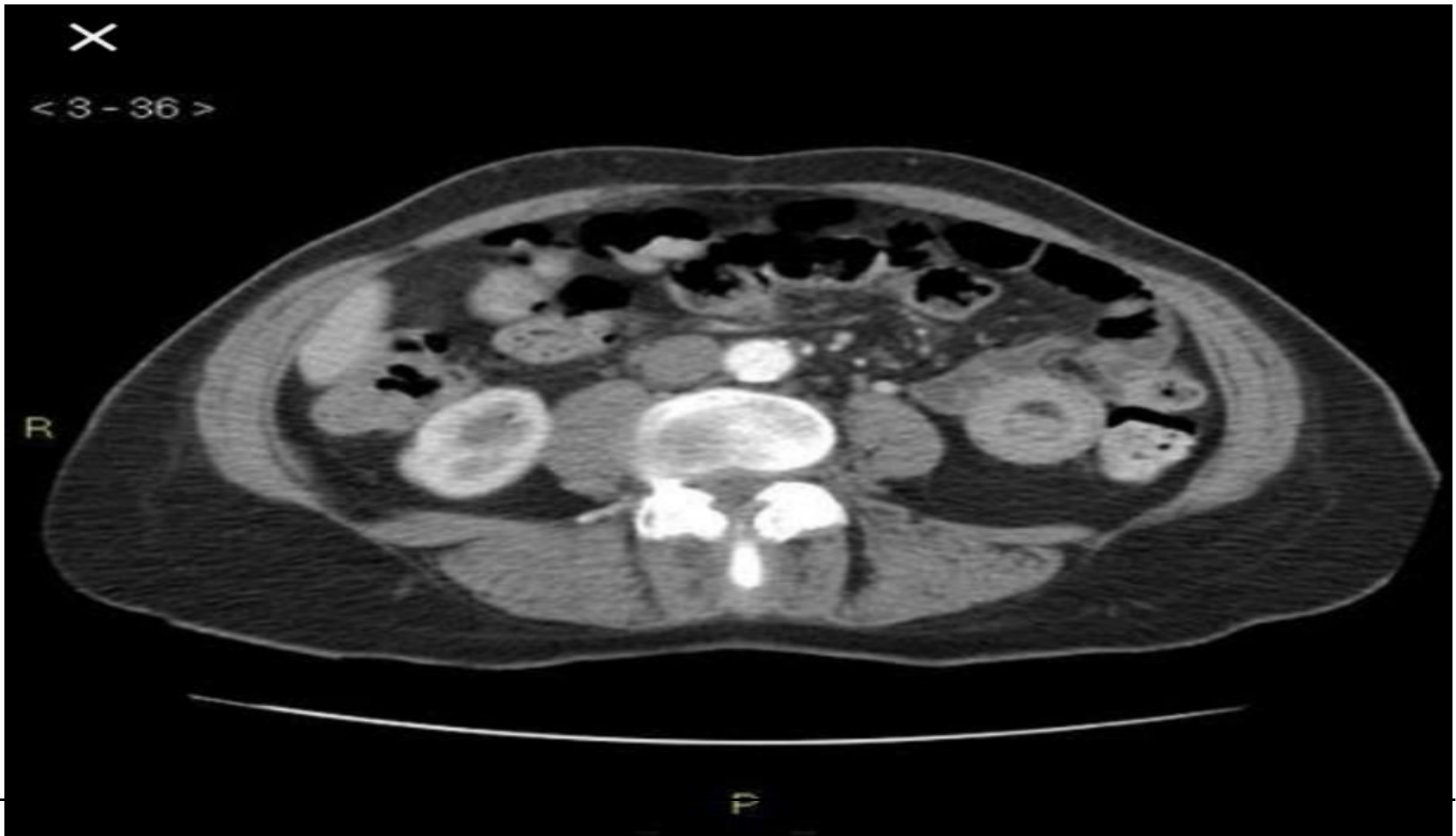
Imaging in INTUSSUSCEPTION

- Plain abdominal X-ray- absent caecal gas shadow in ileocaecal cases.
- Barium enema-claw sign(ileocaecal;does not demonstrate small bowel intussusception)
- Ultrasound-typical doughnut appearance of concentric rings in transverse section.
- CT-'target sign-sausage shaped soft-tissue mass with a layering effect(mesenteric vessels within the bowel lumen)

Claw sign



Target sign



Sonography



Imaging in VOLVULUS

- SIGMOID VOLVULUS
- CAECAL VOLVULUS
- VOLVULUS NEONATORUM

Sigmoid Volvulus



- Bird beak sign
- Pneumatic tyre
- Omega sign

Caecal Volvulus

- Plain X-ray-
 1. caecal dilatation
 2. Proximal small bowel dilatation
 3. Collapsed distal colon
- Barium enema-absence of barium in the caecum
- CT-when diagnosis is in doubt





Volvulus Neonatorum

- X-ray-initially shows duodenal obstruction, when strangulation has occurred abdomen becomes gasless
- Occasionally shows double bubble sign

Double bubble sign



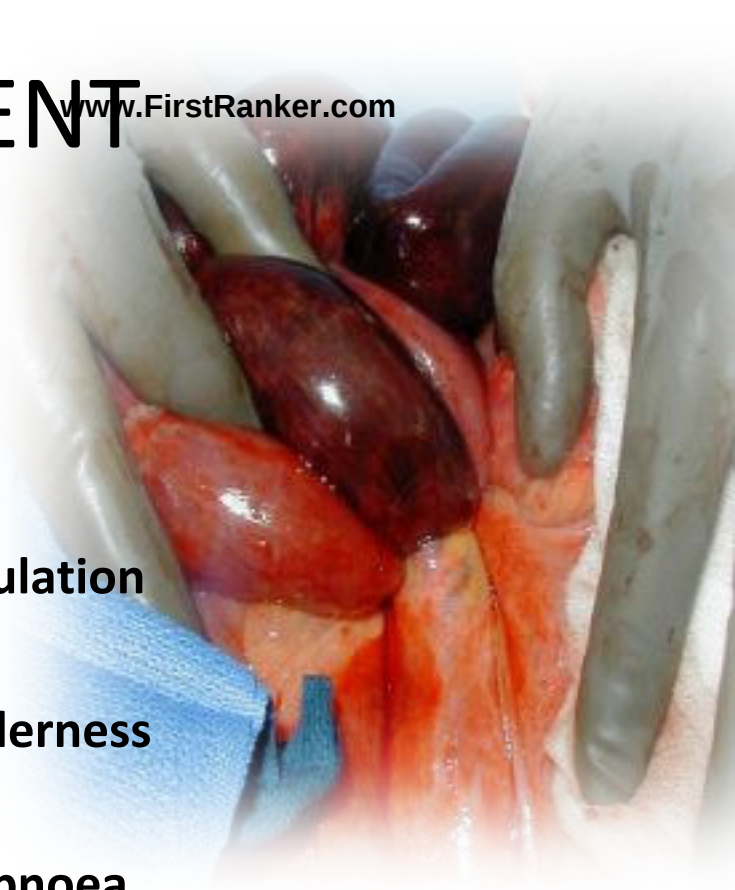
TREATMENT OF ACUTE INTESTINAL OBSTRUCTION

B.S AHALLYA

Roll no: 38

GENERAL TREATMENT PRINCIPLES

- **EVALUATE FOR STANGULATION**
 - Hippocratic facies-in advanced strangulation
 - Tachycardia/hypotension
 - Localised/generalised abdominal tenderness
 - Check for organ failure
 - Respiratory failure-tachypnoea
 - Renal failure-oliguria



Hippocratic facies

In advanced cases,

➤ The abdomen becomes distended and tympanitic. The patient become increasingly toxic with rapid thread pulse and cold extremities with cyanosis "circulatory failure".



INITIAL MANAGEMENT

- **BOWEL REST- NIL PER ORAL**
- **DECOMPRESSION- continuous ryles tube aspiration**
- **CORRECT DEHYDRATION- IV fluids**
- **CORRECT ELECTROLYTE IMBALANCE**
- **IV ANTIBIOTICS, if strangulation is suspected**

DEFENITIVE MANAGEMENT

- **CONSERVATIVE MANAGEMENT-** if post-operative adhesions are suspected.
- **DEFENITIVE MANAGEMENT–** if cause is unlikely to be adhesions.

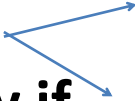
ADHESIONS



TREATMENT OF ADHESIONS

- **Conservative management- for upto maximum 48hrs**

Strangulation sets in early

- **Laprotomy if**  **Obstruction not relieved by 48hrs**

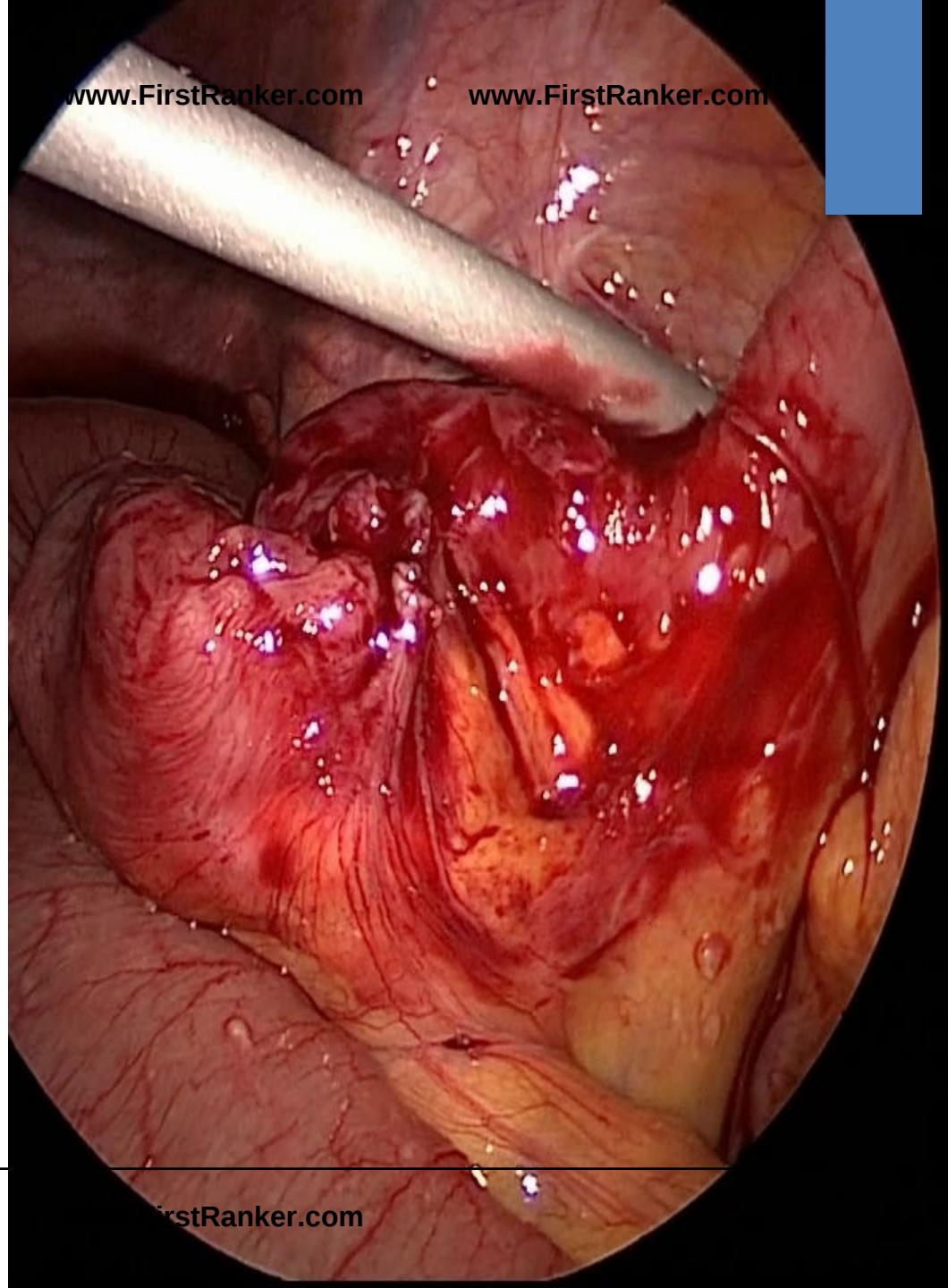
- **Laprotomy preferred over laparoscopy**

