

Gastrointestinal tract imaging

Large intestine

- single contrast enema
- double contrast enema

Normal enema

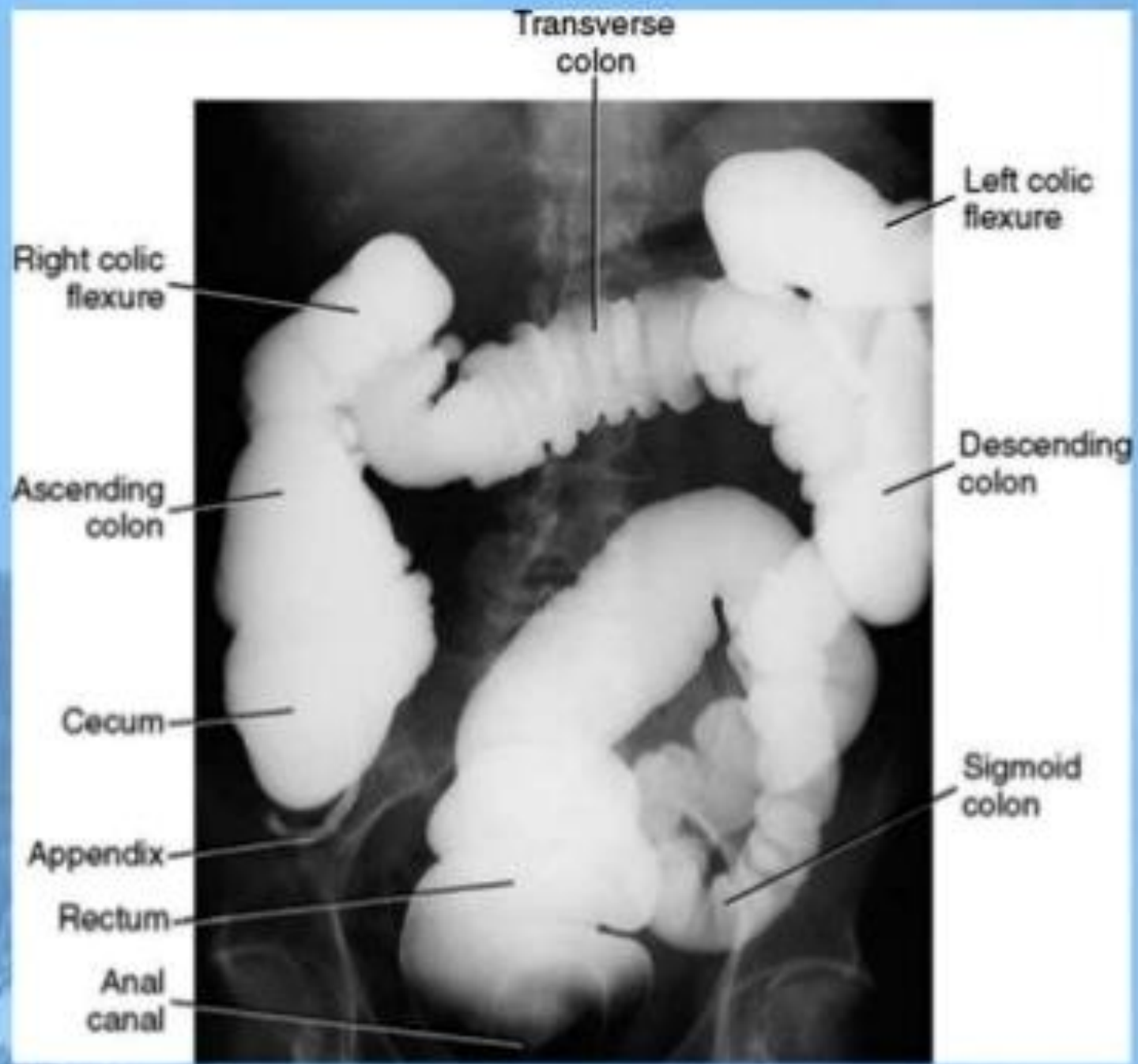
- Calibre decrease from caecum to the sigmoid colon.
- Lips of ilio -caecal valves
- Haustra can usually be recognised in the whole of the colon but may be absent in the descending and sigmoid regions.
- spasm often seen in normal patient mimic narrowing and can be resolved by IV smooth muscle relaxant eg: Buscopan, glucagon.

SINGLE CONTRAST



DOUBLE CONTRAST





The abnormal barium enema

- Narrowing of the lumen or stricture : main causes:
 - carcinoma
 - diverticular disease
 - Crohn's disease
 - Ischaemic colitis

Different types of stricture

- **Neoplastic stricture**
Shouldered edges, an irregular lumen and usually short
- **Benign stricture** have tapered ends, relatively smooth outline and may be any length.
- Site of stricture can help limiting to the D/D.
- **Diverticular disease** are almost always confined to the sigmoid colon.
- **Ischaemic strictures** are usually confined between splenic flexure and the sigmoid colon.
- **Crohn's disease and tuberculosis** have predilection for the caecum.

Filling defects

- polyps.
- neoplasm
- faeces (surrounded by barium and freely moveable) so all enema should be done to clean the colon.

■ Ulceration

Two major causes of the Ulcers of the colonic mucosa

- ulcerative colitis
- Crohn's disease

Abnormal enema



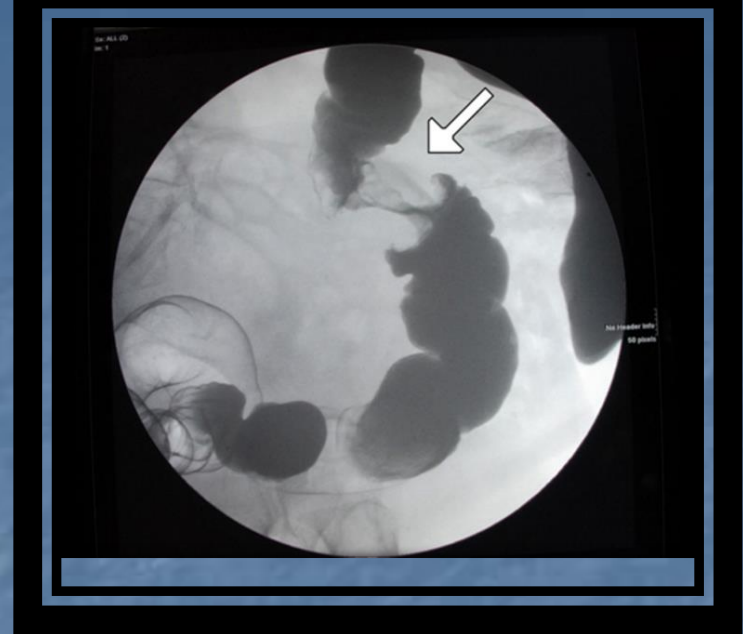
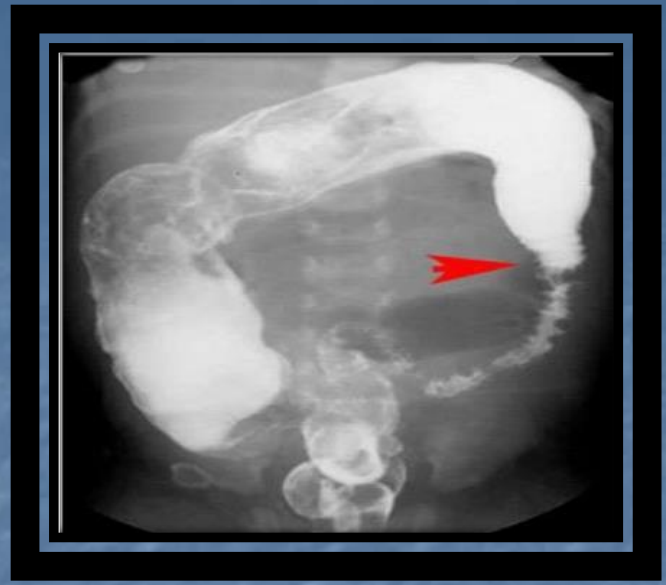
diffuses narrow lumen



polyps



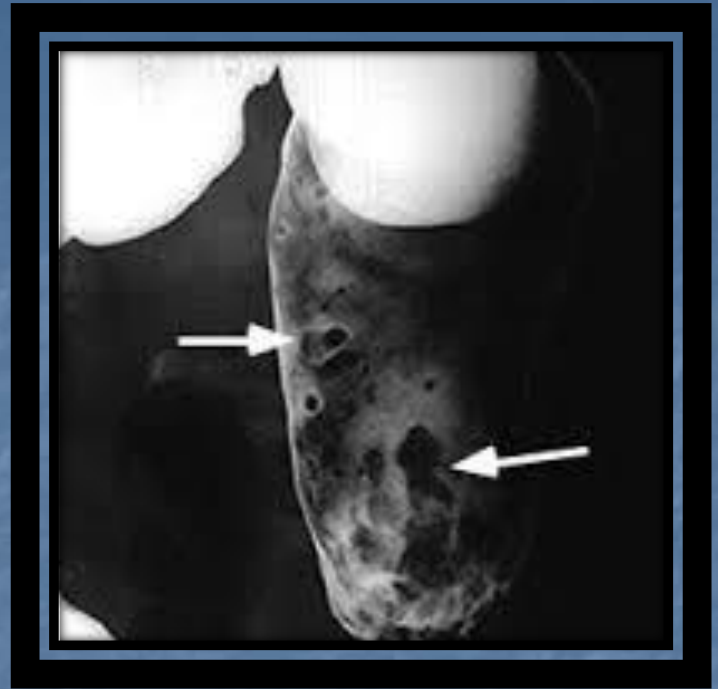
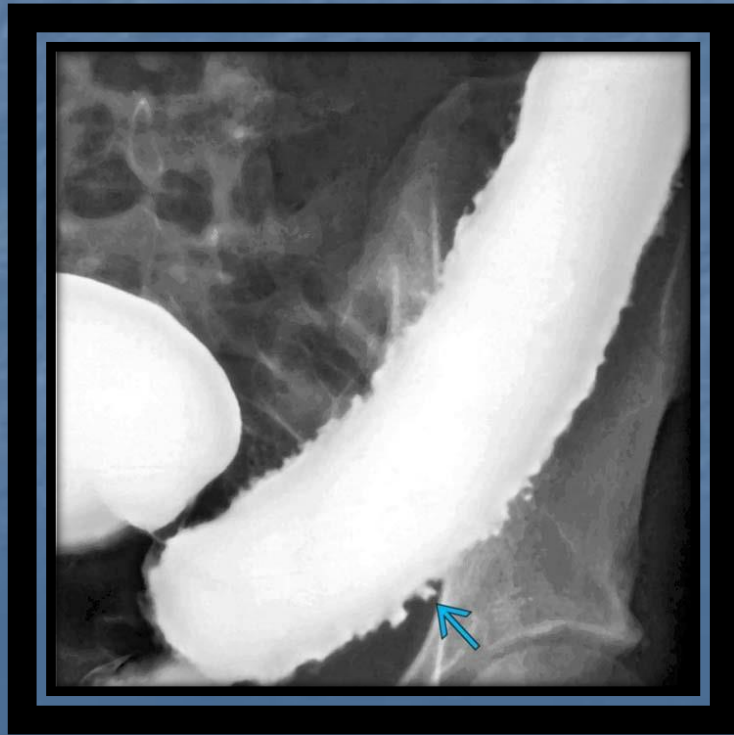
diverticulum

