RADIOLOGY
TEAM 435

Radiology of diseases of the gastrointestinal tract

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● Objectives:

1. To know common GIT Pathologies presentation.
2. To understand step wise approach in requesting GIT Radiology Investigations.
3. To know common Radiologic pathologies in GIT.

● Resources:

- 435 Slides
- 434 Team
- 435 Notes
- Diagnostic imaging 7th edition

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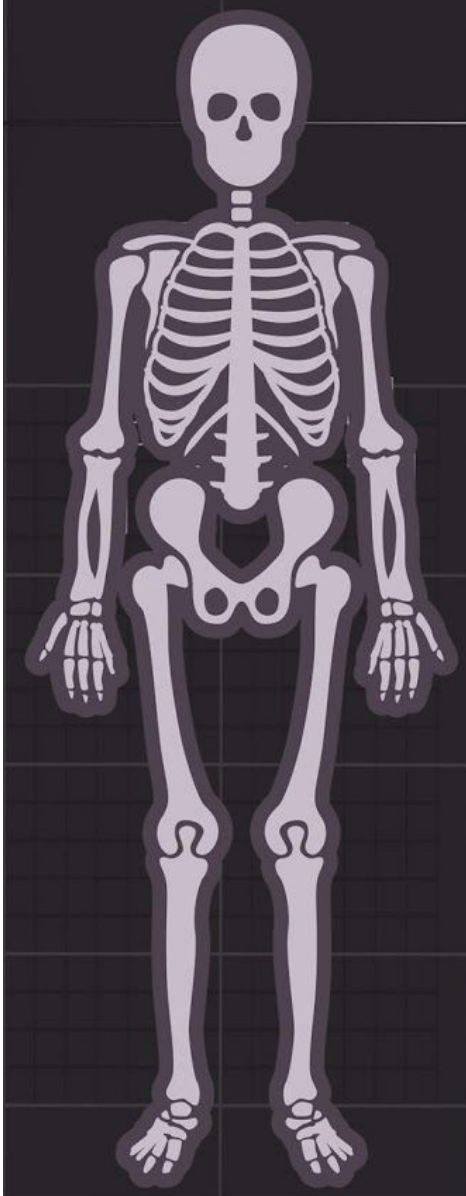


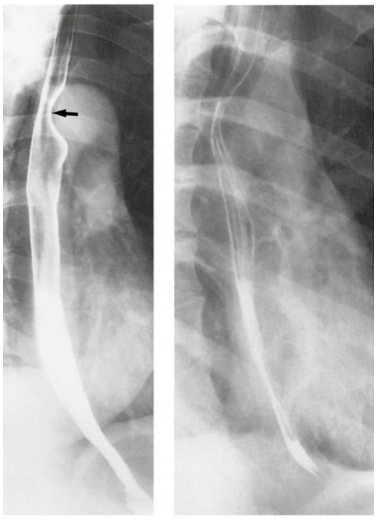
Esophagus

❖ **Clinical Signs and symptoms of Esophageal Disease :**

- Dysphagia
- Odynophagia (painful Swallowing)
- Regurgitations
- Vomiting
- Age (some diseases are common in specific age)
- Constitutional symptoms (Fever, Night Sweat, Weight Loss)

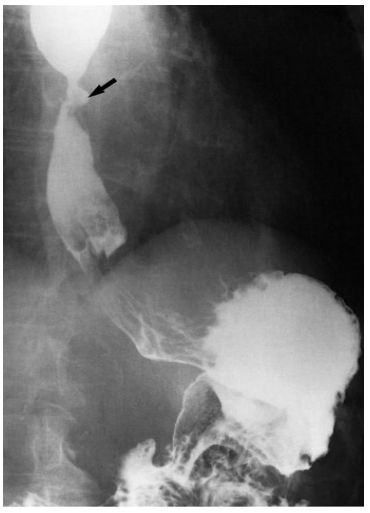
❖ **Imaging Modalities :**

1) X-ray (we will not see clearly because it is behind trachea but we might see dilated esophagus)
2) 1st choice Fluoroscopy "contrast study" (show us the lumen and mucosal lining) "barium swallow"
3) Ultrasound (rarely used)
4) 2nd CT (not the main study of choice)
5) MRI (limited role)
6) Nuclear Medicine
7) Angiography



Normal Esophagus shows full Barium with a smooth Outline and Indentation made by Aortic Arch. Compare Tapered narrowing in the second and Third Image.