1. Grossly distended bowel
2. Possible adhesions to anterior abdominal wall

- **However experienced laparoscopic surgeons might attempt laparoscopy**

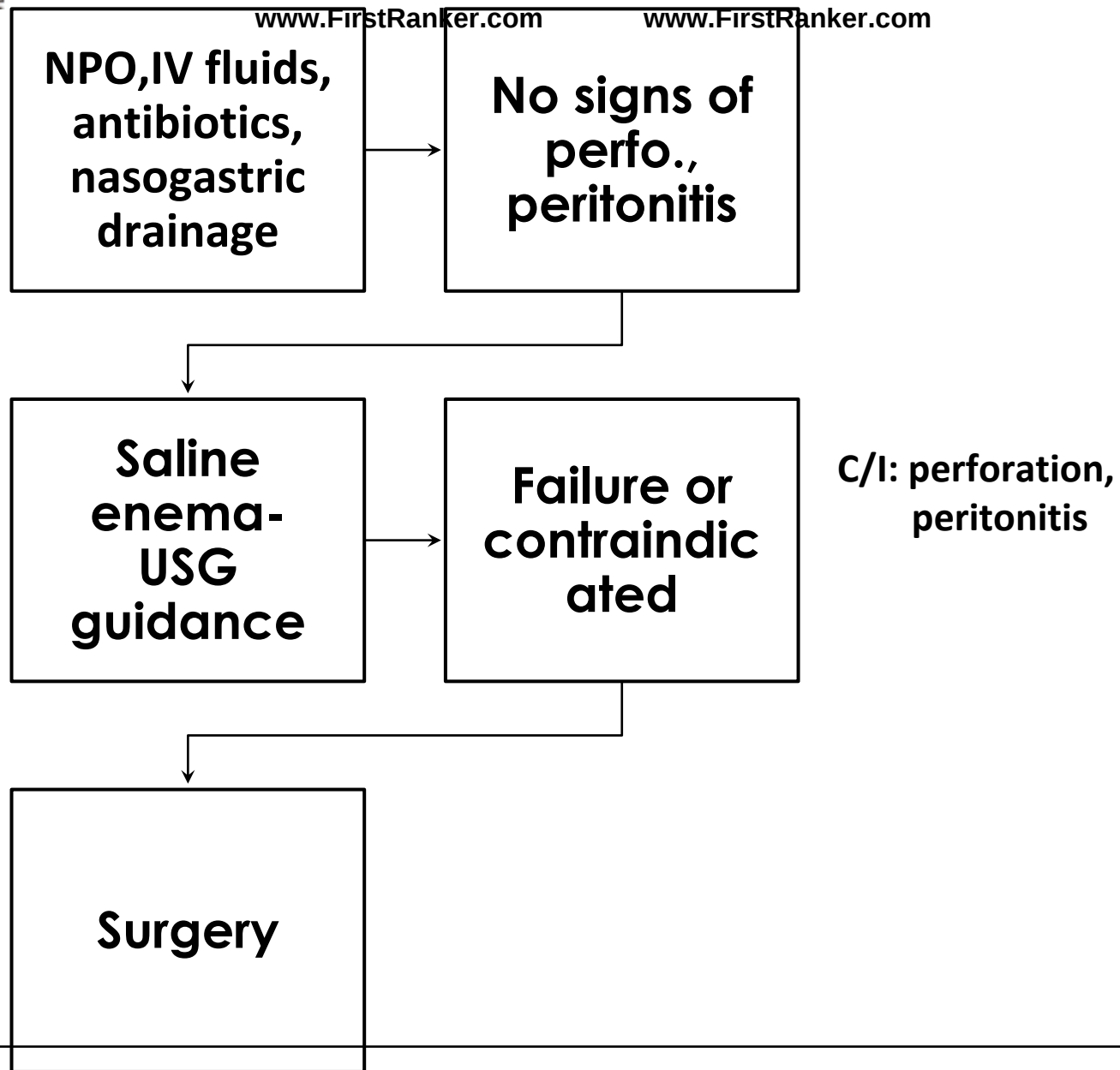


LAPROSCOPIC ADHESIOLYSIS

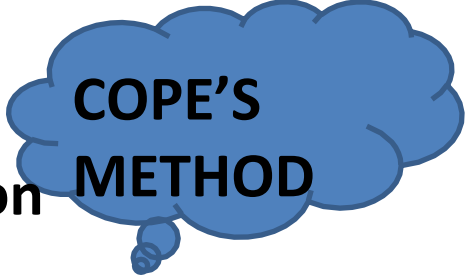




INTUSSUSCEPTION



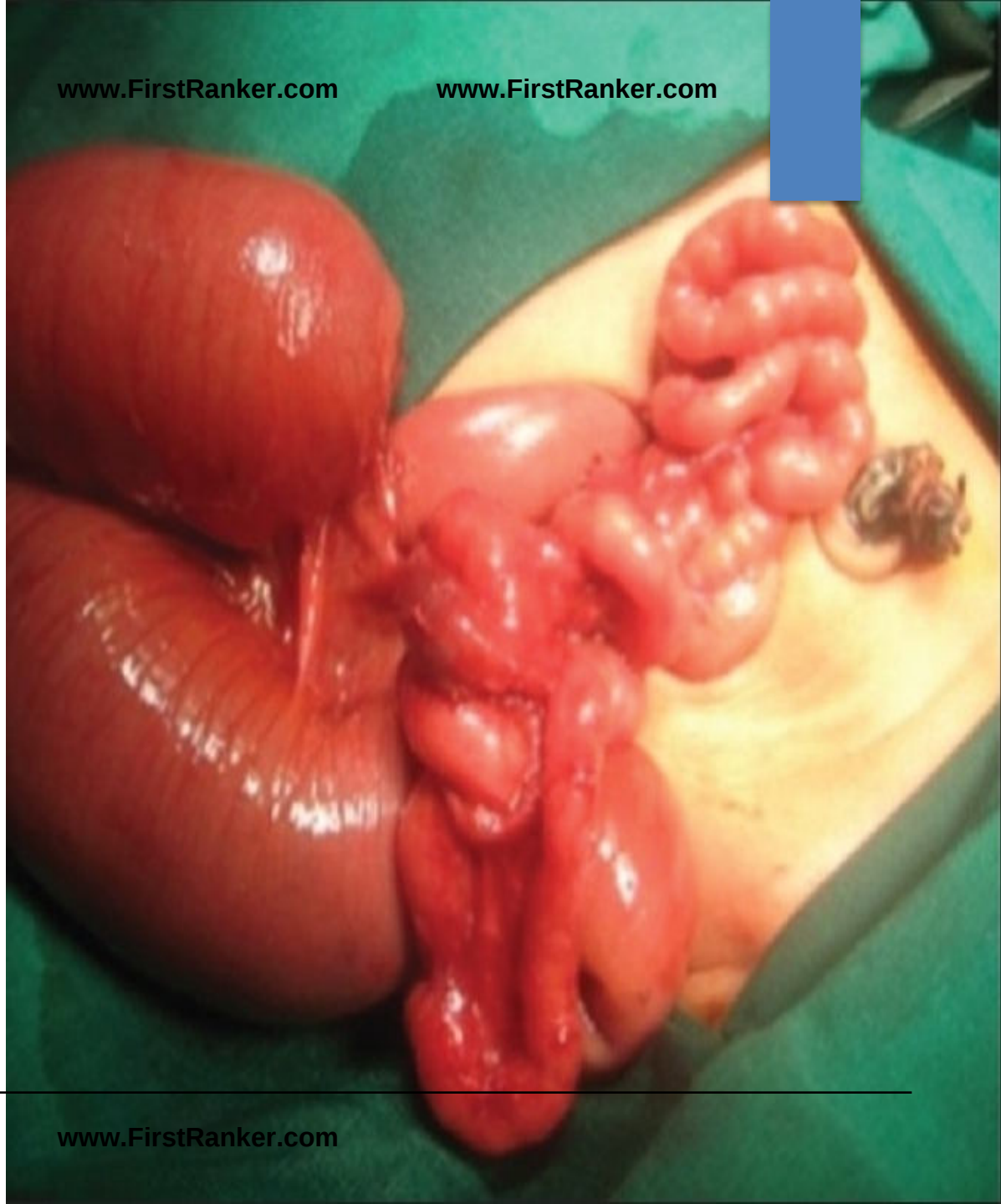
SURGERY



COPE'S METHOD

- Transverse rt.sided abdominal incision
- Reduction- gentle compression over the most distal part of intussusception towards its origin..do not pull
- After reduction-->appendix and terminal ileum would appear oedematous and bruised.-->check viability-->
 - Appendicectomy
 - Irreducible/infarcted segment-->resection and anastomoses