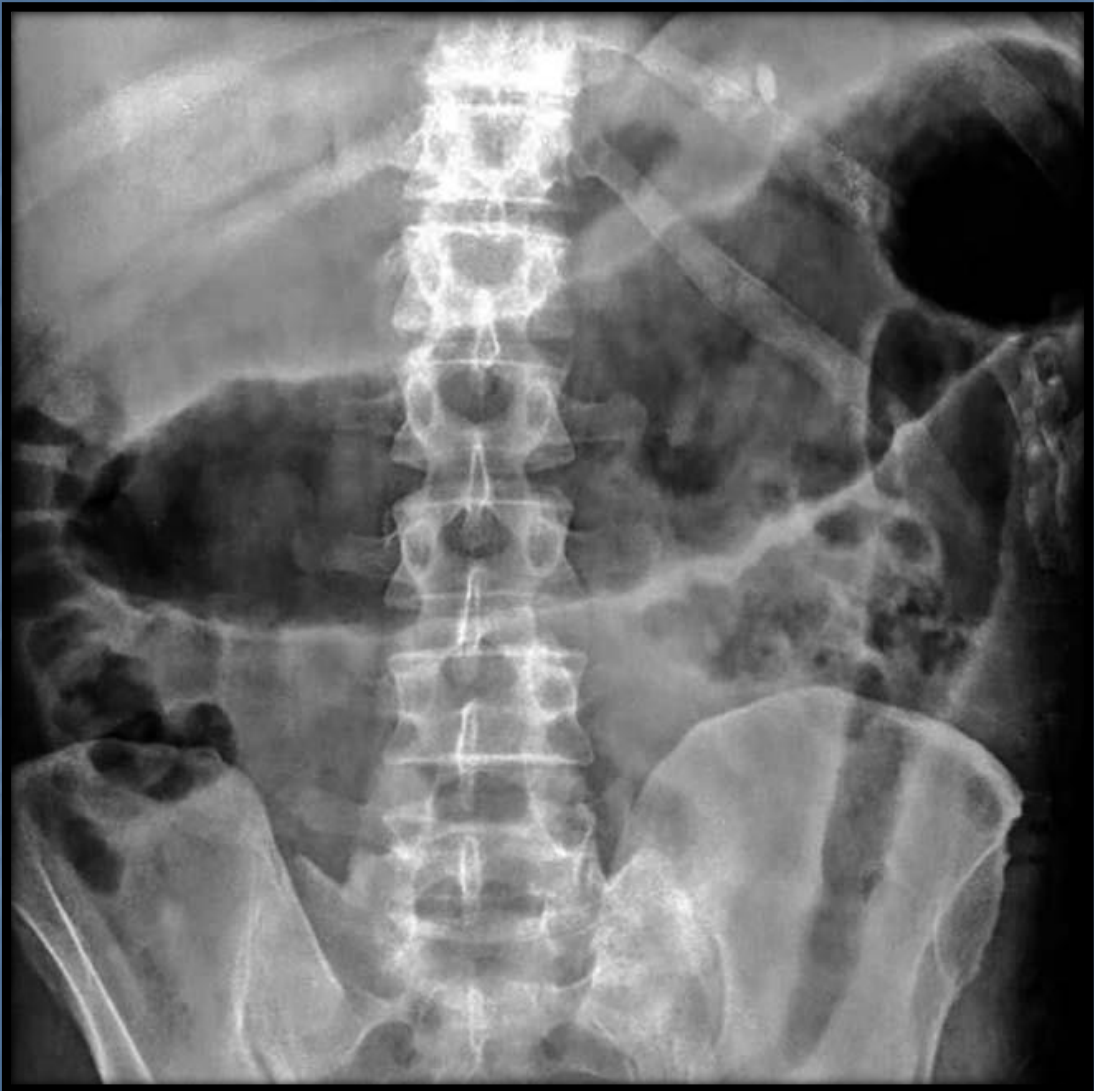


Ulcerative colitis

- unknown aetiology characterised by inflammation and ulceration of the colon.
- The disease always involves the rectum.
- When more extensive it extends in continuity around the colon.
- The cardinal radiological sign is widespread ulceration usually shallow.
- Loss of normal colonic haustra in the affected portions of the colon.

- Narrowing and shortening of the colon (a rigid tube)
- Pseudo-polyps(swollen mucosa in between ulceration)
- Strictures rarely when present are likely to be due to carcinoma.
- Dilated terminal ileum when all colon involved .
- Toxic dilation (toxic megacolon),no barium enema because of risk of perforation.





Crohn's disease of the colon

- Chronic granulomatous condition of unknown aetiology which may affect any part of the GIT (but most frequently involves the lower ileum and colon)
- The disease it may be involve only one portion of circumference of the bowel (ulcerative colitis circumference)
- The diseased areas intervening with normal bowel (skip lesion)

- Early stage:

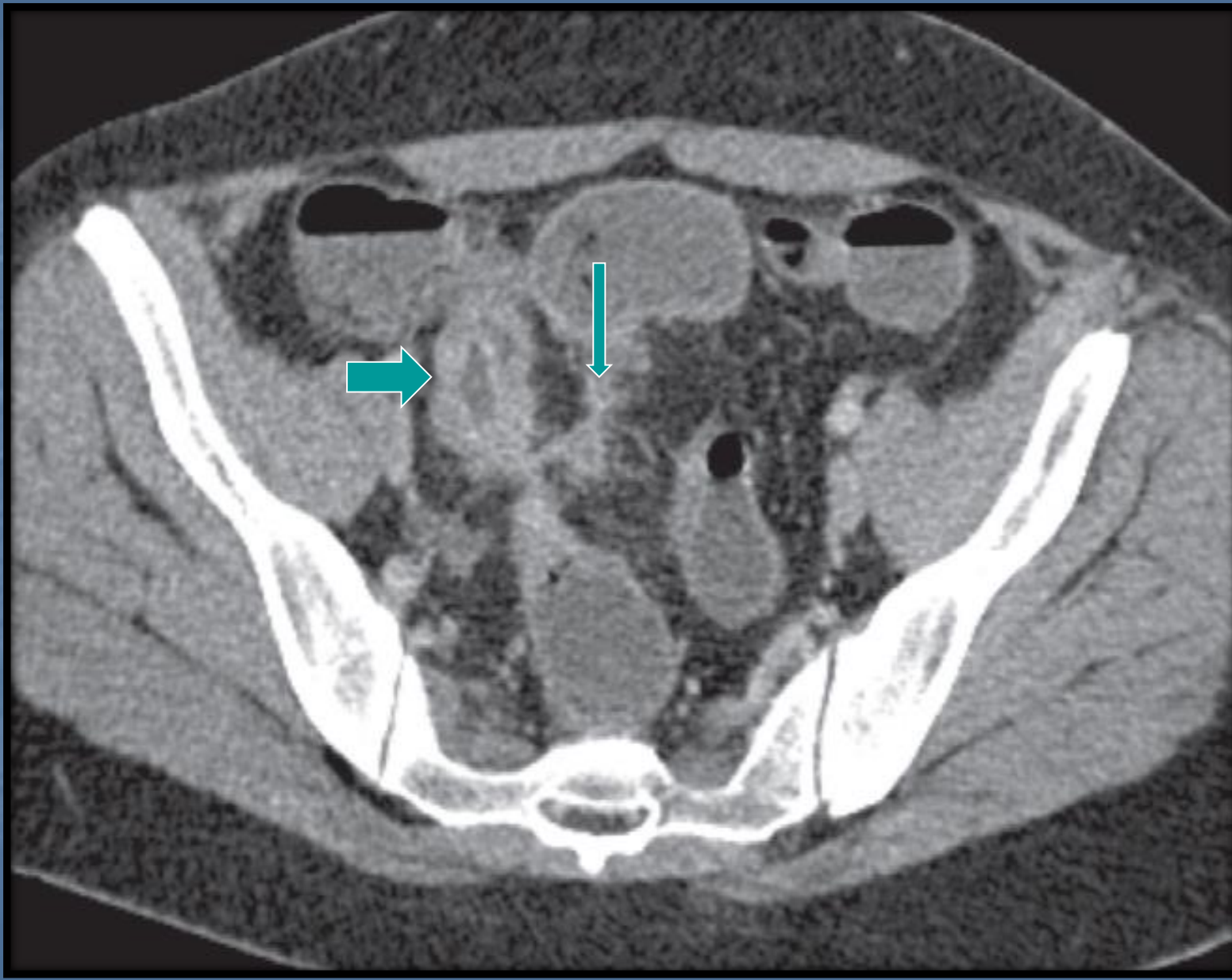
- loss of haustration

- narrowing of the lumen of the bowel and shallow skip ulceration , combined with mucosal edema may give rise to a 'cobble-stone' appearance of the mucosa.

- Later stage:

- ulcers may be very deep, penetrating into the muscle layer and become deep fissures.

- The deep ulceration in Crohn's disease may lead to the formation of intra-and extra mural abscesses, Fistulae and Stricture