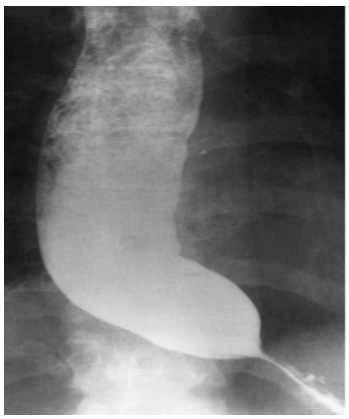
Irregular narrowing in the mid of esophagus with Dilated upper esophagus because of the narrowing (there is a mass constricting the lumen which gives shouldering at the upper end).



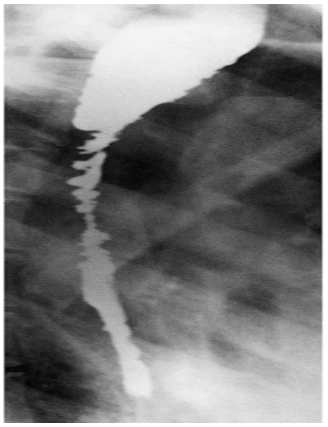
Tapered smooth narrowing of the mid esophagus we see it in Gastroesophageal reflux disease "GERD" (peptic stricture in the esophagus) and there is an ulcer within the stricture (arrow).

- **Also there is Hiatus Hernia.**

smooth focal stricture, no shouldering
> benign



Most of Esophagus is Dilated (food residual) with smooth narrowing at the lower End. Rat tail "achalasia" bird beak sign



Irregular narrowing in the whole esophagus (corrosive Induced stricture along the whole esophagus) "corrosive are Chemicals like acids or bases".
"corrosive esophagitis"

External posterior **compression causes narrowing of Esophagus due to apparent Subclavian Artery as it passes behind the esophagus "arrow"**
- anomalous right subclavian artery.

Esophageal web. Shelf-like indentation "arrow" from the anterior wall of Esophagus.

Pharyngeal Outpouching filled with contrast with compression of the esophagus (zenker's Diverticulum). in elderly

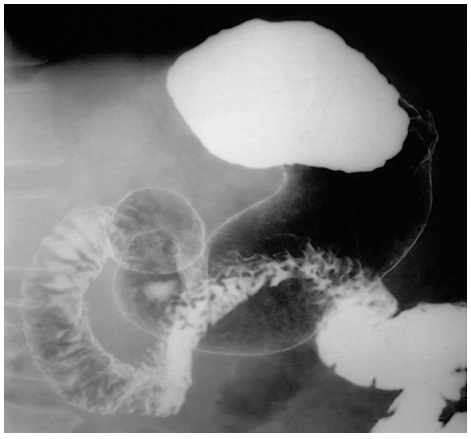
Stomach

❖ Clinical Signs and symptoms :

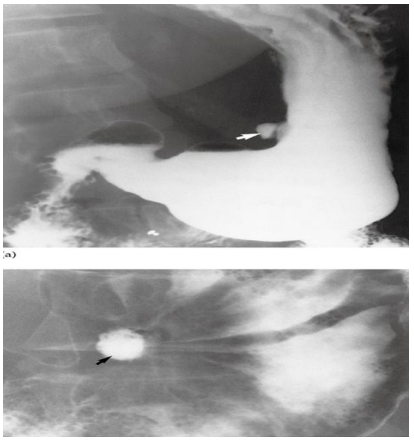
1) Epigastric pain
2) Vomiting
3) Hematemesis
4) Age (some diseases are common in specific age)
5) Constitutional symptoms (Fever, Night Sweat, Weight Loss)

❖ Imaging Modalities :