INTESTINAL ATRESIA

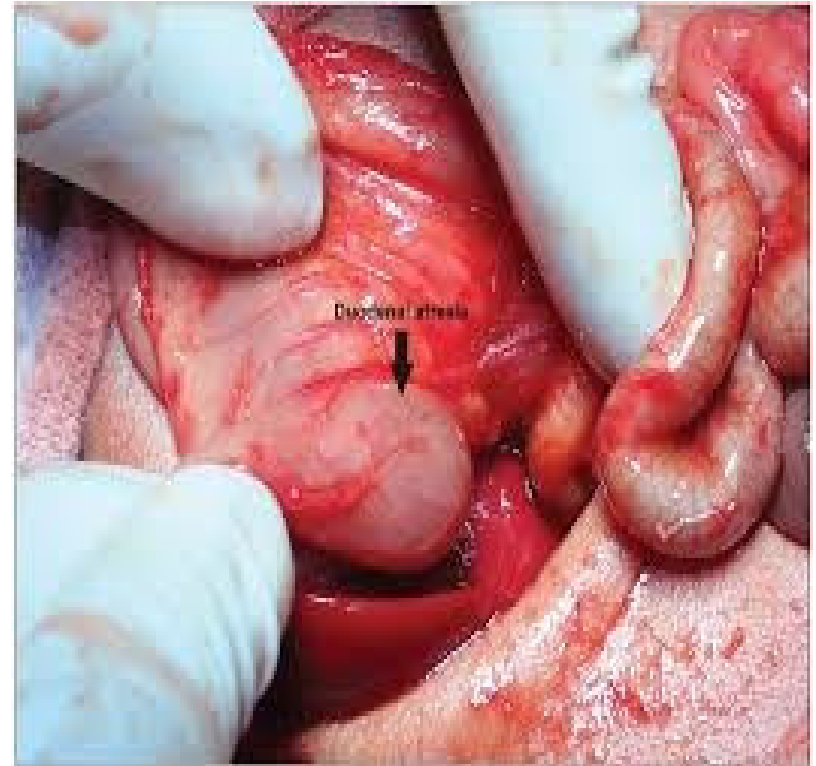
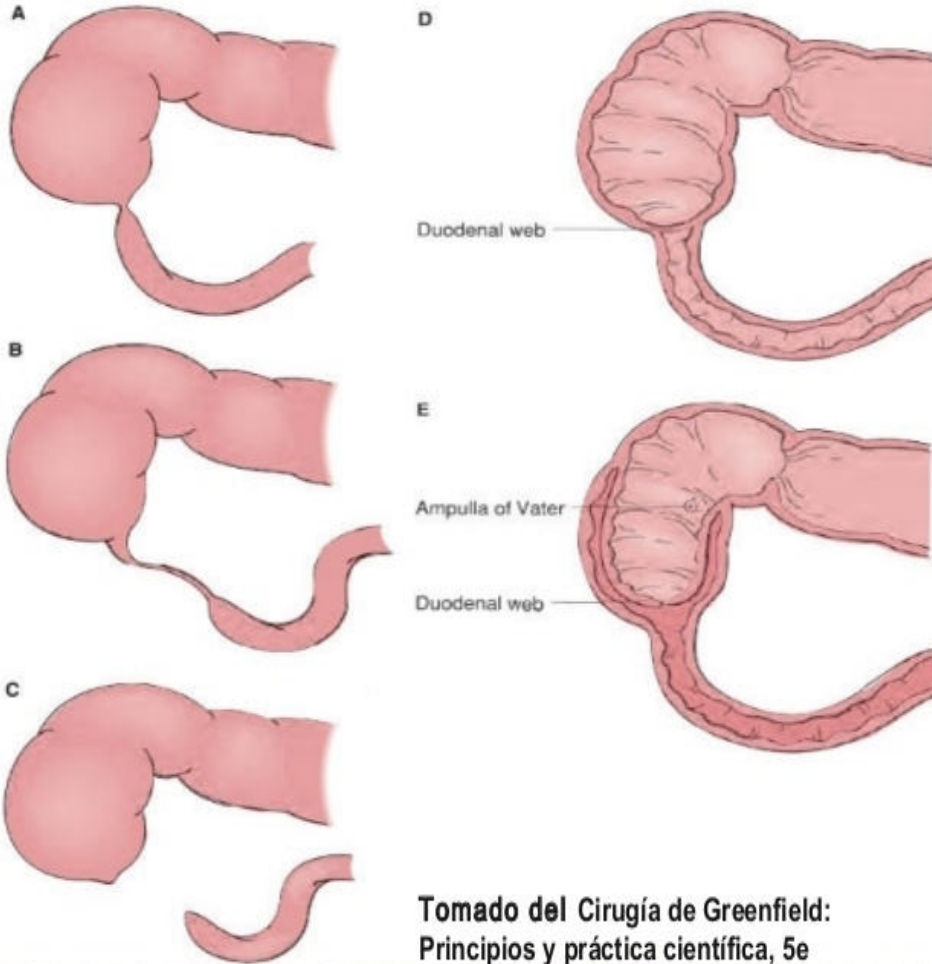