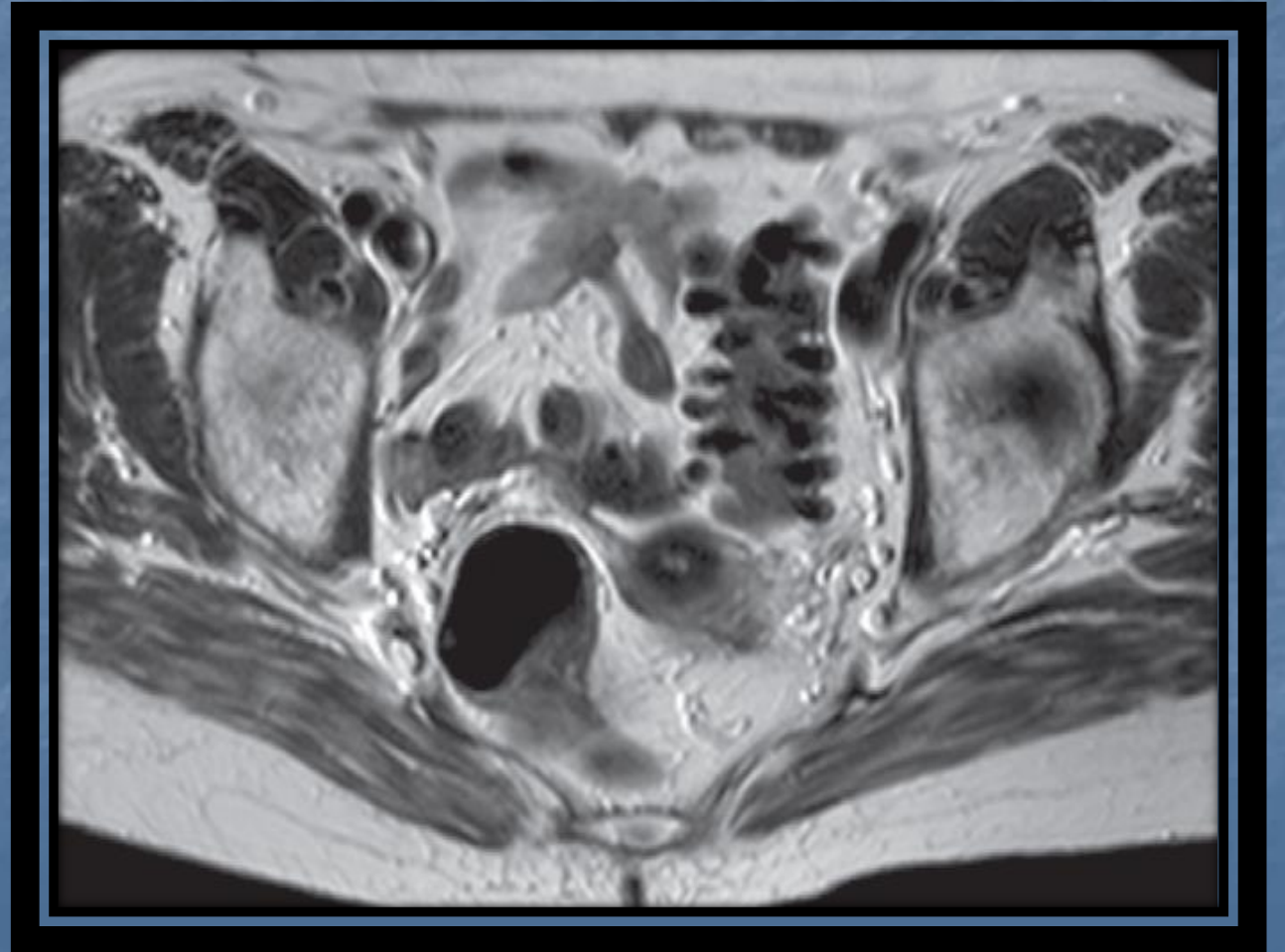


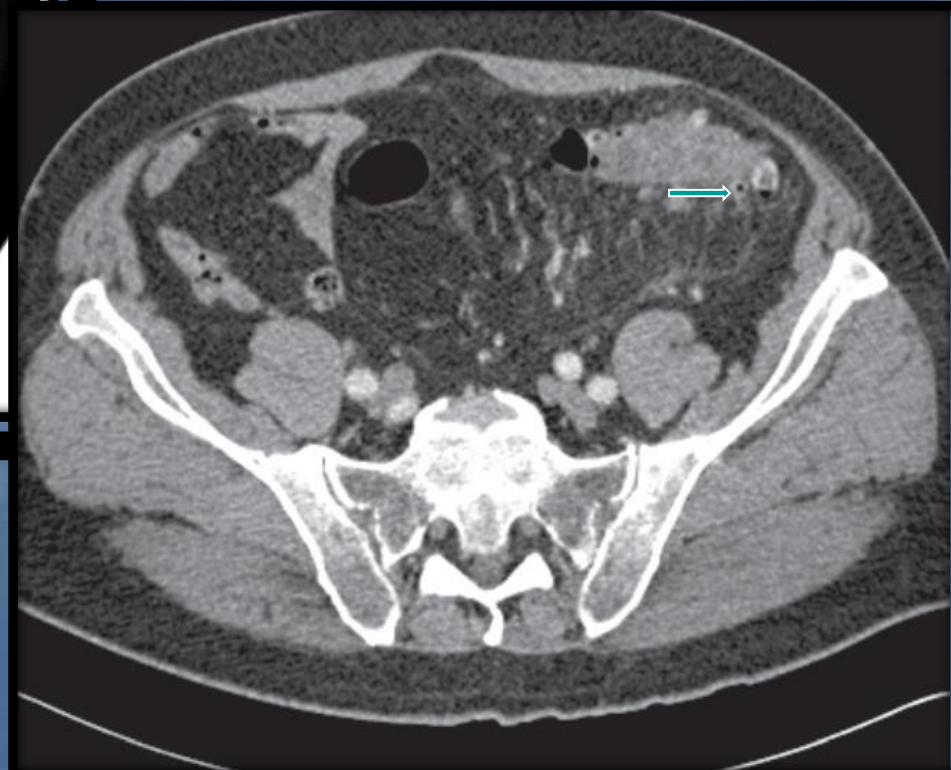
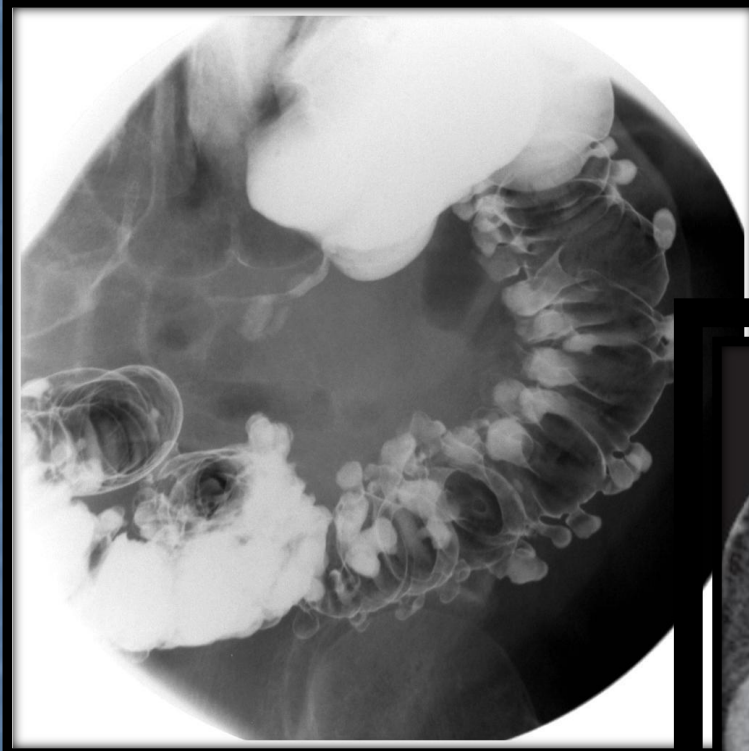
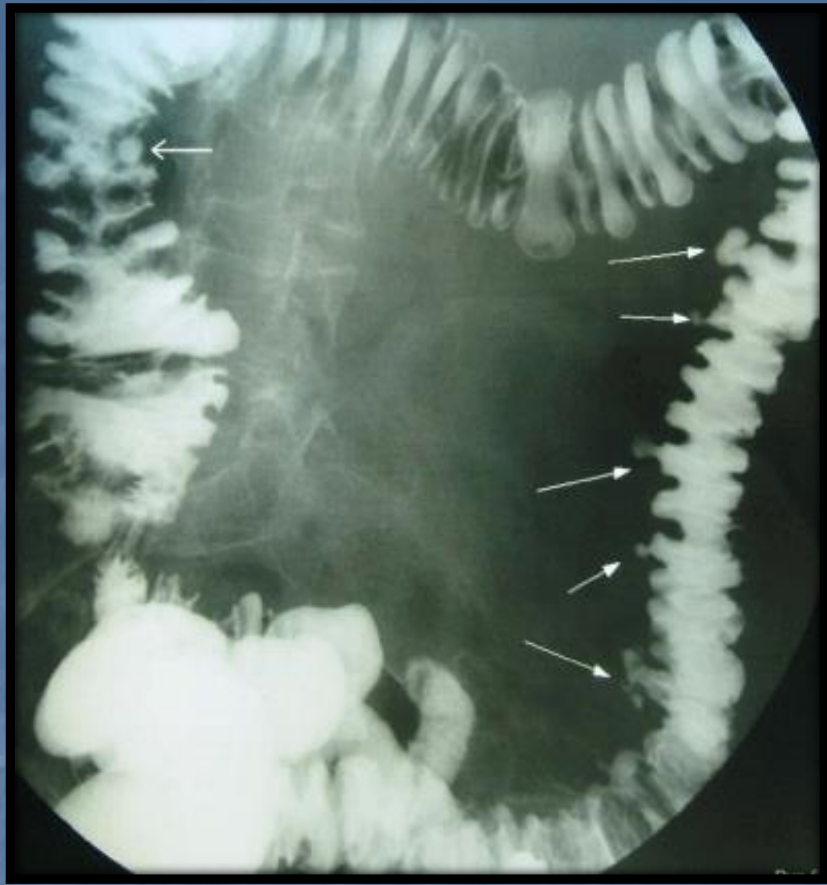


Diverticular disease

- Diverticula are sac-like and out-pouching of the mucosa through the muscular layer of the bowel wall
- Herniated of the mucosa through weakness areas where blood vessels penetrate the muscle.
- Diverticula common in the elderly.
- commonest in the sigmoid colon
- A diverticulum may complicating by
 - perforate; resulting in a pericolic abscess or fistula.
 - stricture.