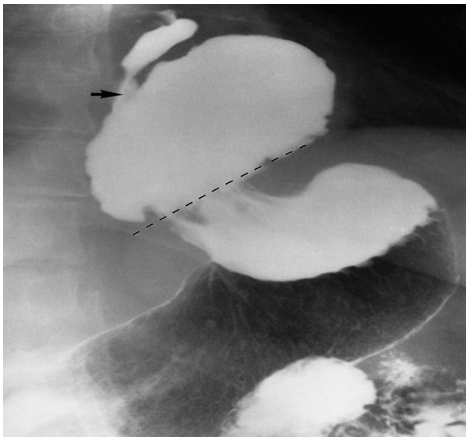
1) X-ray
2) Fluoroscopy "contrast study" "called meal"
3) Ultrasound > in pediatric for pyloric stenosis
4) CT
5) MRI
6) Nuclear Medicine
7) Angiography



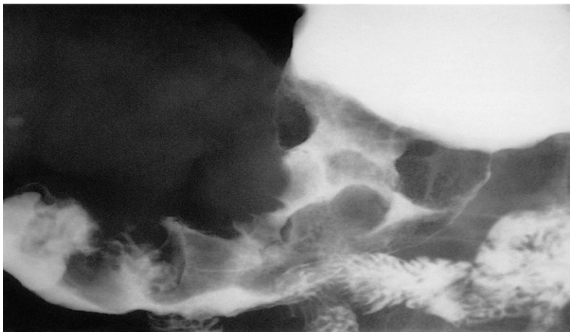
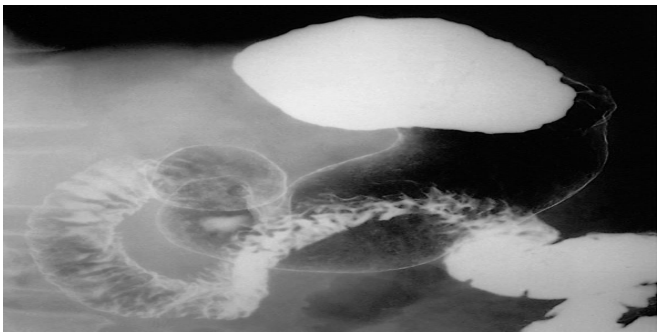
Normal Stomach and Duodenum on double contrast barium meal. On this supine view, barium collects in the fundus of the stomach. The body and the antrum of the stomach together with the duodenal cap and loop are coated with barium and distended with gas. Note how the fourth part of the duodenum and duodenojejunal flexure are superimposed on the body of the stomach.



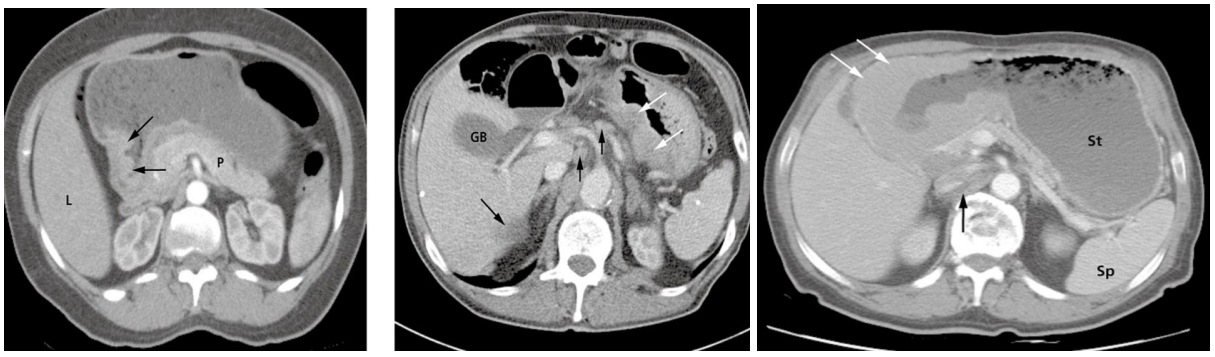
Outpouch filled with contrast in the lesser curve of the stomach which indicates benign ulcer "arrow".
En face of the same ulcer "arrow" is seen as rounded collection of barium.