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DUODENAL ATRESIA

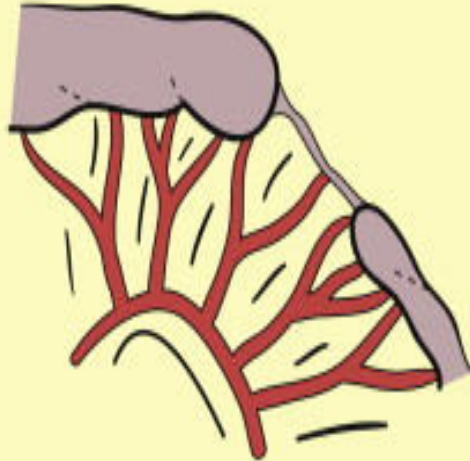


**Treatment-->Duodeno
duodenostomy+correction of
associated malformations, if any.**

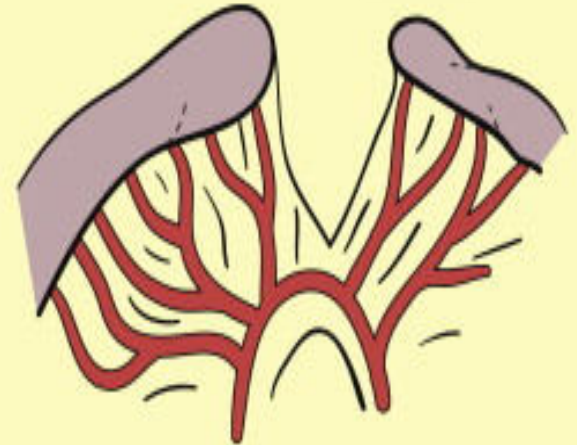
I



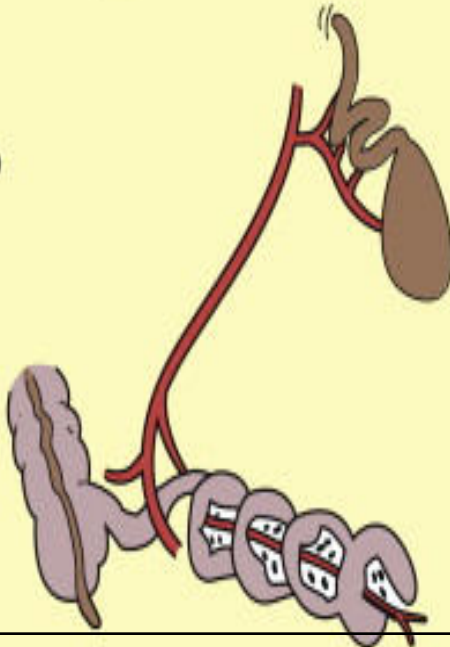
II



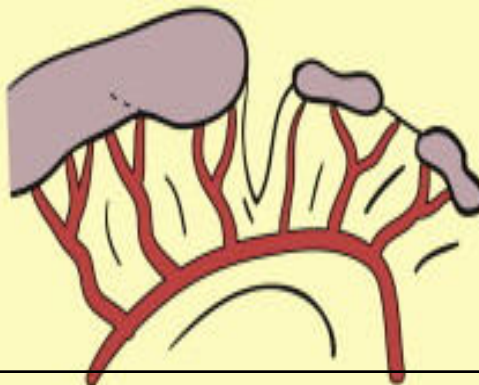
IIIa



IIIb



IV



"APPLE PEEL" ATRESIA

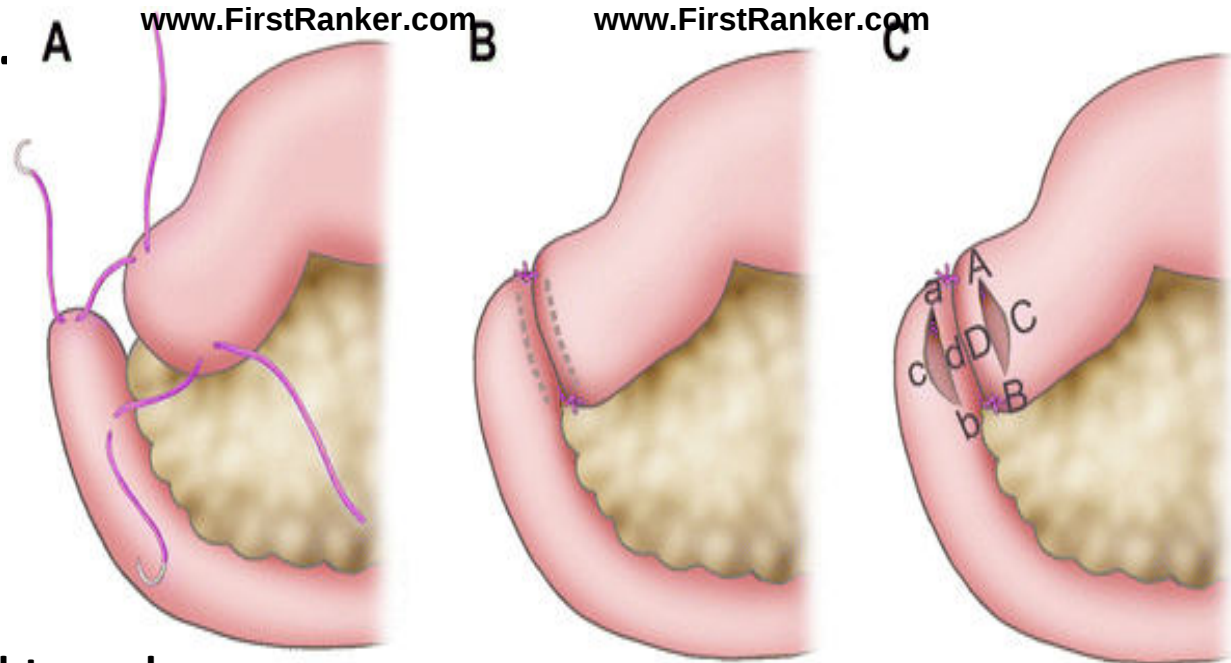


CONGENITAL MIDGUT ATRESIA

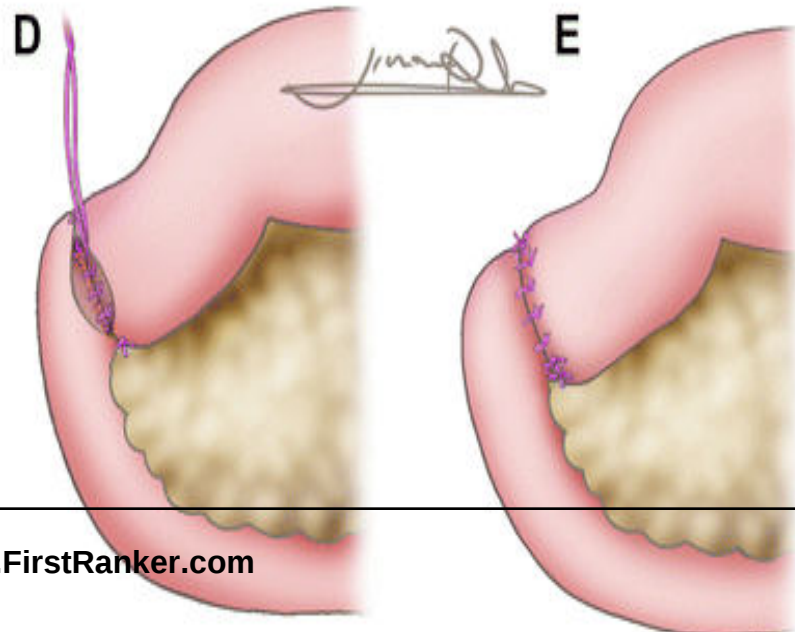
ILEAL ATRESIA



TREATMENT



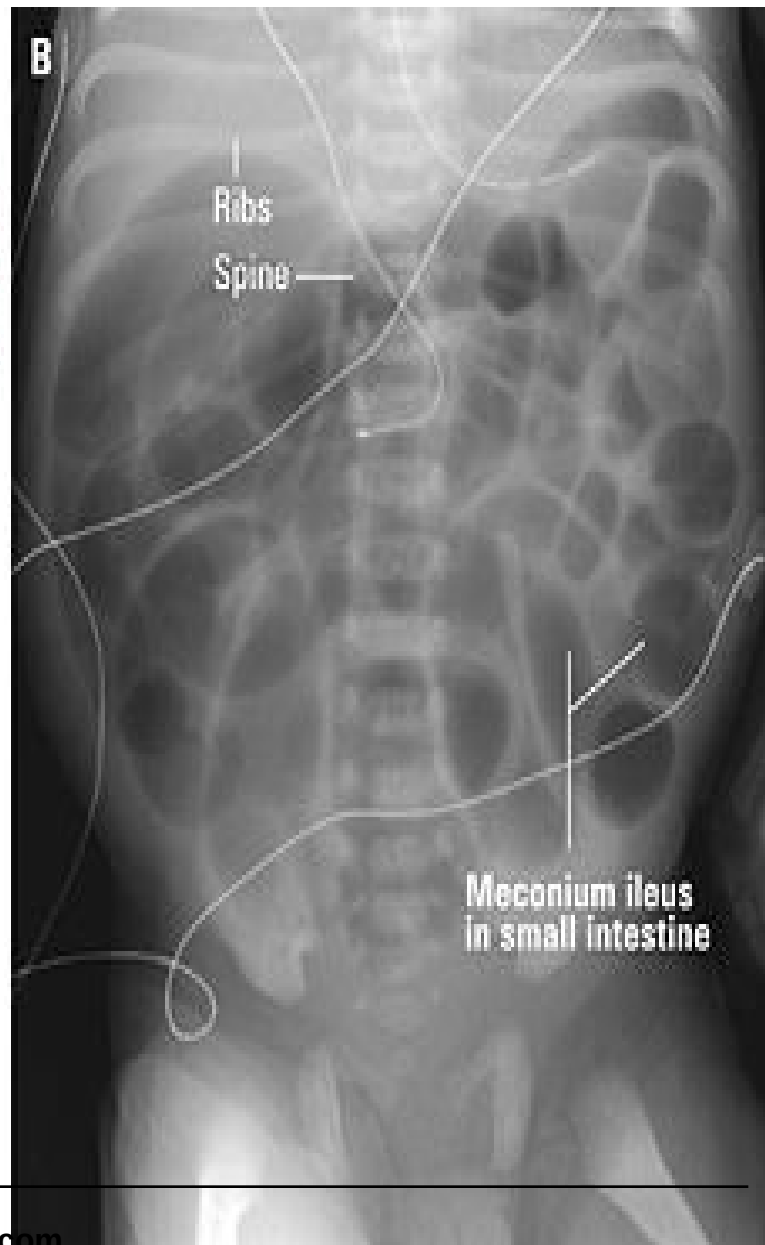
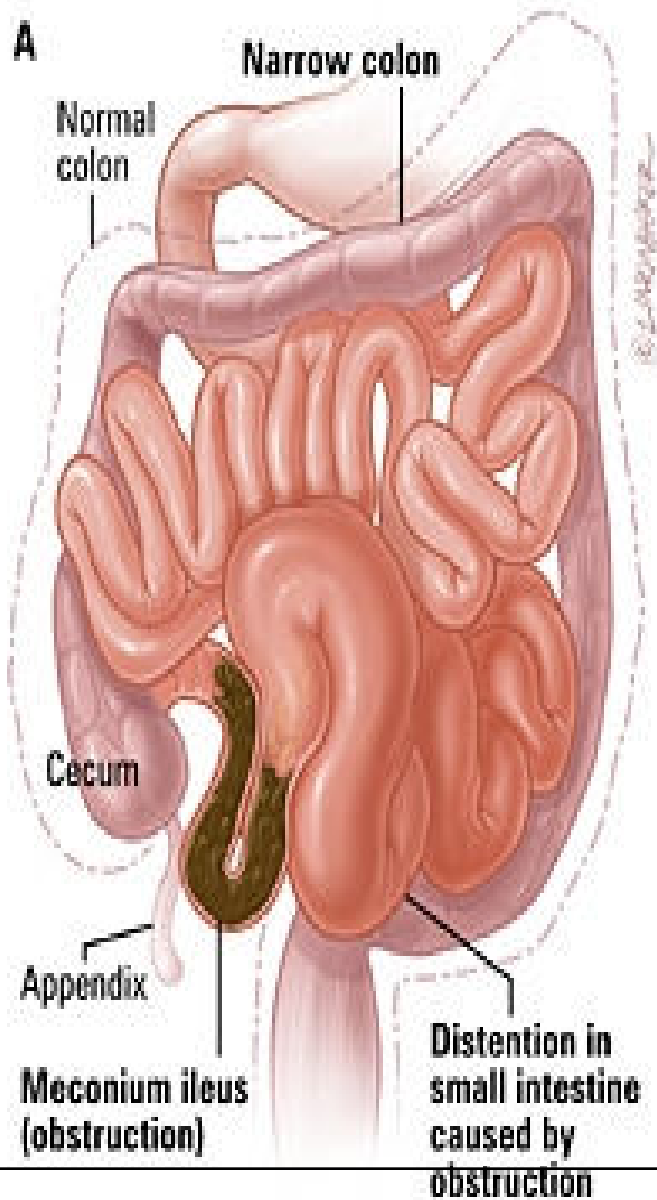
Resection and primary end-to-end anastomosis.



M E C O N I L E U S

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Meconium ileus

- Conservative measures- trying to dissolve the inspissated meconium using

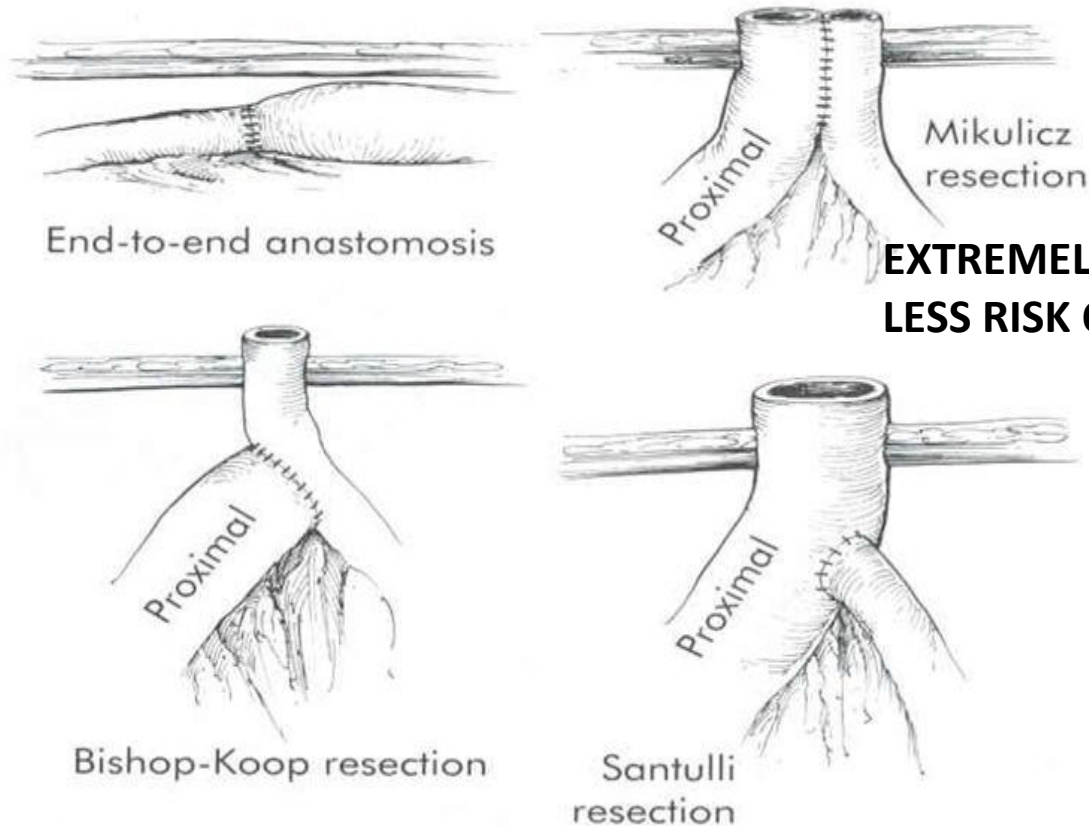
N-Acetyl Cysteine. ★ Breaks the disulphide bonds in meconium and helps in retrieval

- If it doesn't work, or
- Evidence of peritonitis, or
- Child is too sick



**SURGERY
MAYBE
REQUIRED**

Meconium Ileus



**EXTREMELY SICK
LESS RISK OF LEAKAGE**

Fig. 69-2 Operative options for the surgical treatment of meconium ileus.

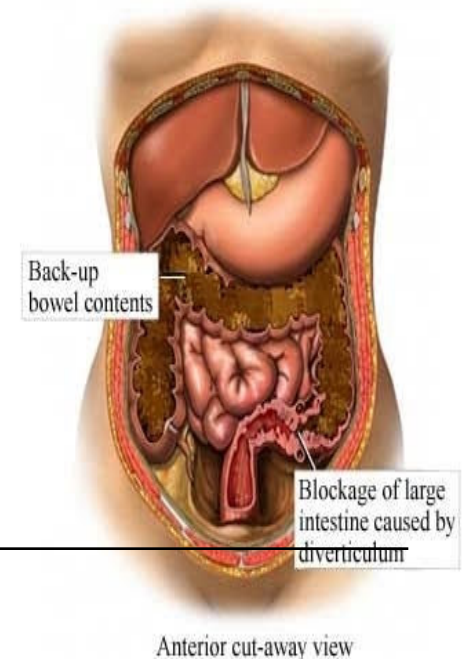
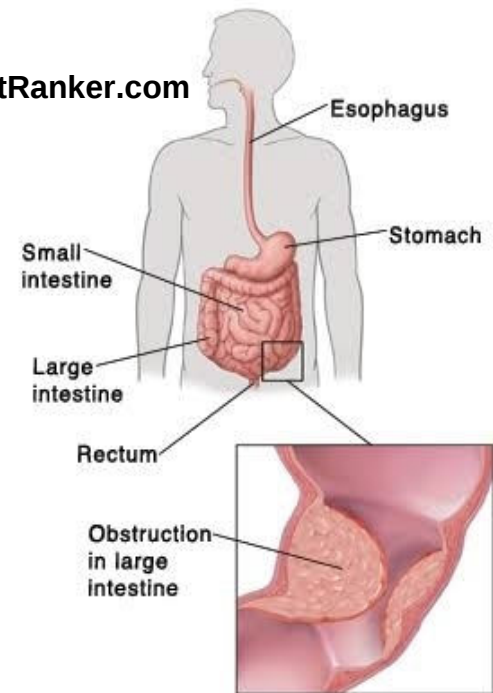
TREATMENT OF ACUTE LARGE BOWEL OBSTRUCTION



BALASREE V S

ROLL NO: 39

- Large bowel obstruction is commonly caused by **carcinoma**.
- Other causes include:
 - Caecal / sigmoid volvulus
 - Diverticular disease
 - Bands / adhesions
- Pseudo-obstruction to be excluded by a contrast CT when in doubt.