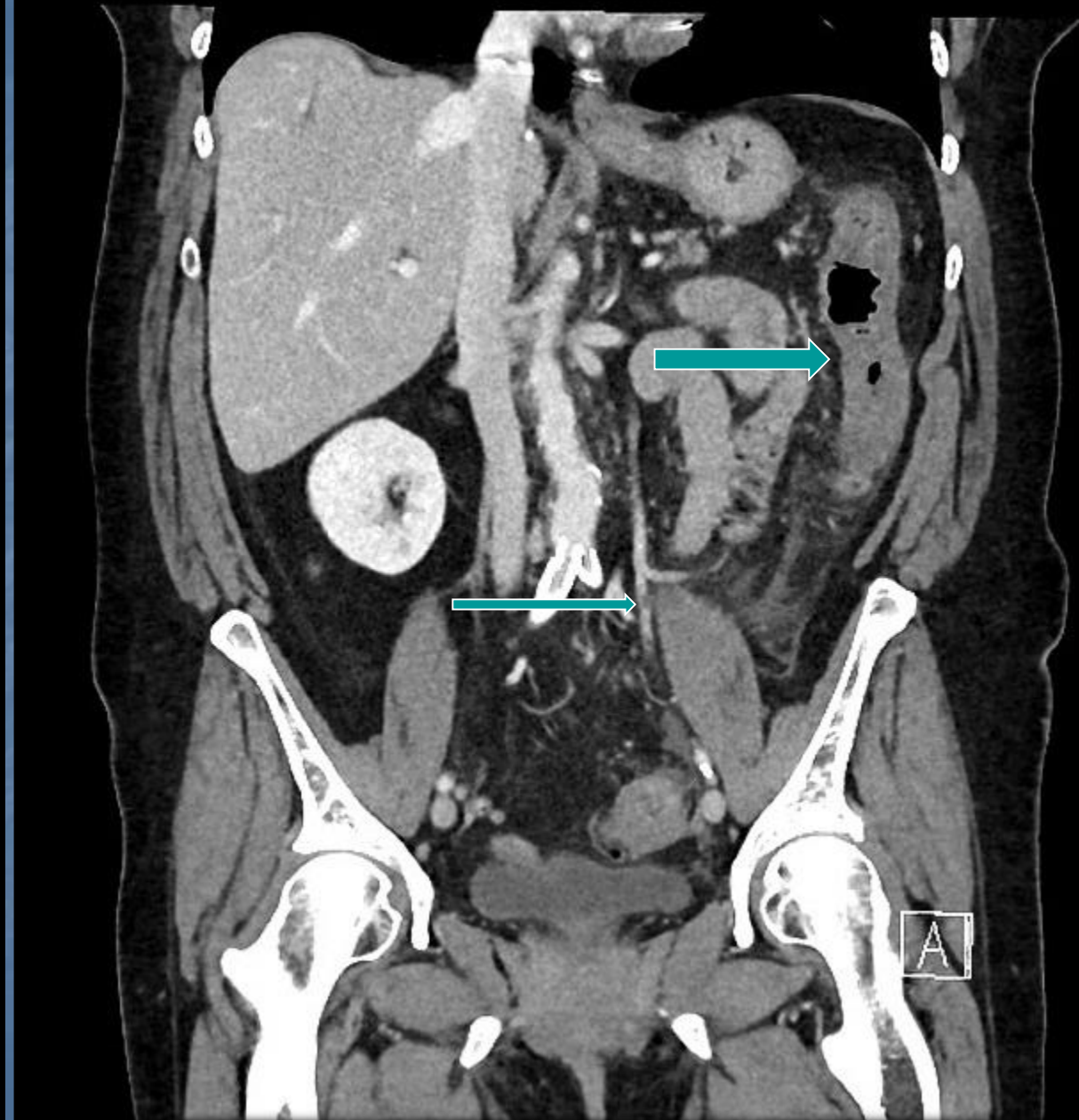
Diverticular disease



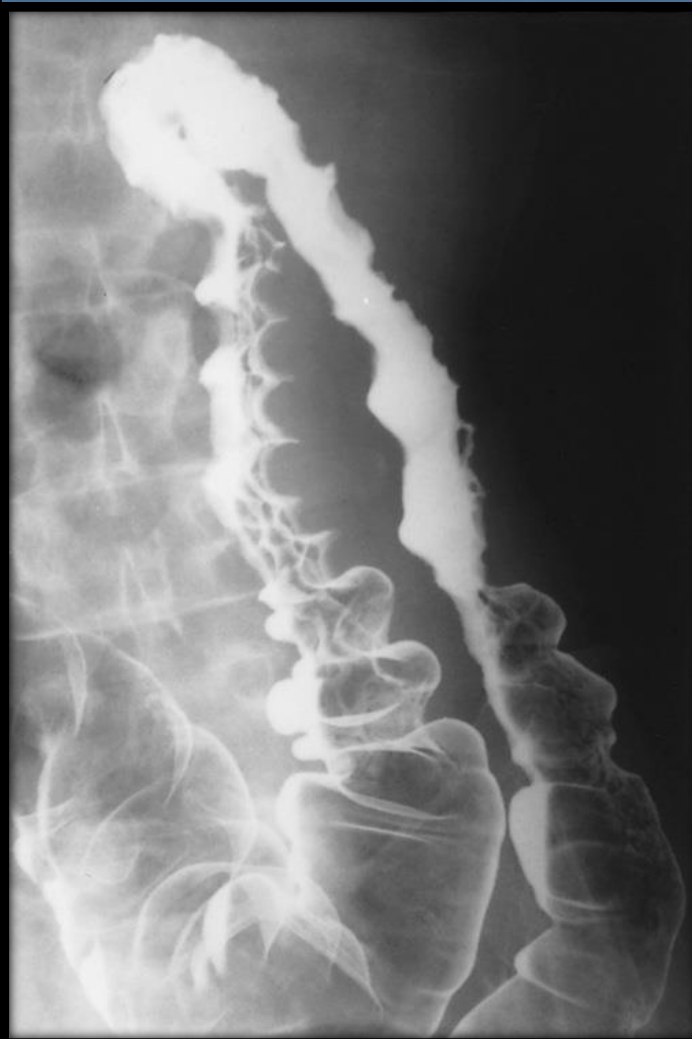


Ischaemic colitis

- Common from the splenic flexure to the sigmoid colon since this region with the most vulnerable blood supply in the colon.
- **Complications:**
 - strictures
 - sacculations

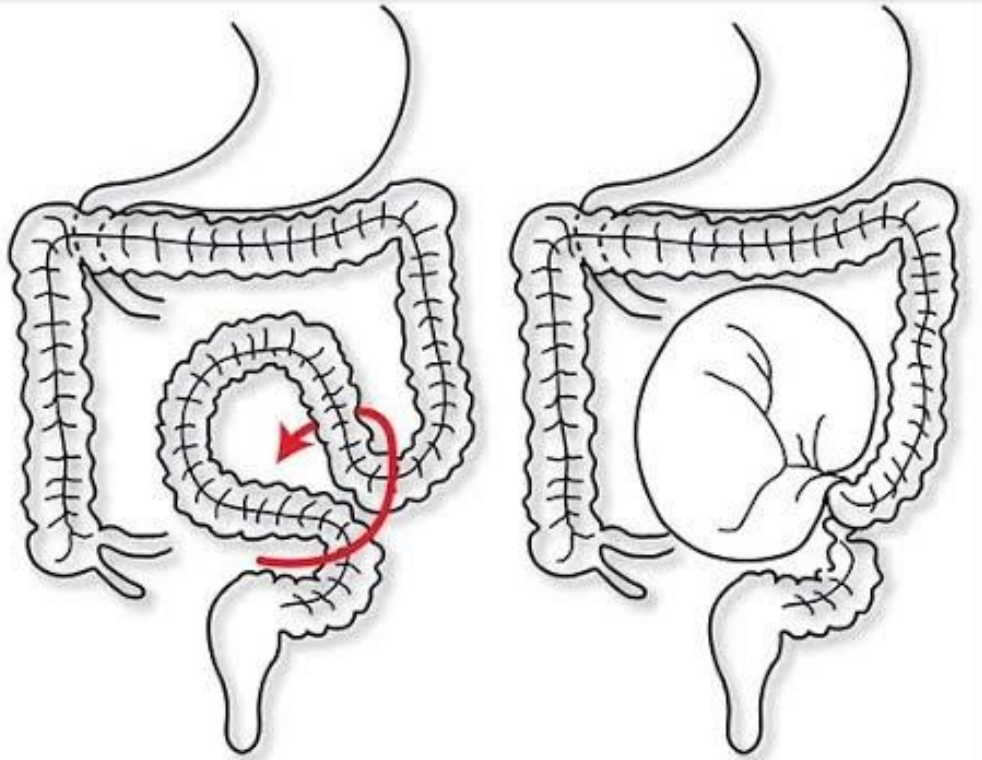


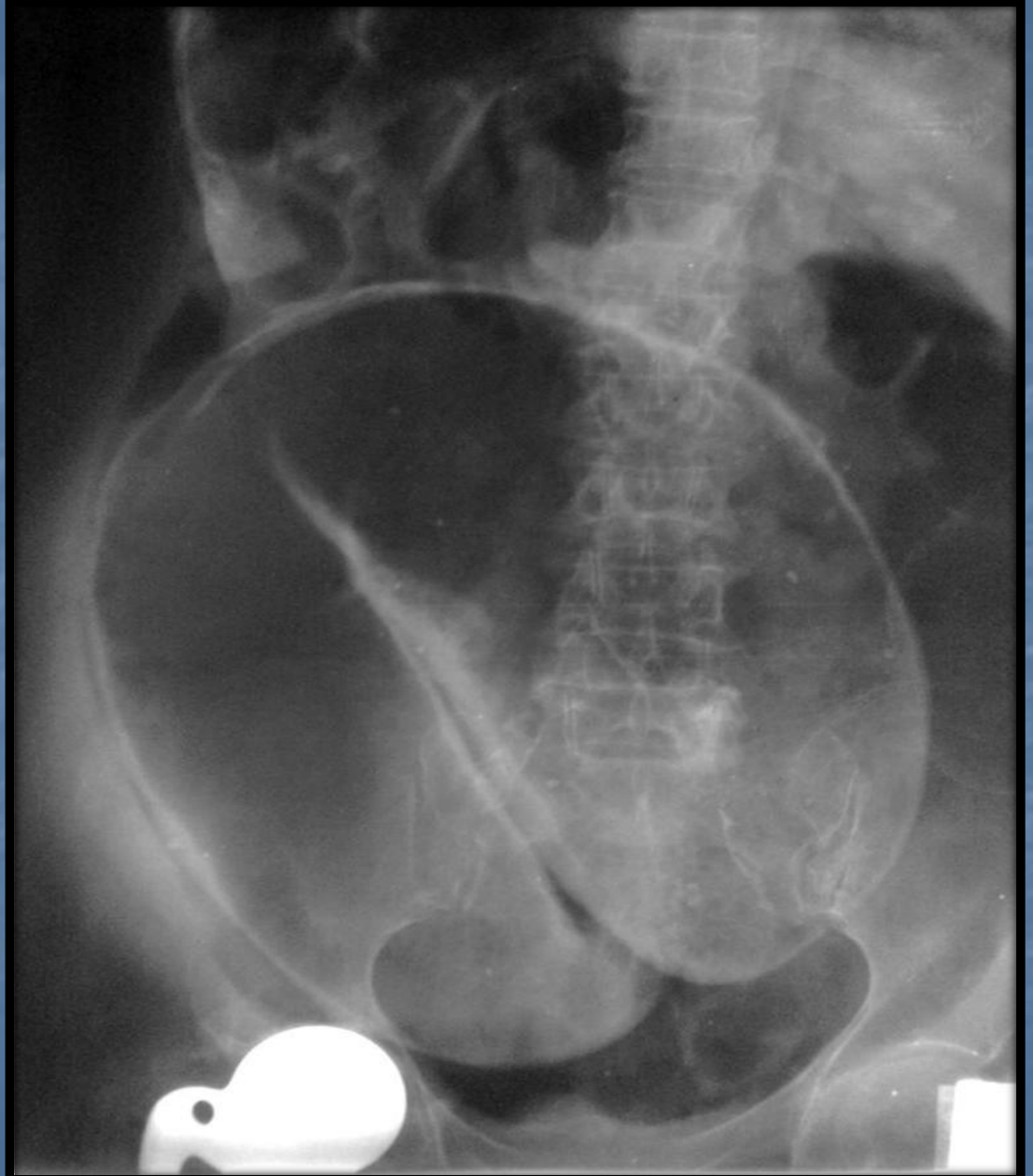
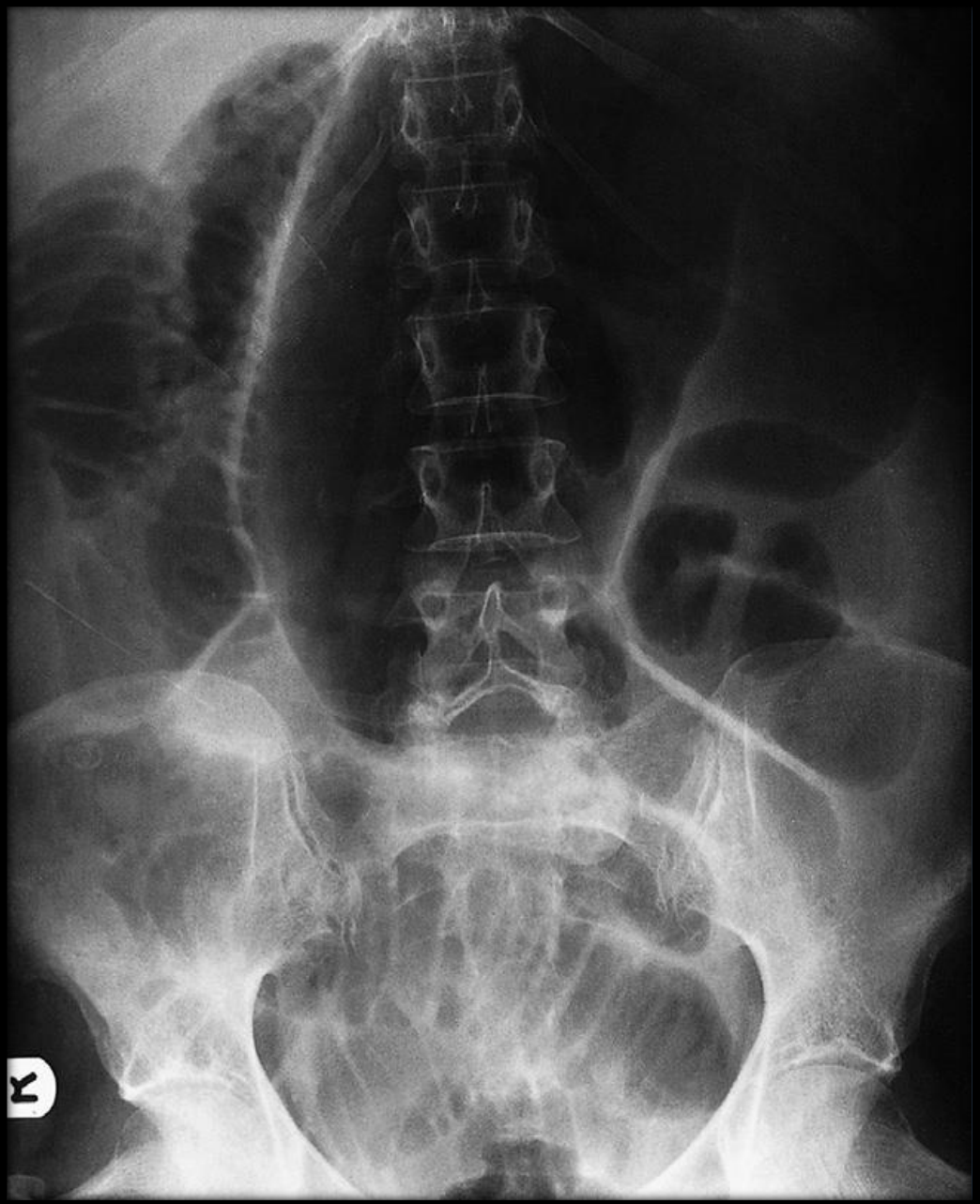