Sliding Hiatus Hernia. The fundus of the stomach and the gastroesophageal junction "arrow" have herniated through the esophageal hiatus and lie above the diaphragm (dotted Line).

Black areas are filling defects in the antrum and body of stomach which indicate mucosal abnormality (infiltration) - Gastric Carcinoma.
The difference between Gastric masses and ulcer is that the ulcer will accumulate the contrast in ulcer site which will appear as dense but in case of mass , the mass will clear the contrast and will appear black.



CT with IV contrast, there is thickening of the wall in all of these CT scan Images, It is either **Primary Gastric Cancer** Or **Infiltration of Metastasis** Or **Lymphoma**.
Right Image : Significant Thick wall and the lumen is narrowed.

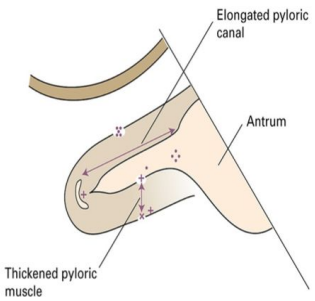



Fig. 6.29 Pyloric stenosis. Ultrasound scan in a neonate showing a thickened, elongated pyloric canal.

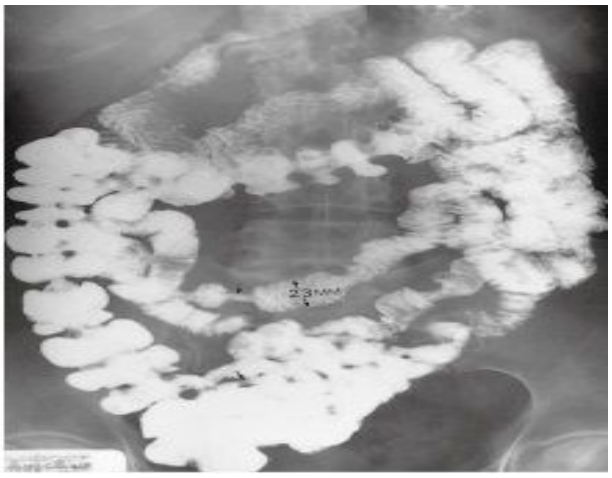
Ultrasound has very limited role in stomach but may play a role in **Pyloric Stenosis** in **pediatric Age group**.

Doctor's notes:
usually a second male in the family, less than 6 weeks of age and presents with projectile vomiting and olive-shaped mass when feeling the upper belly which indicates the presence of hypertrophic pylorus.

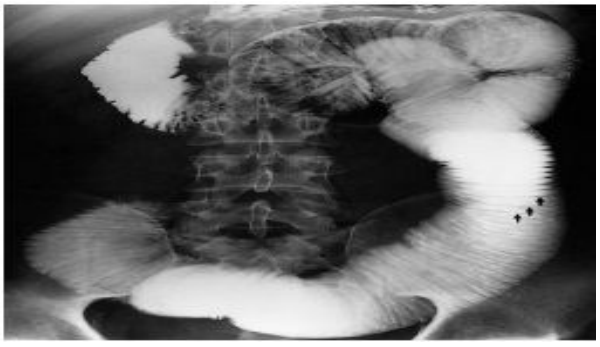
Small bowels

❖ **Clinical signs and symptoms:**
1) Malabsorption.
2) Vomiting.
3) Diarrhea.
4) Age also important (some diseases related to specific age).
5) Constitution symptoms (Fever, sweating and weight loss).

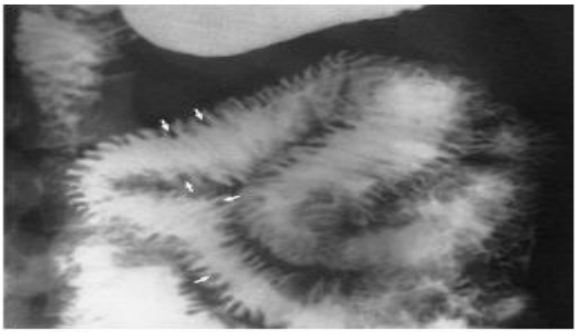
❖ **Imaging modalities:**
1) X-ray. (Bowel obstruction)
2) Fluoroscopy. (Contrast study)
3) Ultrasound. (no because it filed with gas).
4) CT.
5) MRI.
6) Nuclear medicine.
7) Angiography.