Diagnosis History

- Constipation for 10 - 14 days.
- Dull ache in the abdomen.
- Peripheral distension (distension of flanks).
- Past history of bleeding or passing mucus PR / altered bowel habits.
- Vomiting >>>>>> late feature
faeculent
- Strangulation / perforation >>severe abdominal pain
patient may collapse

General Appearance

- Strangulation / perforation :
patient presents in an unstable condition
- Hippocratic facies

- Tachycardia >>>> Hypotension
- Hyper/ Hypothermia
- Tachypnoea
- Leucocytosis / Leucocytopenia





Abdomen

- Distension
(especially of flanks)
- Rigidity and tenderness
(strangulation /
perforation)



Per Rectal Examination

- Empty ballooned up rectum
- Finger may be stained with blood or malenic stool
- Rectal carcinoma may be palpable

Investigations

- **Plain X-Ray Abdomen**
 - dilated large bowel loops
 - giant caecum (>9 cm), if Ileocaecal valve is competent
- **CT with contrast:**
 - If patient is stable
 - Can detect etiology



Investigations....

- CBC , LFT
 - Ultrasound Scan
 - CEA (carcinoembryonic antigen).
 - FNAC of left supraclavicular lymph node (if palpable).
-
- Barium enema / Colonoscopy:
 - Not preferred in an emergency setting
 - Risk of barium peritonitis
 - Cumbersome to perform

Carcinoembryonic antigen

- Associated with colorectal cancers
- Non specific → increase significantly in :
 - Pancreatic carcinoma
 - Gastric carcinoma
 - Lung carcinoma
 - Breast carcinomas
- Nonmalignant conditions:
 - Pancreatitis
 - Hepatitis
 - Obstructive jaundice
 - BPH



Treatment

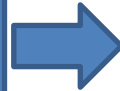
- **Emergency resuscitation**
 - I.V fluids
 - Correction of electrolytes
 - Optimization of co- morbid states
- **Midline laparotomy**
- **Confirm diagnosis**
 - Caecal distension
 - Identification of a collapsed distal segment
 - Palpate the obstructing tumor



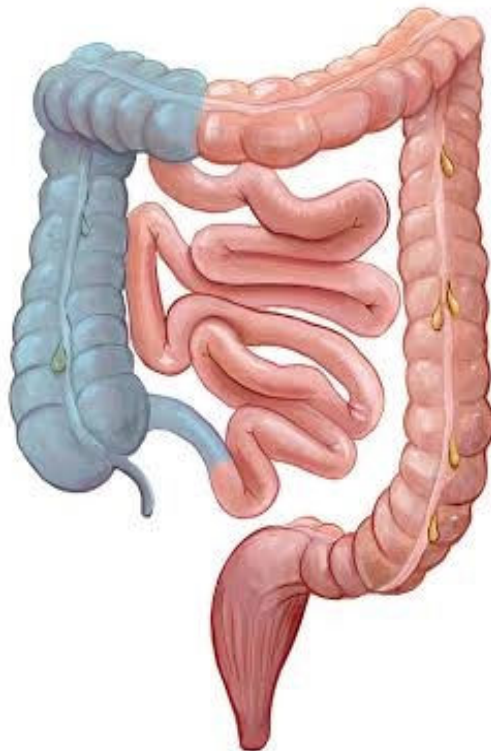
- 3 surgical options:
 - Resection and anastomosis >>>> if the patient is stable
 - Resection and diversion >>>>>> in presence of adverse factors
 - Simple diversion >>>>>>> unstable patient

Resection and anastomosis

Removable lesion in the
caecum, ascending colon,
hepatic flexure or
proximal transverse colon



*emergency right
hemicolectomy*



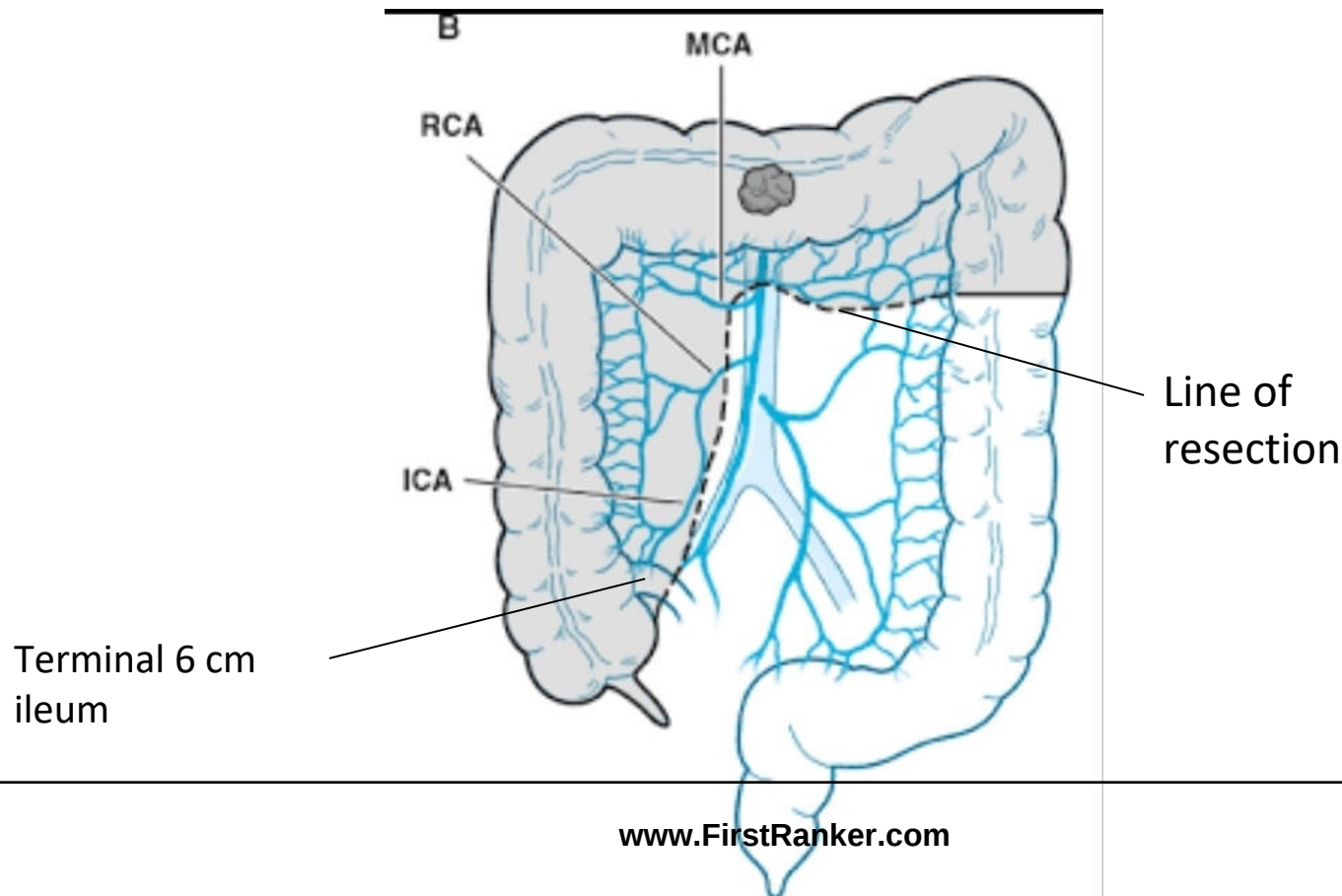
PRE- OPERATIVE



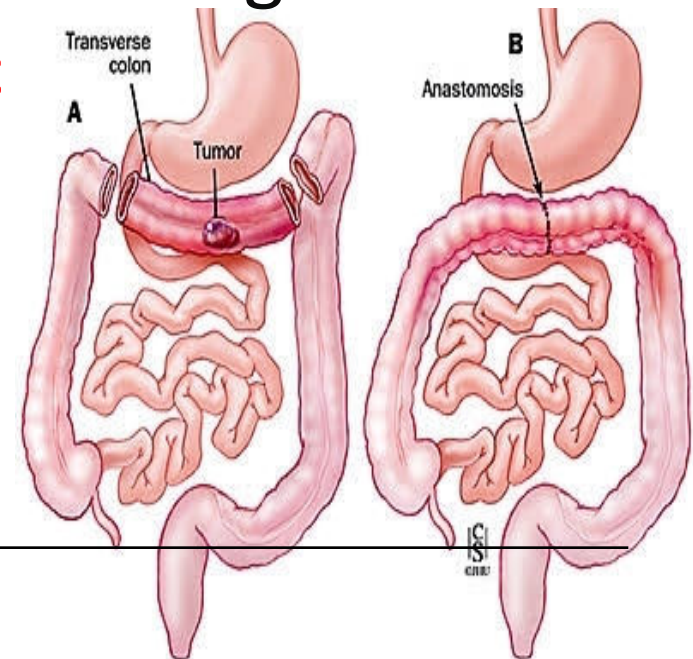
POST- OPERATIVE

Transverse colon growth

- An extended right hemicolectomy



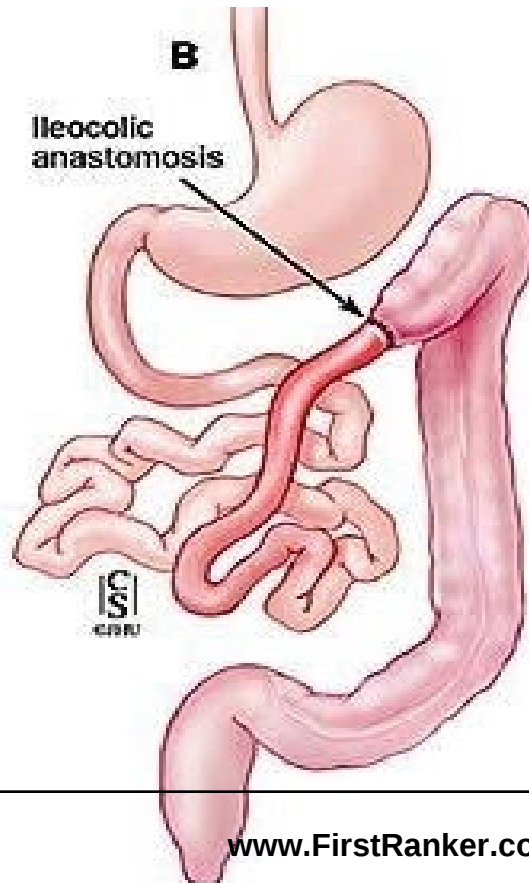
- Alternatively, in mid-transverse colon growth, transverse colon with both flexures can be removed
- Anastomosing cut ends of ascending and descending colon— **colocolic anastomosis**



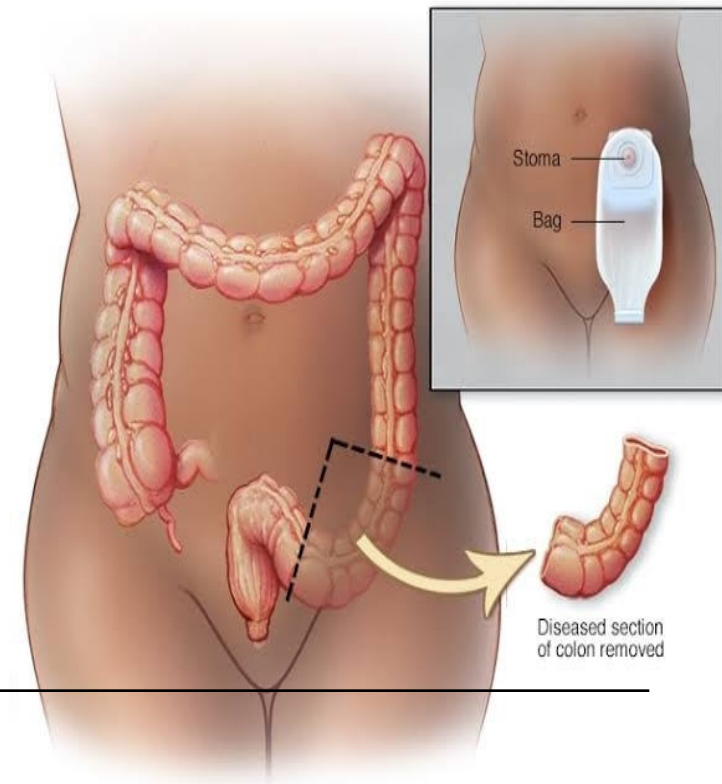
Obstructing lesions at
the splenic flexure