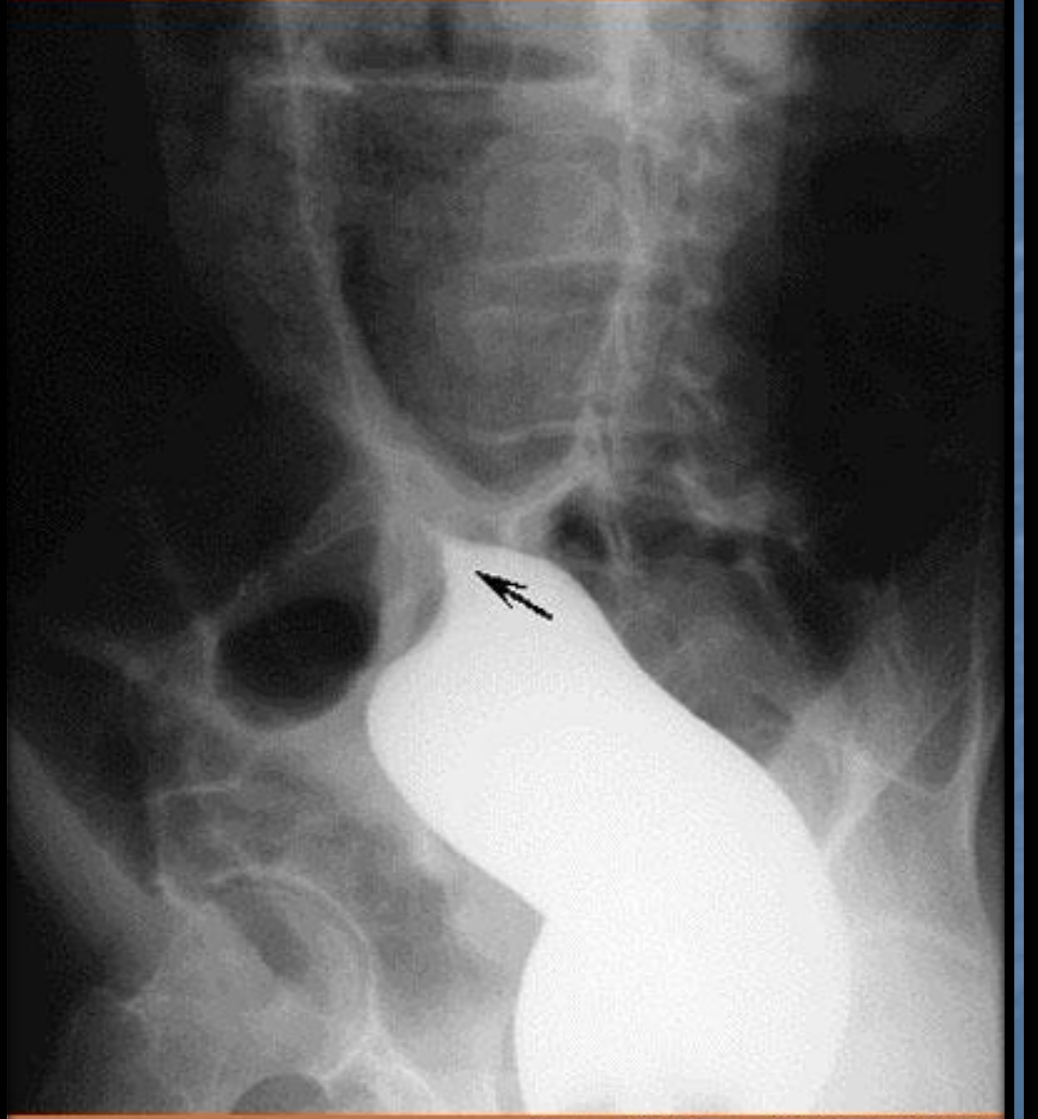
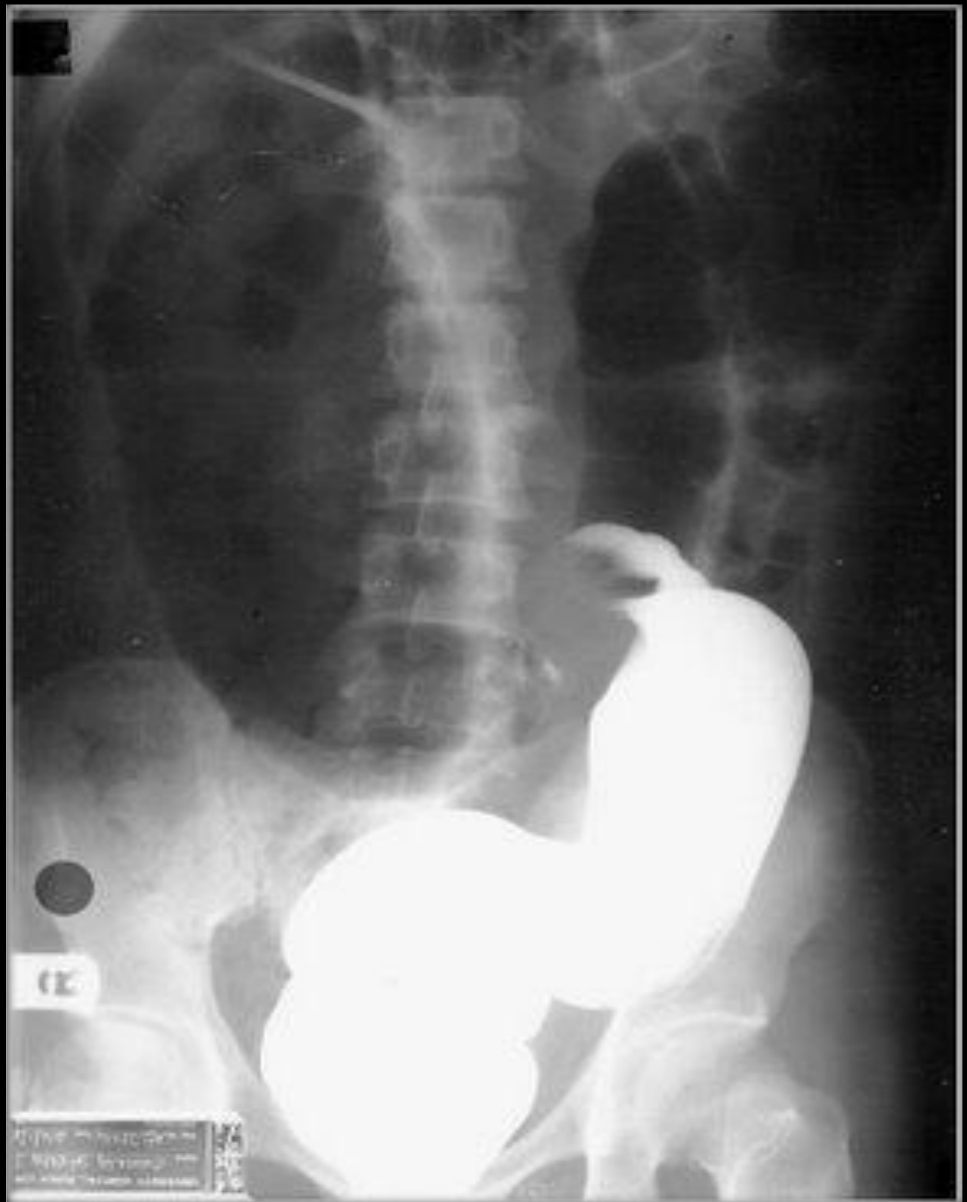


Volvulus

- In volvulus a loop of bowel twists on its mesentery.
- Frequent place in the sigmoid colon
- Less frequent place in the caecum.
- The twisted loop becomes greatly distended.