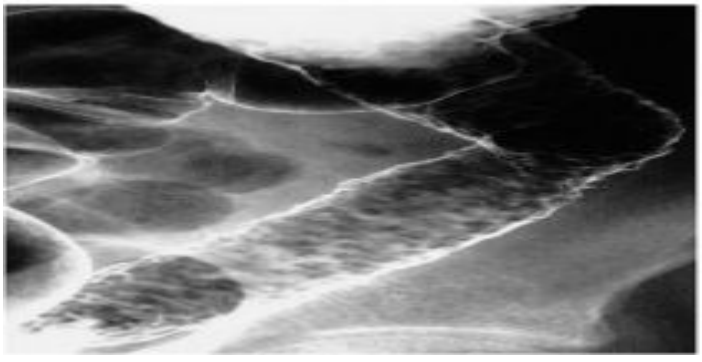
Normal fluoroscopic image of the small intestine.



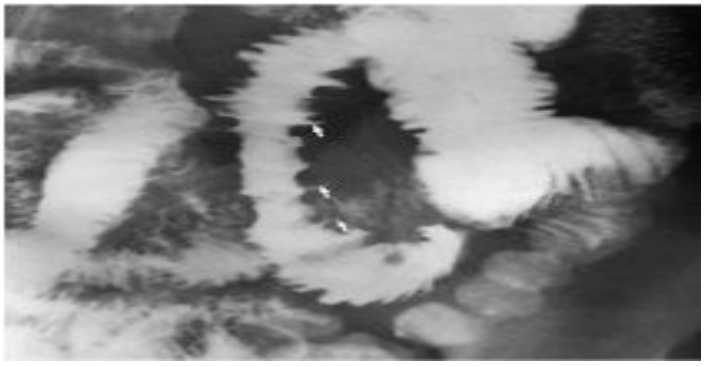
Significant dilation of the small bowel (without obstruction due to malabsorption disease) featureless, pt. with (dilation + malabsorption = celiac disease)



Mucosal abnormality with infiltration of the bowel and thickening of the wall in the all areas "thumb-printing"



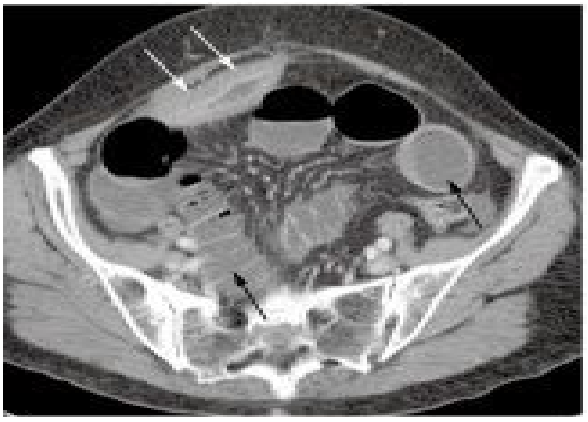
(mucosal ulceration the black spots in picture**) small erosion of the mucosal lining (cobblestone sign).**



(deep ulcer) if the erosion extended to submucosa we will see the contrast filling the submucosa (thorns rose).

- **Note : these changes are seen in the crohn's disease (cobblestone sing & thorns rose)**

- **normal smooth regular ilio-cecal junction**

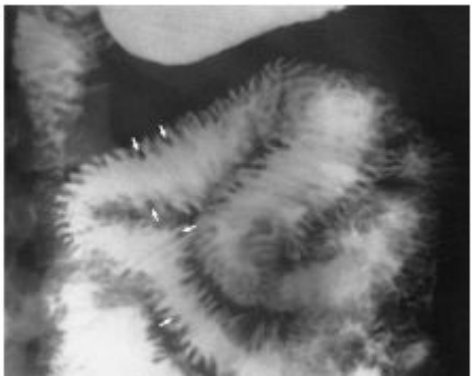


(A) **(B)**

(A) Narrowing. There is a long stricture **(arrows)** in the ileum due to Crohn's disease and an abnormal mucosal pattern. There is also separation of the abnormal segment from other loops of the bowel.