*Extended right
hemicolectomy with
ileodescending colonic
anastomosis.*



Resection and diversion



Colostomy

- It is an artificial opening made in the colon to the exterior (skin) to divert faeces and flatus.
- **Types**
 - Loop colostomy
 - End colostomy
 - Double barrelled colostomy



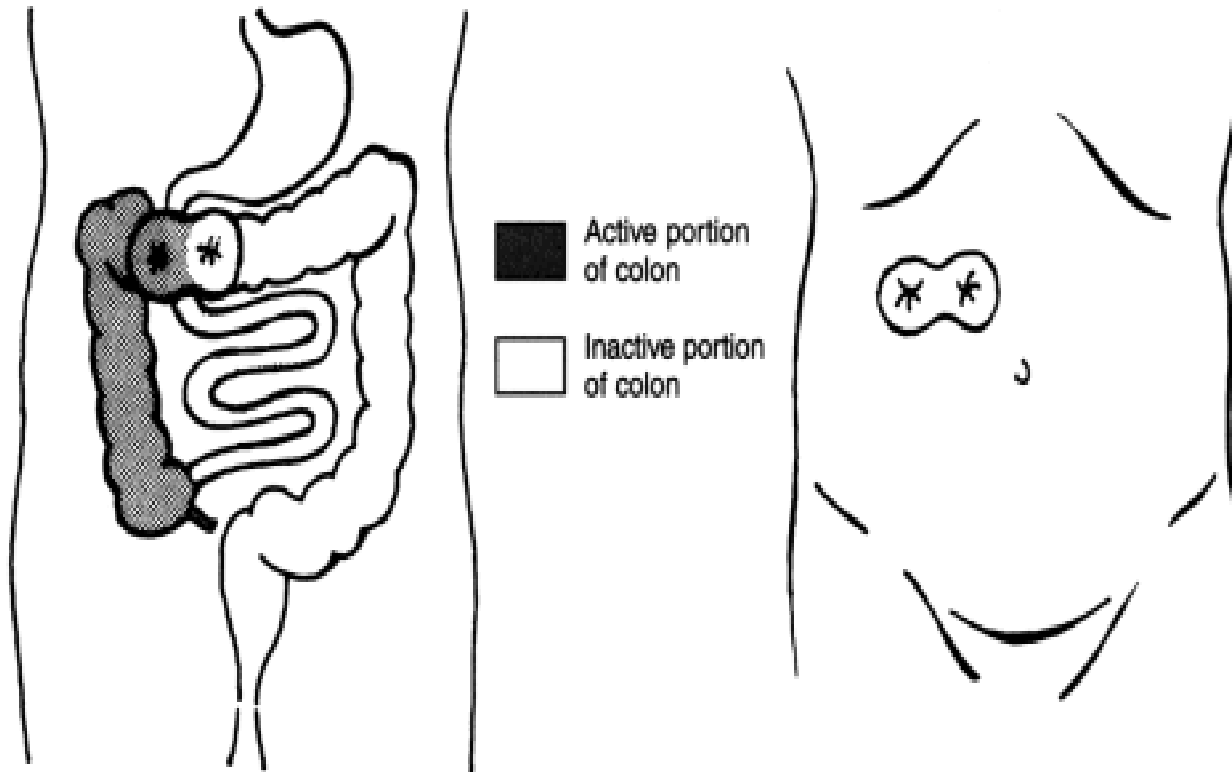


Figure 2
Loop Transverse Colostomy

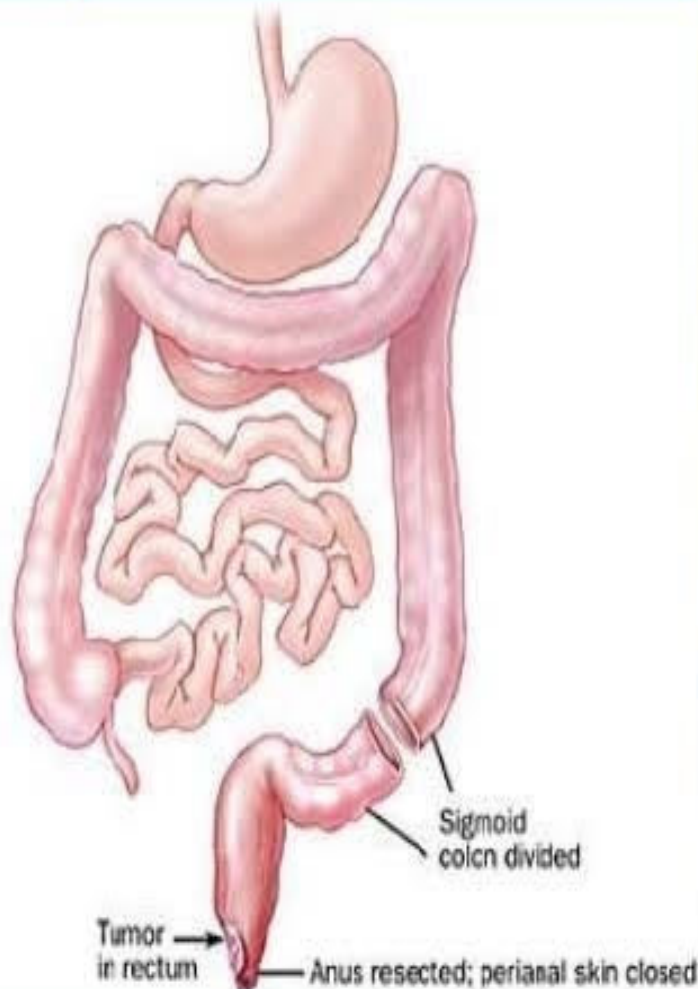
Figure 3
Loop Transverse Colostomy

END STOMAS -

End colostomy

HARTMANN'S
OPERATION

APR

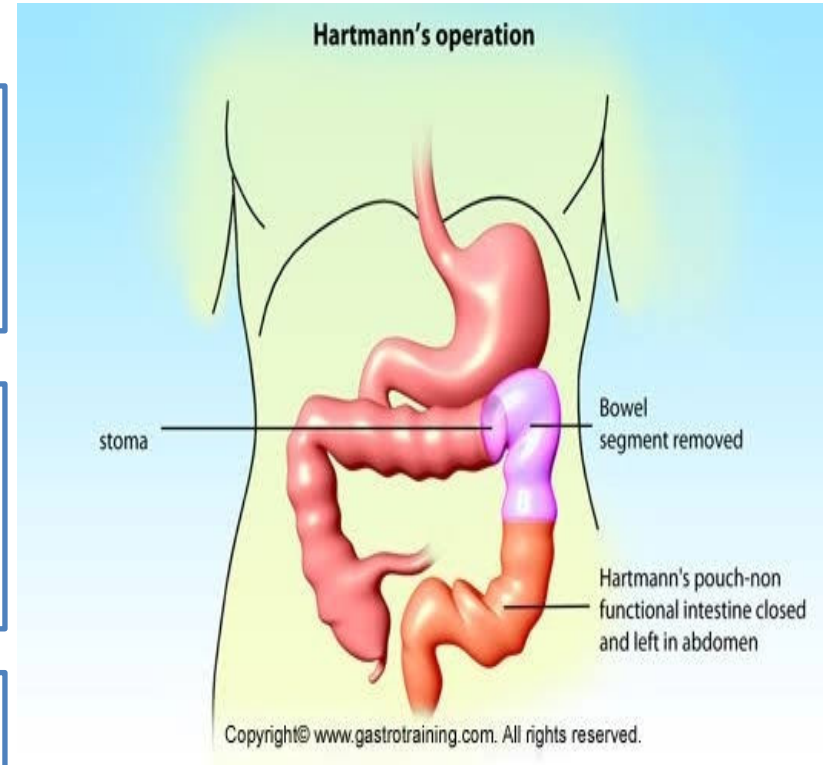


Hartmann's procedure :