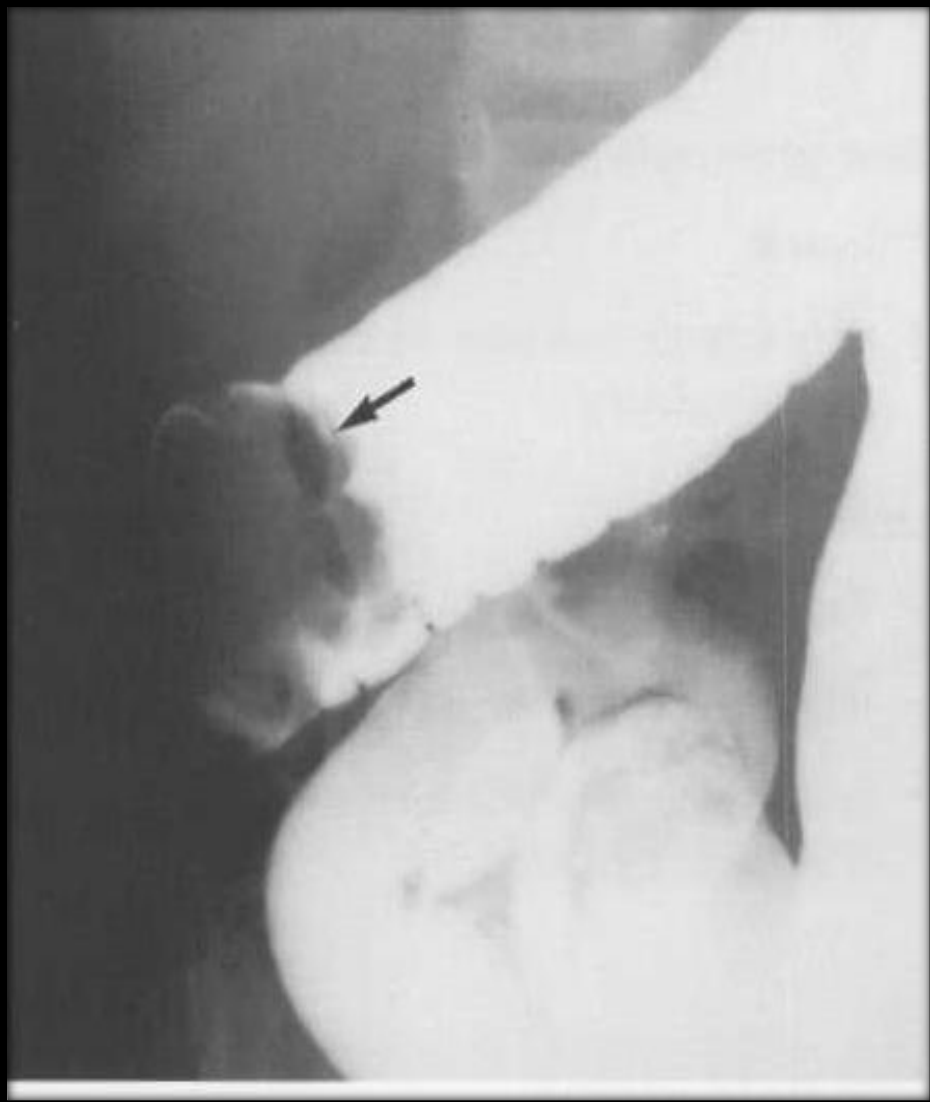


Intussusceptions

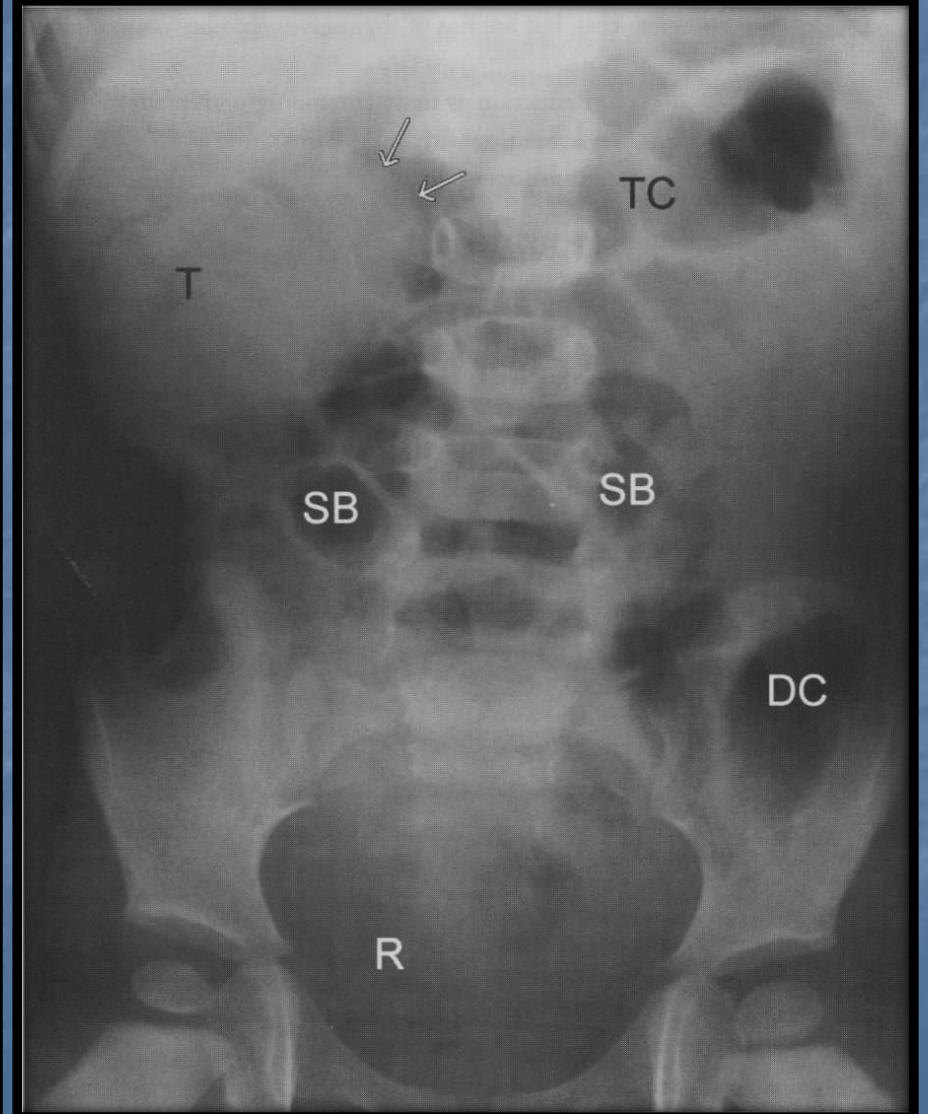
- It is the invagination of one segment of the bowel into another:
 - Ileo-colic(commonest type)
 - Colo-colic
 - Ileo-ileal.
- Infant are much more liable to intussusception than adult.

- At barium enema the flow of barium is obstructed by the leading edge of the intussusception, which causes a convex filling defect.
- In infant and young children, an intussusception can sometimes be reduced with barium enema, the child should have no signs of peritonitis.
- In adult , surgical treatment is invariable as an intussusceptions is usually caused by a tumor.

Ba. Enema shows filling defect at hepatic flexure



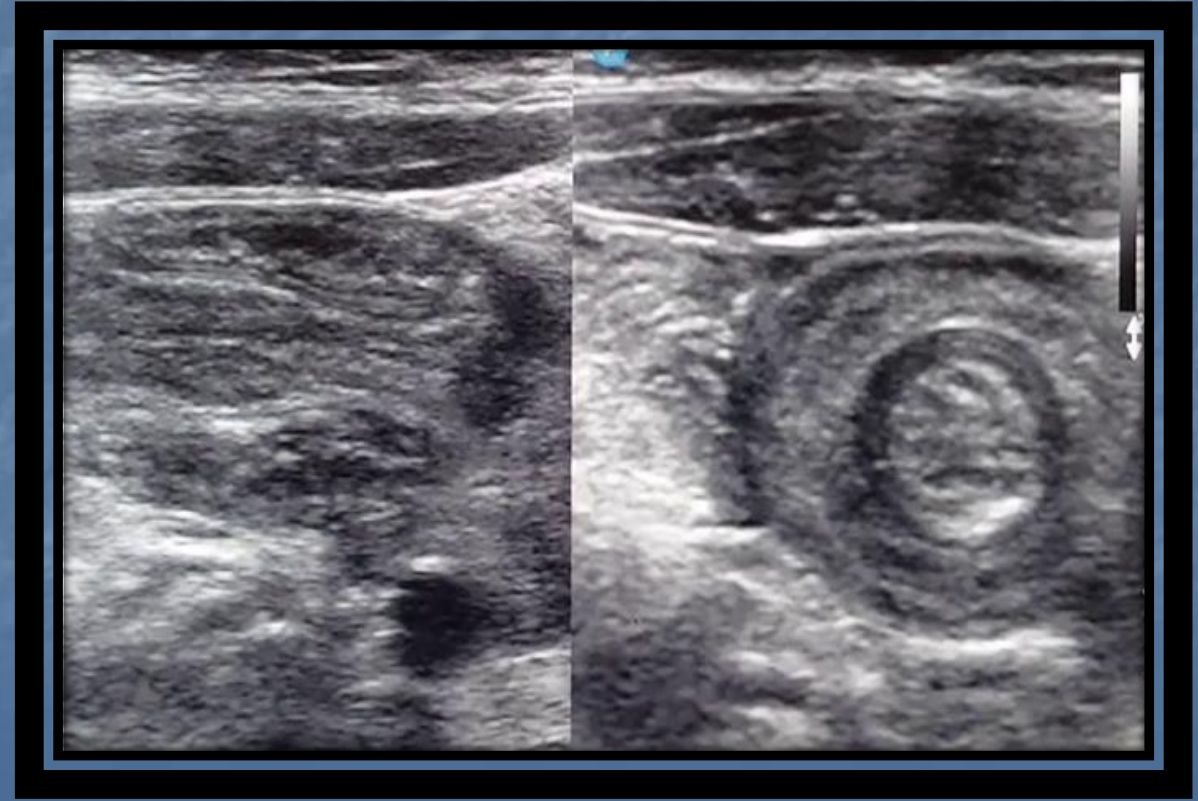
Plain abdomen x-ray intussusception

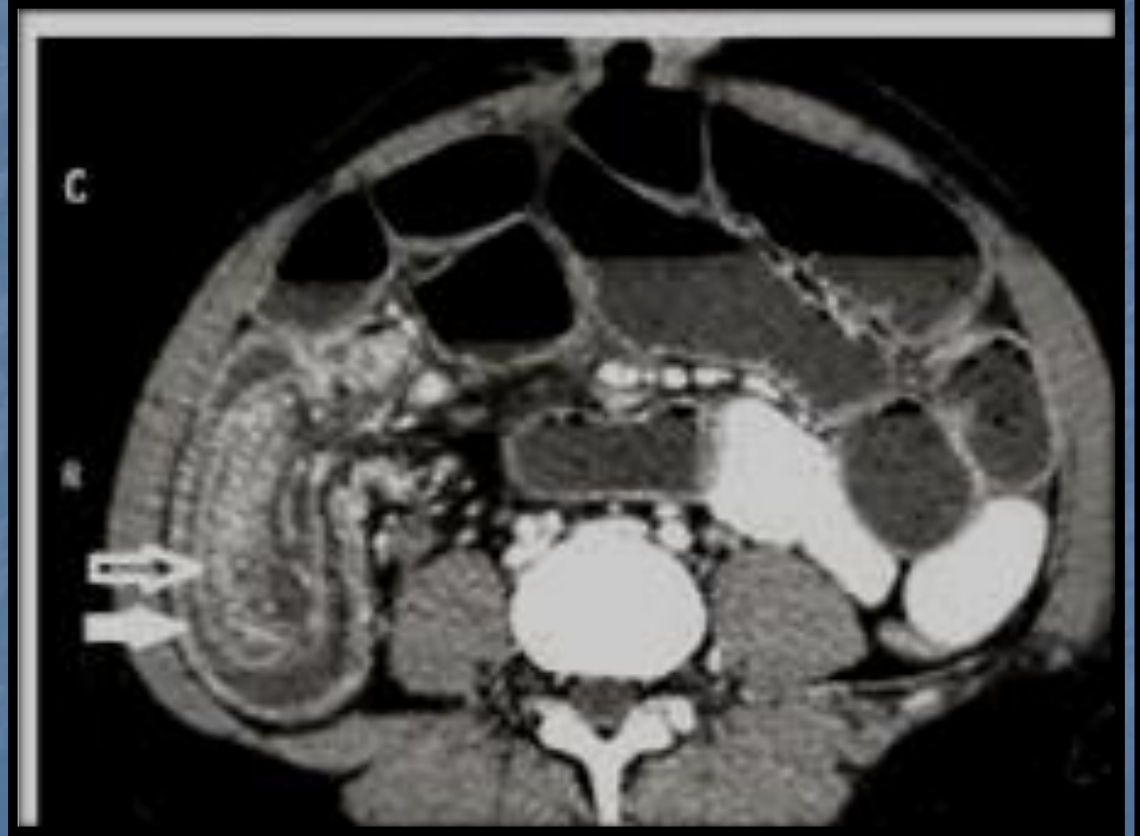




intussusception on ultrasound

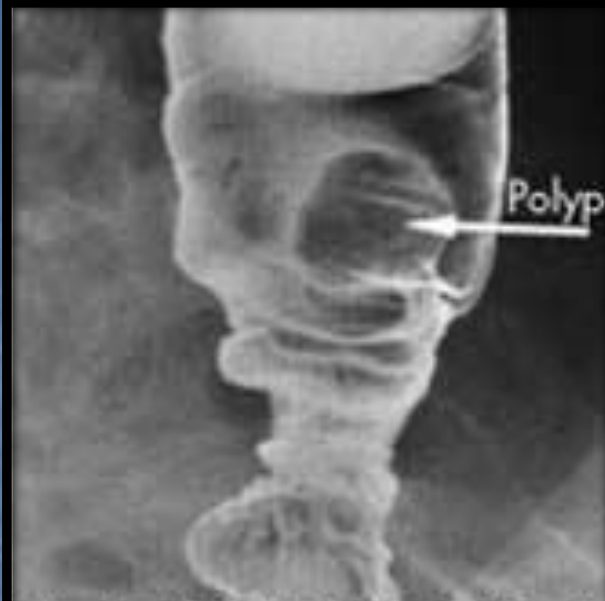
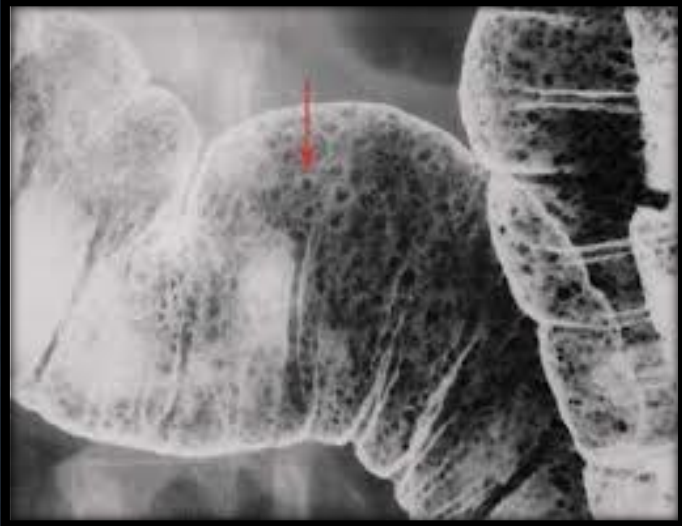
Intussusception occurs when one segment of bowel is pulled into itself or a neighboring loop of bowel by peristalsis.