(B) CT in the same patient demonstrating marked thickening of the abnormal loop of small bowel, with a narrowed lumen **(white arrows)**. Several dilated loops of small bowel are also seen (black arrows), due to some obstruction at the level of the stricture.

Note: these changes are seen in the crohn's disease.



Thickening (more than 1 cm) is seen in the wall due to infiltration of any type of cells (Malignant cells (lymphoma), connective tissue disorders, storage diseases, malabsorption diseases).

normal CT scan of the small bowel

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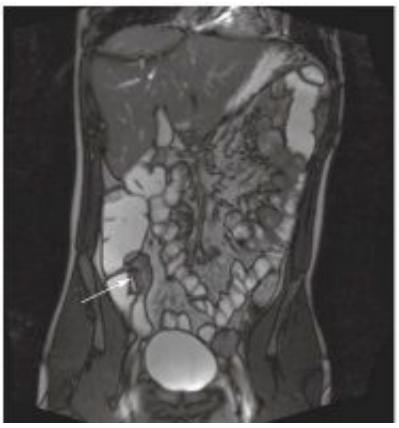
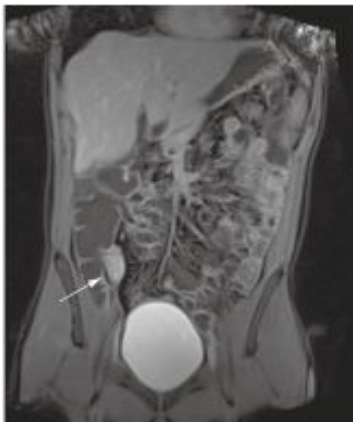
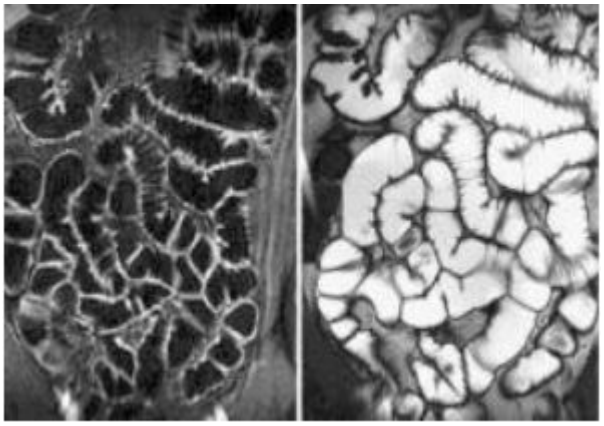
<tr><td> 
(A)</td><td> 
(B)</td><td>  </td></tr>
<tr><td colspan="2">- Narrowing of the lumen and thickening in the wall of ileocecal junction are seen by MRI enterography</td><td rowspan="4">- Normal MRI enterography</td></tr>
<tr><td>- (A) coronal T2 post contrast image</td><td>- (B) coronal T1 post contrast image</td></tr>
<tr><td colspan="2">- Both images demonstrate mucosal thickening and enhancement involving terminal ileum.
- NOTE: these changes are seen in Crohn’s disease</td></tr>
</table>

Large Bowels

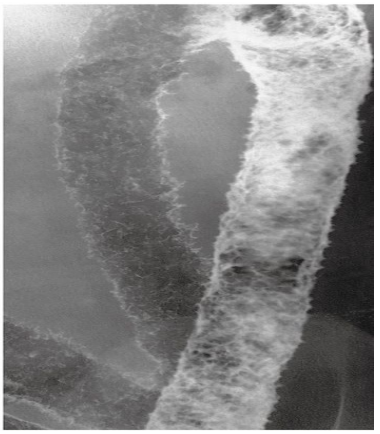
❖ Clinical Signs and Symptoms :

1) Abdominal Pain
2) Diarrhea
3) Hematochezia
4) Vomiting
5) Anal pain and Discharge
6) Age also important (some diseases related to specific age).
7) Constitution symptoms (Fever, sweating and weight loss).