resection

exteriorization of proximal
segment

closure of distal segment



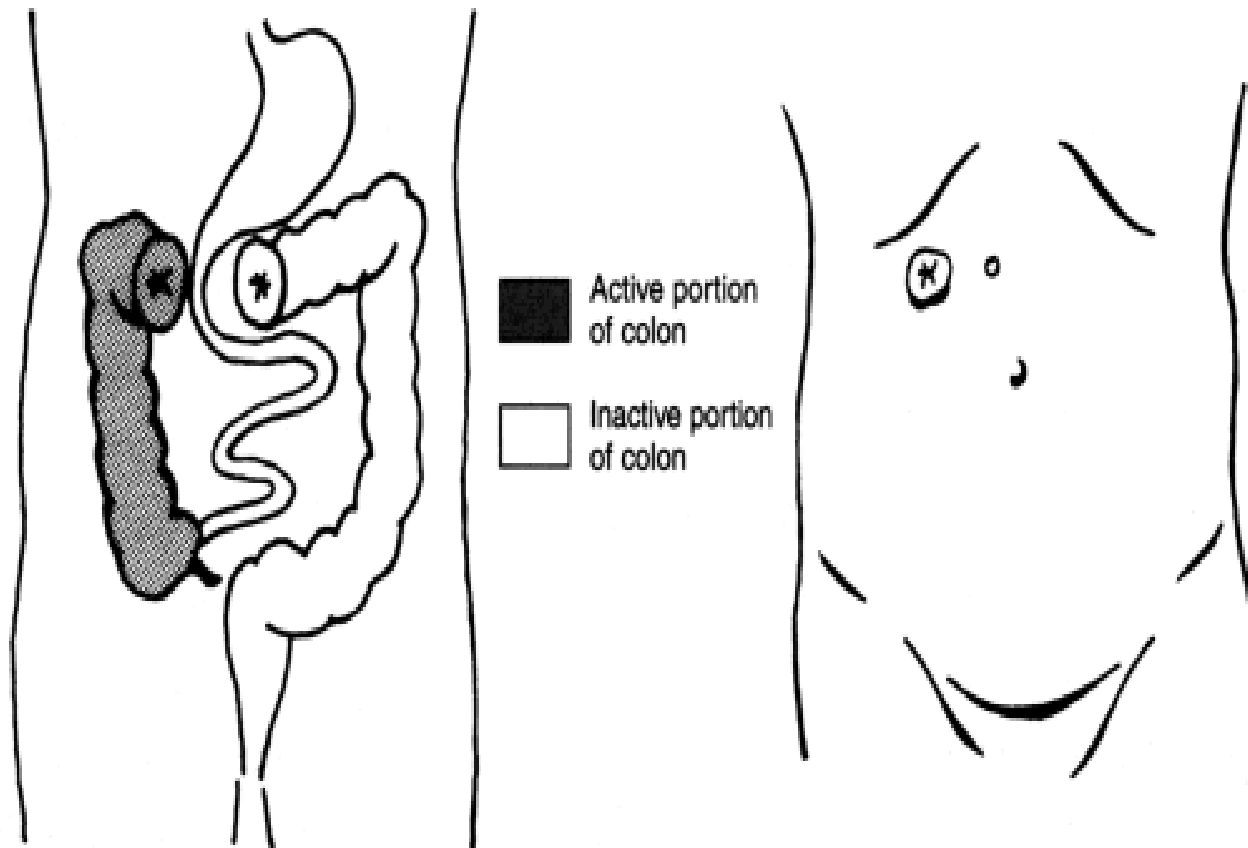


Figure 4

Double-Barrel Transverse Colostomy

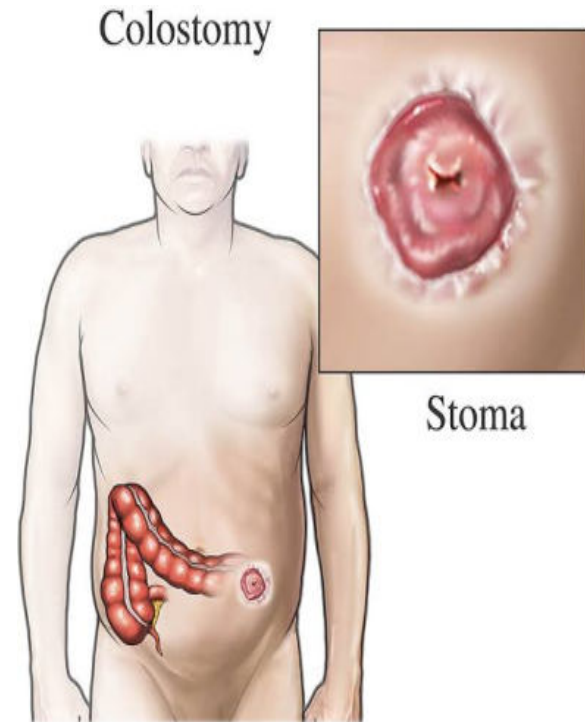
Figure 5

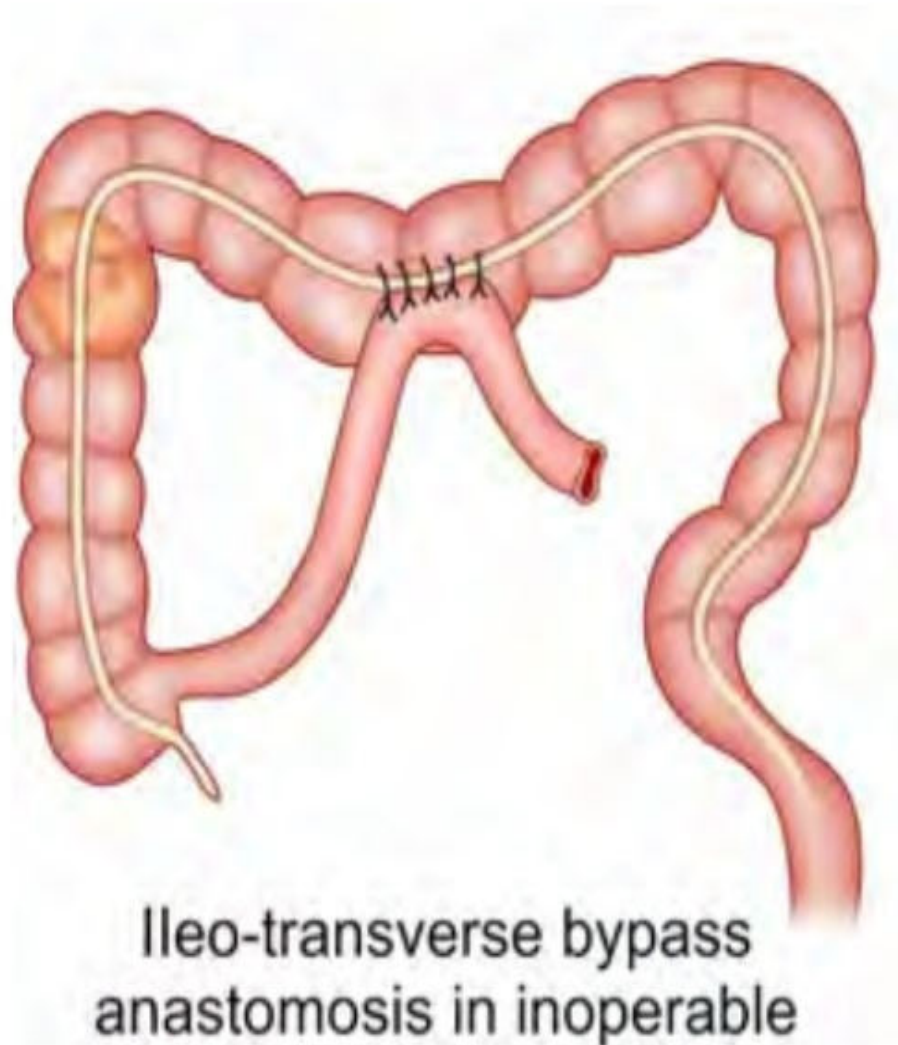
Double-Barrel Transverse Colostomy

Simple diversion

- Unstable patient
(hypotension >>>>> faecal peritonitis)
- Inexperienced surgeon
- Advanced disease

Loop colostomy without resection
Ileotransverse anastomosis



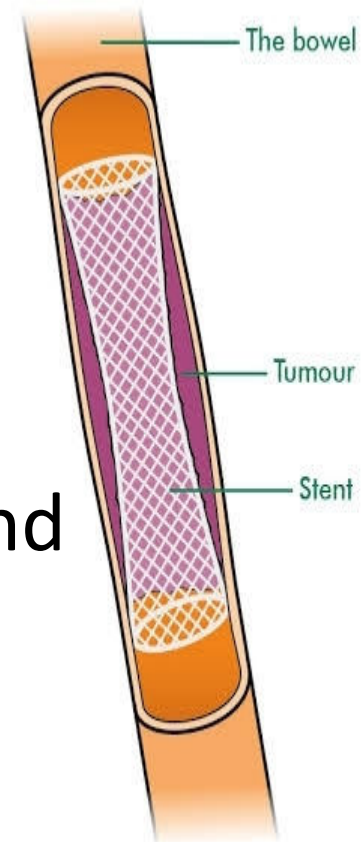


Ileo-transverse bypass
anastomosis in inoperable
right side growth

Non surgical procedures

Stenting:

- Optimal conditions
 - Accessible location
 - Short segment narrowing
 - Availability of expertise
- Bridge to subsequent resection and anastomosis



Complications of colostomy

- Prolapse of mucosa (prolapse of distal loop mucosa is common)— commonest complication
- Retraction
- Necrosis
- Stenosis
- Herniation
- Bleeding
- Diarrhoea
- Enteritis
- Skin excoriation

Chronic Large Bowel Obstruction

ORGANIC

- ☐ Intraluminal(rare)-faecal impaction
- ☐ Intrinsic intramural-1.Carcinoma
 - 2.Ulcerative colitis(toxic megacolon)
 - 3.Crohn's disease(stricture)
 - 4.Anastamotic strictures
 - 5.Diverticulitis
 - 6.Ischaemic colitis
- ☐ Extrinsic intramural(rare) –metastatic deposits(ovarian),
endometriosis,
stomal stenosis.

FUNCTIONAL

Hirschsprung's ds,
idiopathic megacolon,
pseudo-obstruction.

SYMPTOMS(chronological order)

- CONSTIPATION
- ABDOMINAL DISTENTION(flanks)
- PAIN(dull acheing)
- VOMITING(late,faeculant)
- DEHYDRATION

CARCINOMA COLON/RECTUM

- Usually affects the elderly
- Rarely in younger individuals(familial syndromes like FAP,HNPCC,or IBD)
- **CLINICAL FEATURES:**
 - ❖ Constipation
 - ❖ Constipation alternating with diarrhoea,
 - ❖ With/without passage of blood/mucus
 - ❖ Loss of weight ,loss of appetite
 - ❖ Progressive constipation over 1-2 weeks ,
 - ❖ Massive distention of flanks,
 - ❖ Dull ache in abdomen,
 - ❖ Finally faeculant vomiting.

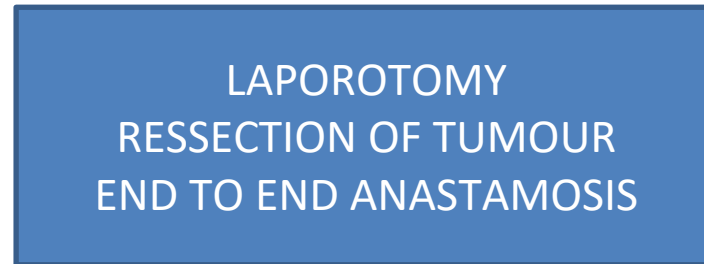
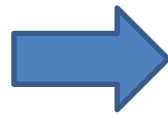
DIAGNOSIS



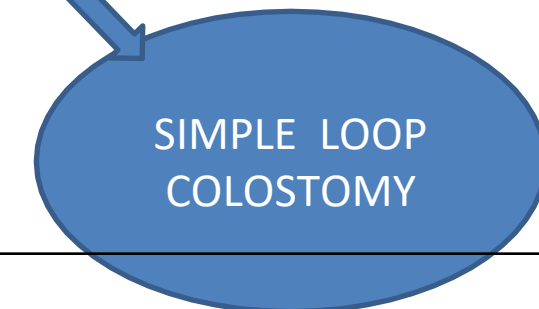
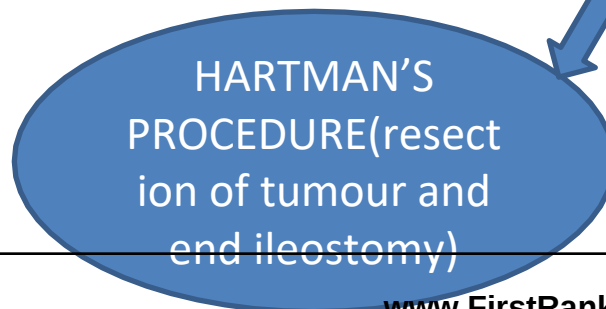
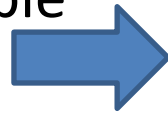
- Per rectal examination(Ca rectum)
- Plain X-ray abdomen showing haustral folds
- CT scan-
thickened large bowel,
proximal dilatation,
with/without ascites or liver mets.
- Barium enema-Apple core Carcinoma colon

TREATMENT

❖ If patient is stable



❖ If patient is unstable



STRICTURES- CROHN'S DISEASE

- Chronic ,transmural,noncaseating often granulomatous disease involving any area of GIT .
- **CAUSES:** 1. infection
2.immunologic
3.genetic
4.Jews
5.smoking,diet,OCP



CLINICAL FEATURES

FIRST STAGE

Mild diarrhoea
Colicky pain
Anaemia
Mass in R iliac fossa
Recurrent perianal abscess

SECOND STAGE

A/c or C/c intestinal obstruction due to cicatrization with narrowing

THIRD STAGE

Fistula formation
-enterocolic,
enteroenteric,
enterovesical,
enterocutaneous

INVESTIGATIONS....