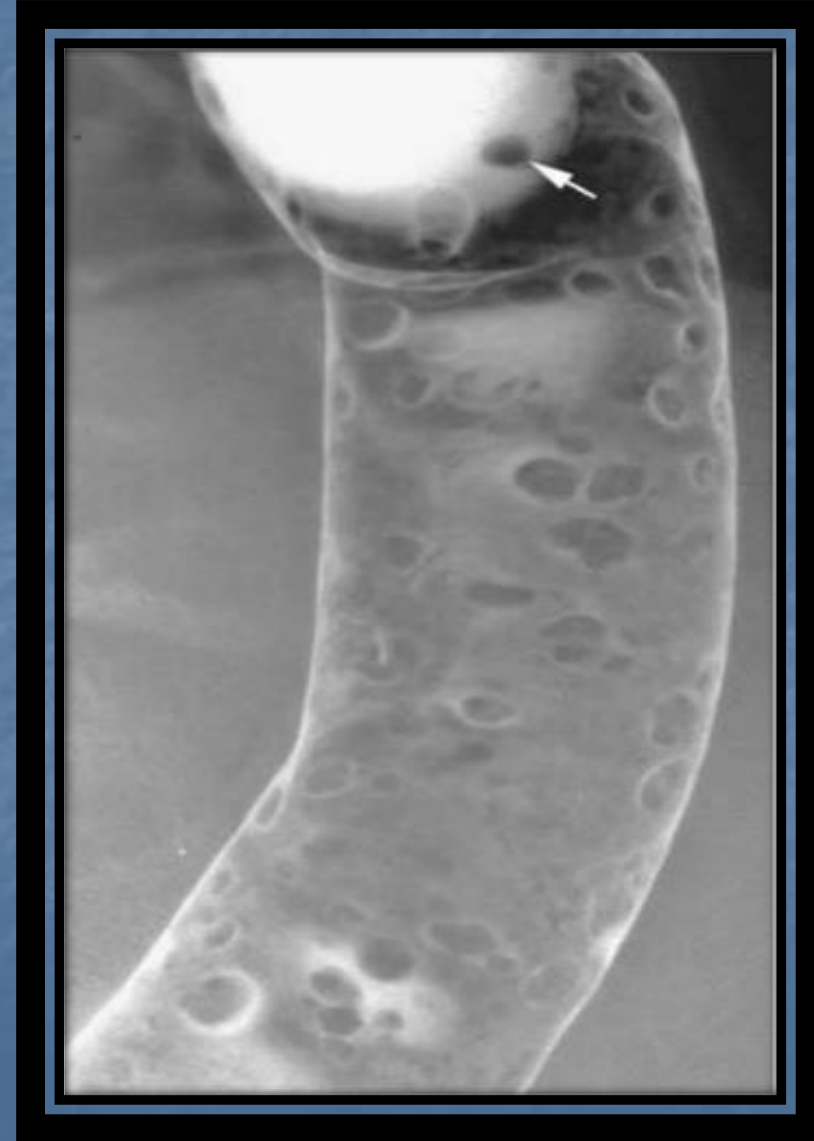


Tumours

- Polyps:
- small mass of tissue arising from the wall of the bowel projecting into the lumen .
- polyps may be sessile or on a stalk.
- polyps may be single or multiple.
- The features that suggest malignancy are:
 - a diameter of more than 2 cm.
 - irregular surface, short thick stalk.
 - rapid rate of the growth .

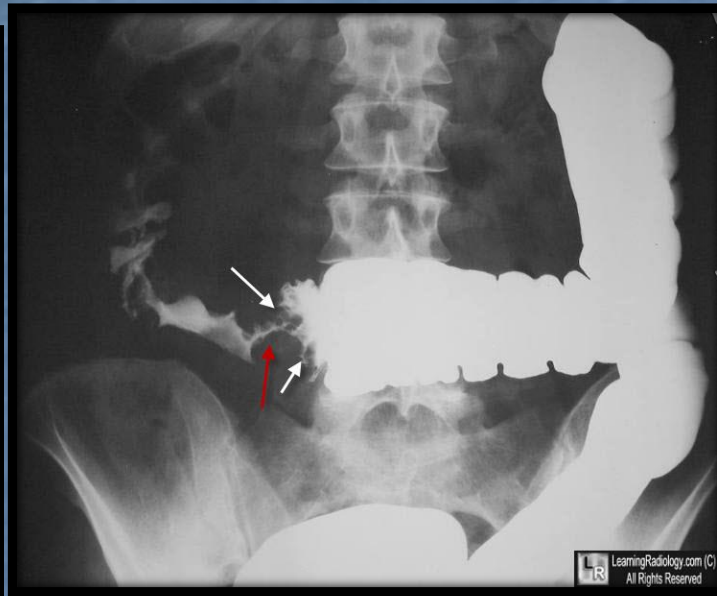


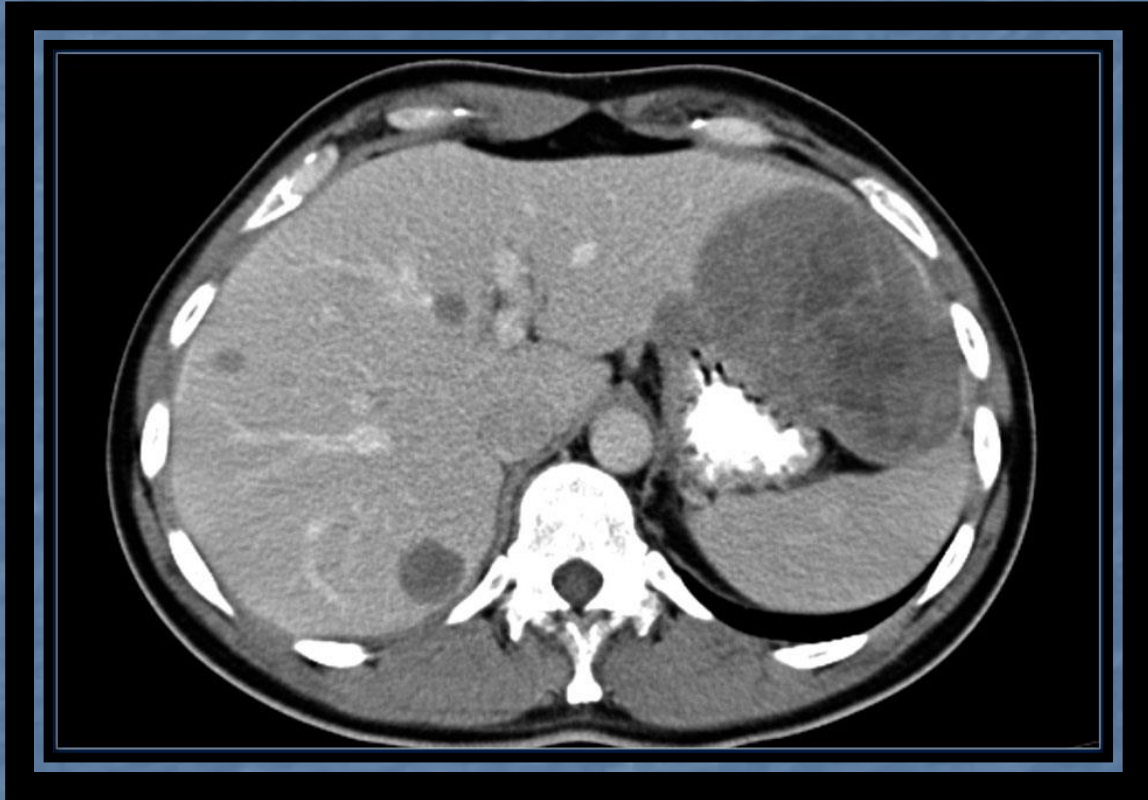
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Carcinoma colon

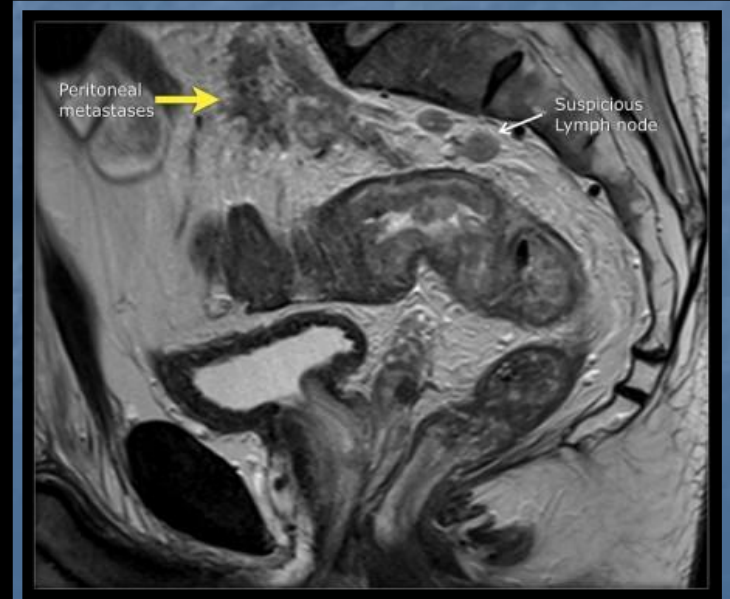
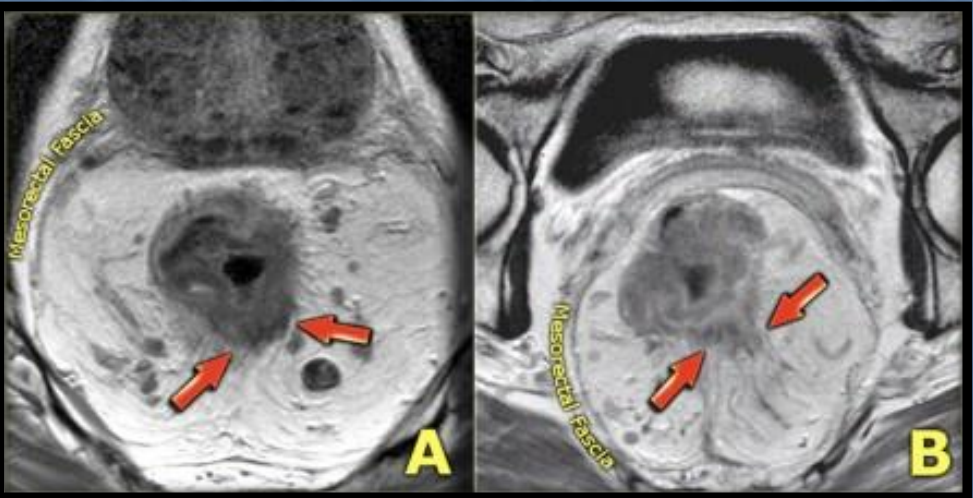
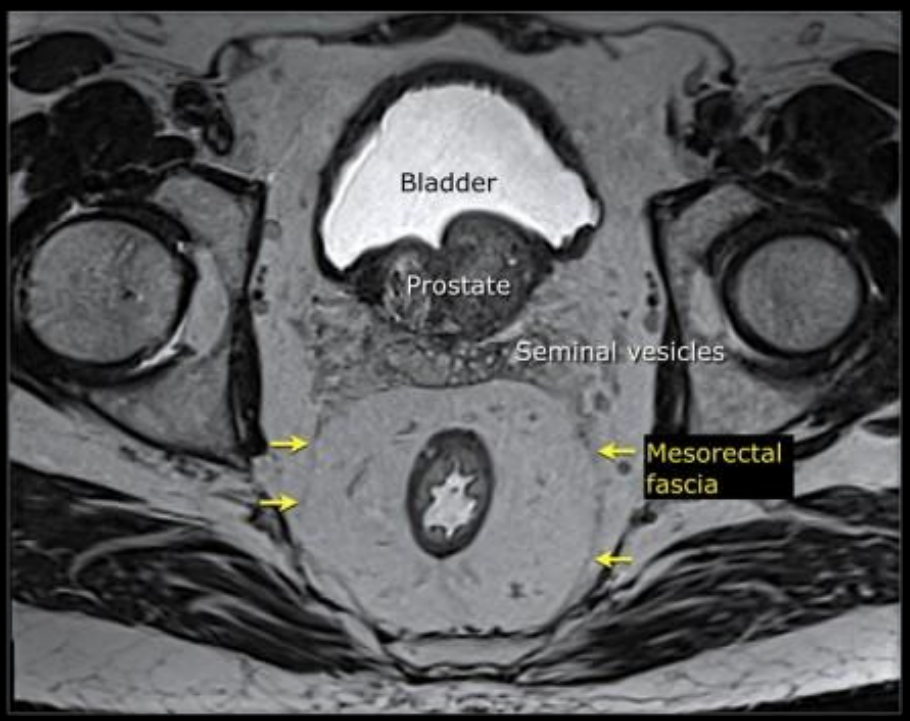
- Common recto-sigmoid region and the caecum
- Recto-sigmoid carcinoma often has annular stricture and presents with alteration in bowel habit and obstruction.
- Caecal carcinoma tumour can become very large without obstructing the bowel, so anaemia and weight loss are the common presenting features.
- The annular carcinoma as apple core appearance or an irregular stricture with shouldered edges.(rarely more than 6 cm)
- The polypoid or fungating carcinoma causes an irregular filling defect projecting into the lumen of the bowel.