❖ Imaging Modalities :

1) X-ray. > for obstruction
2) Fluoroscopy - enema (Contrast study)
3) Ultrasound. (no because it filed with gas).
4) CT.
5) MRI.
6) Nuclear medicine.
7) Angiography.

Normal appearance of double contrast in the colon and it has normal mucosal lining and Haustration.



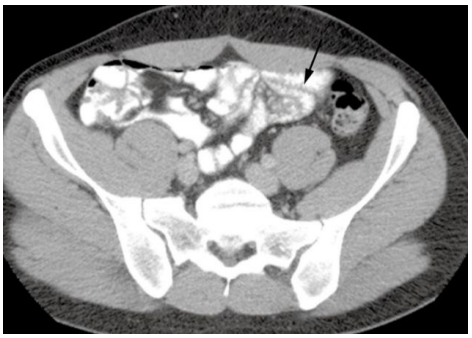
We can see clearly the clearly the lead pipe appearance, and reflux into the ileum through an incompetent ileocaecal valve has occurred.	Single contrast	Double contrast

Ulcerative Colitis :

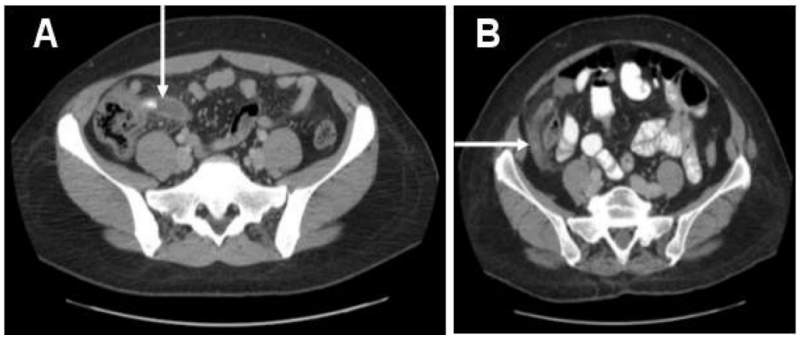
- After multiple episode of Inflammation affecting the mucosa we will have this appearance.
- Ulceration of the mucosa and loss of the haustra (lead pipe appearance) and tiny contrast filling.

★ **Young male healthy Complaining of right iliac fossa pain with leukocytosis and fever. What is the Diagnosis?** Appendicitis

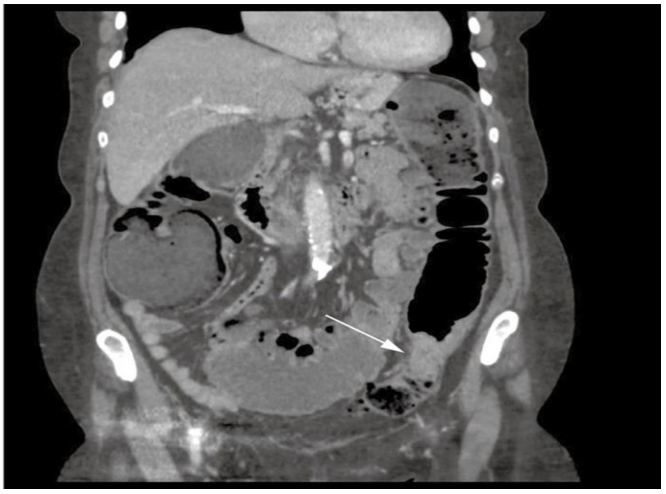
★ **What is the best modality to diagnose ?** CT Scan (If it is a pregnant lady or pediatric patient then we do ultrasound).



CT scan showing Normal appendix.



- Diameter of the wall is more than 6mm.
- Appendicolith the white spot in the appendix (white arrow in image A).
- In US (right image) there is thickening of the wall and we can see appendicolith (single headed arrow).
- The complication of acute appendicitis : perforation, abscess formation and mass formation.
- Before CT scan invention they used to give the patient contrast enema and if it fills the lumen of the appendix this means the patient has appendicitis !!!.