- 1.Plain x-ray abdomen,Ultrasound abdomen
- 2.Single contrast water soluble enema
- 3.CT scan and CT fistulogram
- 4.Colonoscopy >>>normal rectum,
colon showing aphthoid like ulcers ,
reddened mucosal margin.
- 6.Serum markers-90% patients with ASCA –positive
and pANCA-negative.

- **MEDICAL**

Lifestyle modifications: Cessation of smoking

Bed rest,

Protein and vitamin

supplementation.

Drug therapy

Anti-inflammatory: Steroids, Amino salicylates

Immunosuppressors: Azathioprine, Infliximab, Methotrexate

Antibiotics: Ciplox, Metrogel (abscess, fistula)

SURGERY

Stricturoplasty

Segmental resection (conservative resection is better)

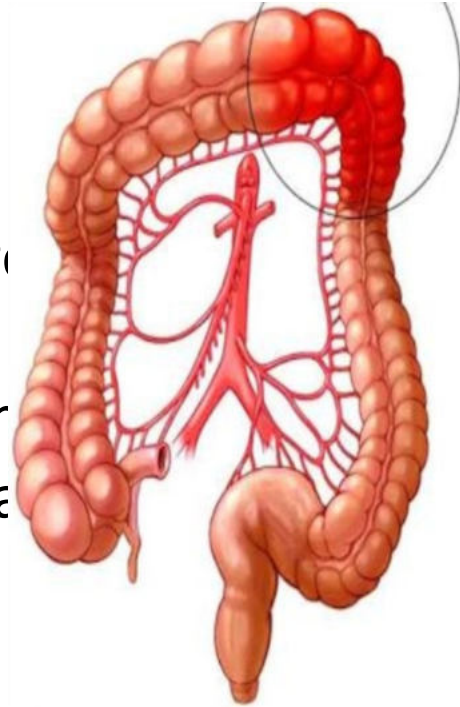
Ileocaecal resection (common procedure done bcz commonly involved site)

Total colectomy and ileorectal anastomosis

Laparoscopic resection

ISCHAEMIC COLITIS

- Occurs in **splenic flexure** (Griffith's point) where blood supply is precarious.
- Common in elderly with a female preponderance.
- Related to atherosclerosis, emboli, vasculitis, diabetes.



TYPES:

1. **Gangrenous** type - ischaemia of full thickness colon causing peritonitis
2. **Stricture** type - ischaemia of muscularis layer causing scarring.
3. **Transient** type - most vulnerable layer, mucosal involvement usually recovers completely.

CLINICAL FEATURES

- pain in the left iliac fossa and left hypochondrium
- vomiting
- diarrhoea
- passing blood in the stool

INVESTIGATIONS



- ❖ Plain X-ray ---- 'thumb printing sign' ---- mucosal edema and submucosal haemorrhage
- ❖ CT scan --- colonic wall thickening with posterior fat shadowing
- ❖ In chronic stage, colonoscopy and contrast study is a must

TREATMENT

Conservative treatment-bowel rest

fluids

antibiotics

adequate perfusion

Surgery is indicated in :

gangrene

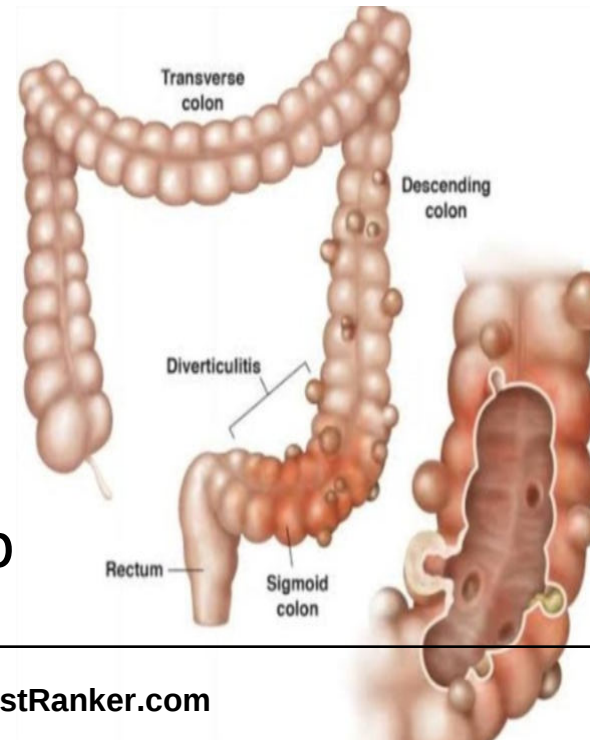
peritonitis

stricture

segmental ischaemia

DIVERTICULAR DISEASE OF COLON

- Acquired herniation of colonic mucosa through circular muscles at the point where blood vessels penetrate.
- Commonly localized to sigmoid colon .Rectum not affected.
- Etiology-
 - diet:low fibre diet
 - aged female
 - non vegetarians.
 - NSAID intake
 - long standing constip



CLINICAL FEATURES

DIVERTICULOSIS

Fullness of
abdomen,
Bloating,
Flatulence,
Vague discomfort

DIVERTICULITIS

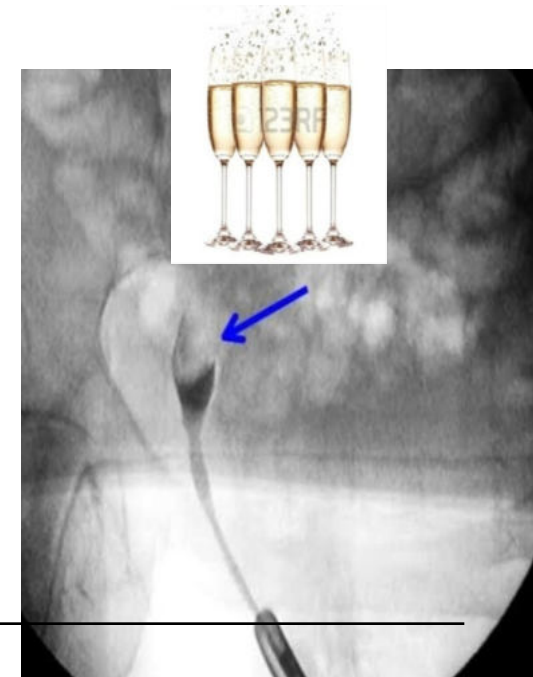
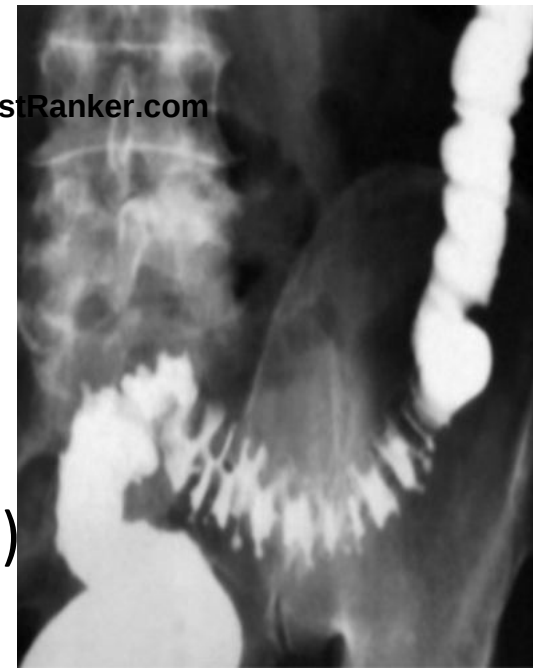
Pain in L iliac
fossa,
Bloody stool,
Massive
haemorrhage,
Fever,
Mass in L iliac
fossa

FISTULA

Commonly
colovesical
leading to
pneumaturia.

INVESTIGATIONS

- ☐ Barium enema--**Saw teeth** appearance.
Champagne glass sign(sigmoid diverticula)
- ☐ Sigmoidoscopy - not be done in acute stage.
- ☐ CT scan-thickening of muscle layer
abscess
perforation
fistula
- ☐ Cytoscopy and colonoscopy -- fistula.



TREATMENT

Lifestyle—high fibre diet,
bulk purgatives

Drugs-Antibiotics

CT guided aspiration or percutaneous drainage
tube>>>abscess

SURGERY

❖ EMERGENCY PROCEDURES

resection and anastomosis

resection and diversion

simple diversion

❖ ELECTIVE PROCEDURES

Resection of the diseased bowel and closure
of fistula--fistula

HIRSCHSPRUNG'S DISEASE (megacolon)

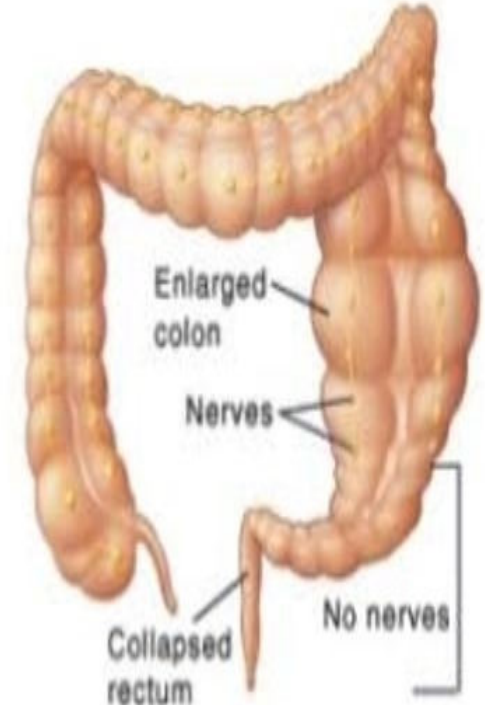
Congenital familial condition, occurring in newborn due to presence of aganglionic segment in anorectum.

SYMPTOMS:

- Failure of passing meconium

INVESTIGATIONS

- Plain X-ray
- Full thickness rectal biopsy (showing aganglionic segment)
- Barium enema (to identify spastic segment)



TREATMENT

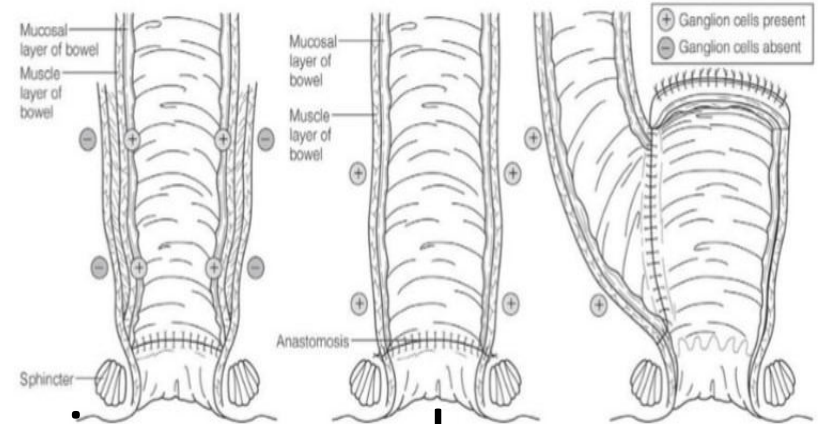
3 stage approach::

1.COLOSTOMY

2.DEFINITIVE PROCEDURES-various procedures are available

Principle-excision of aganglionic segment and colo-colic anastomosis between ganglionic segment to distal rectum

3.REVERSAL OF COLOSTOMY



Thank you