■ **CT and MRI of rectal carcinoma**

- The main value of CT and MRI is to demonstrate any tumour that has spread through the wall of the rectum and also to diagnose pos-operative recurrence.
- Pelvic fat surrounded the rectum, and tumour infiltrating this fat can be readily recognised.
- Invasion into the pelvic wall, sacrum, lymph nodes, metastases.



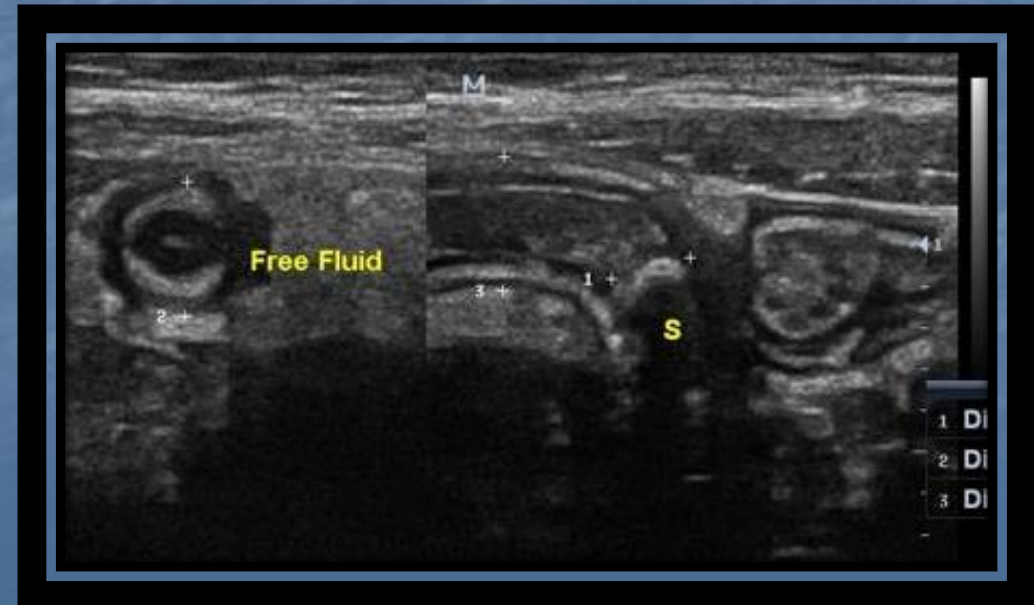
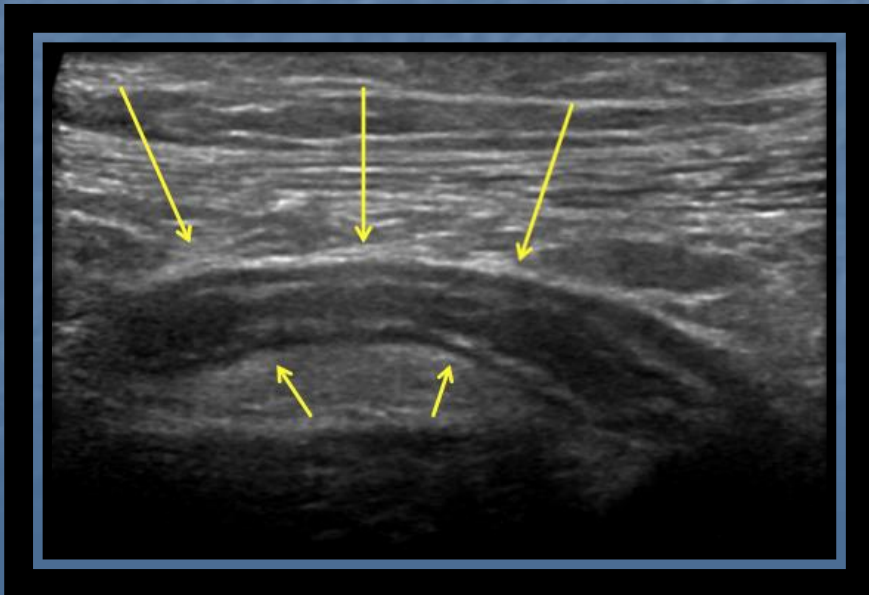
Hirschsprung's disease (congenital aganglionosis)

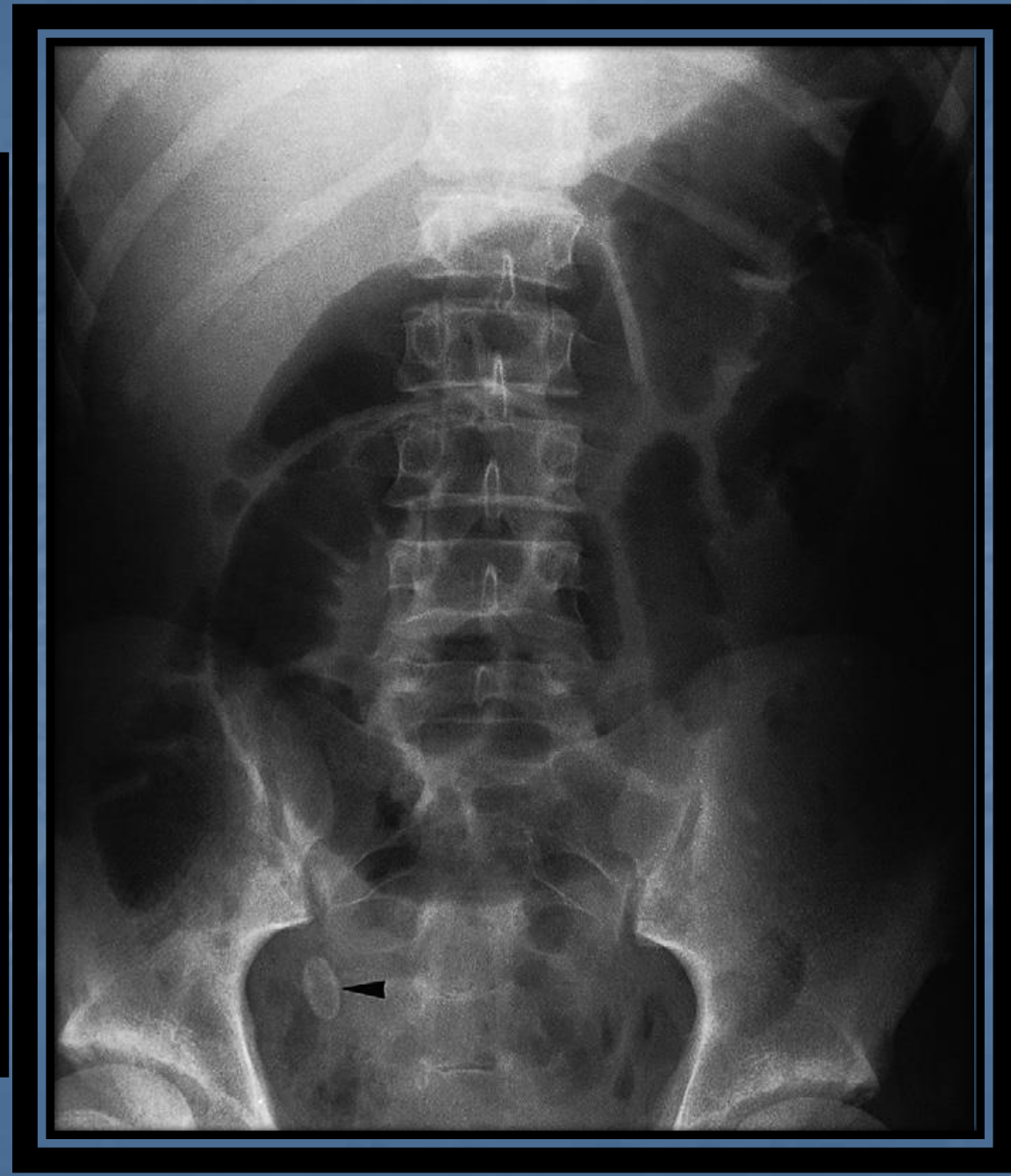
- Absence of ganglion cells beyond a certain level in the colon, usually in the sigmoid or recto-sigmoid region.
- Diagnosis depends on recognising the transition from the normal or reduced calibre colon to the dilated colon.
- The colon is not washed out before the barium enema, to prevent the danger of water intoxication from the dilated colon.



Acute appendicitis

- Blind end non compressible tubular structure
- Thickened wall and more than 6mm transverse axis
- Appendicolith shadowing .
- Hyperechoic changes of the surrounding fatty tissue a





Uss evaluation of GIT disease

- ultrasound of the GI-tract has become a routine procedure in many emergency rooms after the physical examination.
- acute conditions such as appendicitis, diverticulitis, or bowel obstruction can be detected by uss than normal gas filled bowel structures
- Unlike to the examination of liver the gall bladder biliary system or the pancreas , the uss has easier and excellent evaluation for them
- Use conventional curved abdominal probes (2-5 MHz)
- high-frequency linear probe (5 to 15 MHz) , can identify different layers of the bowel wall.

CT of GIT

- CT is an excellent imaging method for evaluating the liver, pancreas, spleen, and even most portions of the digestive tract.
- Using water or oral water soluble iodine contrast media which serves to outline the digestive tract [not using barium] .
- An intravenous injection of water soluble iodine contrast media is usually administered during the examination to outline the blood vessels , enhancing bowel wall , and other abd. Organs



- CT study was most helpful in cases of extrinsic lesions , lymphoma, and smooth-muscle tumors bowel wall , extension of inflammatory disease .
- less helpful than barium study for mucosal abnormality of the bowel like ulceration or adenocarcinoma .
- CT scan using for evaluating acute abdomen like acute pancreatitis , Appendicitis , diverticulitis , obstruction , intussusception , malrotation, volvulus , perforations , abd. Collection

- MRI has become an important tool in the management of patients with diseases of the gastrointestinal tract, such as rectal cancer and inflammatory bowel diseases.
- Better assessment for liver , biliary disease