Enema and coronal CT showing a short, circumferential narrowing in the sigmoid colon **(arrows)** from carcinoma.

- Barium enema **(left image)** shows narrowing of the lumen due to presence of soft tissue mass

"Apple core sign" = (narrowing + shouldering)

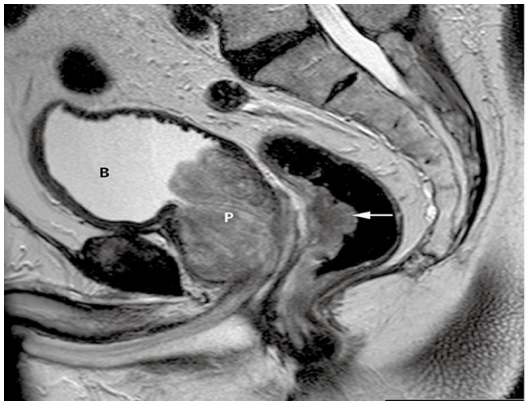
- We can't see the mass in the FLUOROSCOPY **(only narrowing)** BUT we can see it in the CT.

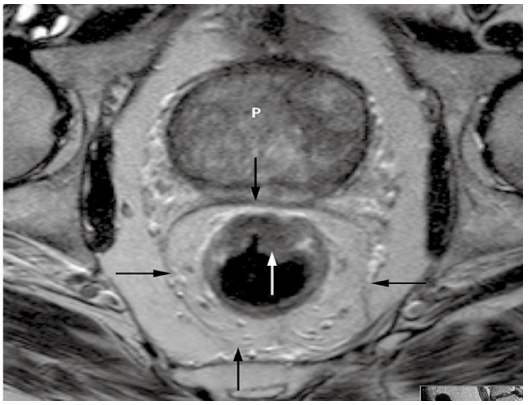
Colon carcinoma standard axial CT acquired on thin sections showing a tumor in the transverse colon.

thinking wall

ex, 60 y/o male presents with fatigue only he's chronic anemia, and nothing else > this suggest colon cancer

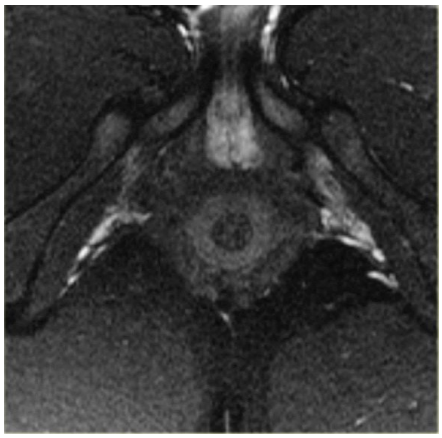
Rectal Carcinoma



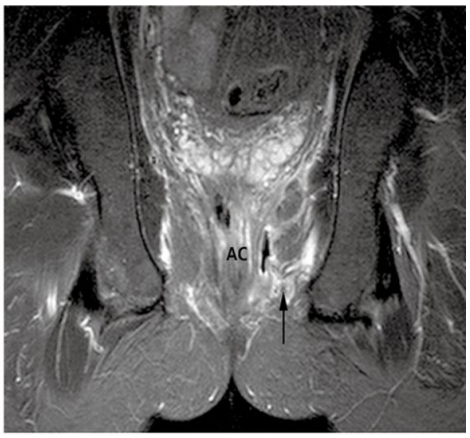


- Posterior wall of the rectum is normal and in the lumin there is gas.
- The anterior wall there is fungating mass. And because there is fat between the mass and the prostate, the mass is not invading.
- Right image is axial image of the same tumor. Black arrow is the mesorectal fascia that encases the mesorectal fat.
- **MRI is very good for rectal cancer local grading. (imp)** & CT for distal metastasis

Perianal fistula



Normal perianal area



Perianal fistula in crohn's disease. MRI is the best in perianal disease.
MRI with contrast