

# 432 Radiology Team



## (10): Gastrointestinal Tract Radiological Anatomy, Investigation & Diseases

\* Many thanks to 431 team for their helpful notes \*



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**COLOR GUIDE:** • Females' Notes • Males' Notes • Important • Additional • 431 team

# Objectives

1. To know radiology **modalities** used in GI tract imaging.
2. To know **advantages and disadvantages** of each modality.
3. To know **indications and contraindications** of each modality.
4. To know the **radiological anatomy of the GI tract.**

## Radiological anatomy (Overview):

**Upper GI:** esophagus, stomach (fundus, body, antrum, LCS “Lesser Curvature”, GCS “Greater Curvature”) and duodenum.

**Lower GI:** jejunum “LUQ”, ileum “RUQ” and colon (cecum, appendix, AC, TC, DC, SC, rectum).

### GIT Modalities:

- ♣ Plain radiograph of abdomen (KUB)
- ♣ Barium study
- ♣ Ultrasound
- ♣ CT
- ♣ MRI
- ♣ Angiography

## X-ray:

### A) How to assess the film:

- ♣ **Basic Details** [name], [age] [sex]. [date] and appears well/poorly penetrated
- ♣ Establish the **projection** of the film (AP) and whether it is **supine** or **erect**.
- ♣ check left and right
- ♣ Check Bone, Soft tissue/Solid Organs, Calcification, Gas pattern & Artefacts

### 1) Image:

- ♣ White ----- bone and calcification
- ♣ Grey ----- soft tissue
- ♣ Black ----- air

### 2) INDICATIONS

- ♣ Abdominal pain
- ♣ Bowel obstruction
- ♣ Stones
- ♣ Masses
- ♣ Trauma
- ♣ Others, foreign body, supportive lines.. Etc

### 3) CONTRAINDICATIONS:

- ♣ pregnancy “relative not complete”



**Erect**

**Supine**

In Erect “Standing” position: the gas will appear in the lower abdomen.  
While in Supine: the gas will be distributed all over the abdomen.

## B) How to assess the film: Gas

- ♣ Essentially you're looking at the bowel here.
- ♣ Before you start, **check that there is gas under the diaphragm (if it is visible)**
- ♣ Look at small bowel and large bowel

### ➤ **SMALL BOWEL:**

Because of peristalsis the outline of the gas in the normal small bowel is **often broken up into many small pockets** (not fully filled with gases or solids).

- It is generally **central in the abdomen**.
- Jejunum has '**valvulae conniventes**' "**feathery pattern**", ileum is characteristically **featureless**.
- The calibre of the normal small bowel should **not exceed 2.5–3 cm** "**more than 3 is dilated**".
- If small bowel is not visible at all, it **suggests that it is abnormal**.

### ➤ **LARGE BOWEL:**

- The caecum therefore **normally contains semifluid material containing multiple pockets of gas** and, like much of the right side of the bowel, assumes a granular appearance on X-rays, creating mottled areas of gas seen best against the background of the iliac bone.
- When visible the **haustral folds of the colon may be seen**, only partially visualised across part of the large bowel lumen.

**Normal stomach**

If the stomach contains air it may be visible in the left upper quadrant of the abdomen. The lowest part of the stomach crosses the midline.

**Normal small bowel**

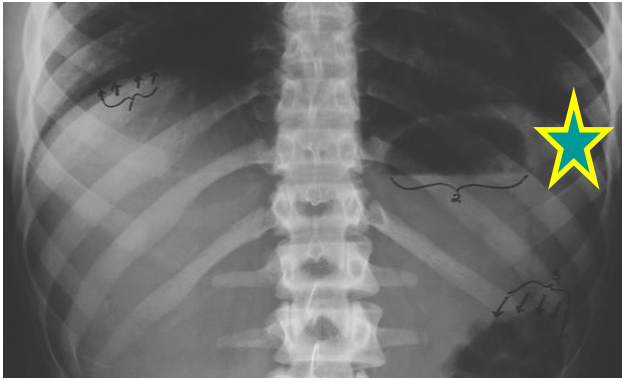
Identified by -

- Central position in the abdomen
- Valvulae conniventes - mucosal folds that cross the full width of the bowel (arrowheads)

**Normal large bowel**

Normal large bowel may be identified by -

- Peripheral position in the abdomen (the transverse and sigmoid colon occupy very variable positions)
- Haustra (arrowheads)
- Contains faeces



Standing position showing Air-fluid level  
If multiples and the bowel increased in diameter: obstruction.

We prefer the supine position in the GI imaging but for calcification it doesn't matter.

Standing is done in suspicious cases of obstruction and perforation to see air under diaphragm.

### C) How to assess the film: Bone

- ♣ Ribs, spine, sacrum, pelvis & hips
- ♣ Bones may show evidence of malignant disease
- ♣ Sacro-iliitis may be associated with intestinal problems such as Crohn's disease
- ♣ Excessively sclerotic bones may hint at other diseases e.g. Paget's (which can present as abdominal pain) or GI ulcers (which are associated with sclerotic bone lesions)
- ♣ Don't forget to check the spine for conditions such as ankylosing spondylitis.



#### Normal bones on abdominal X-ray

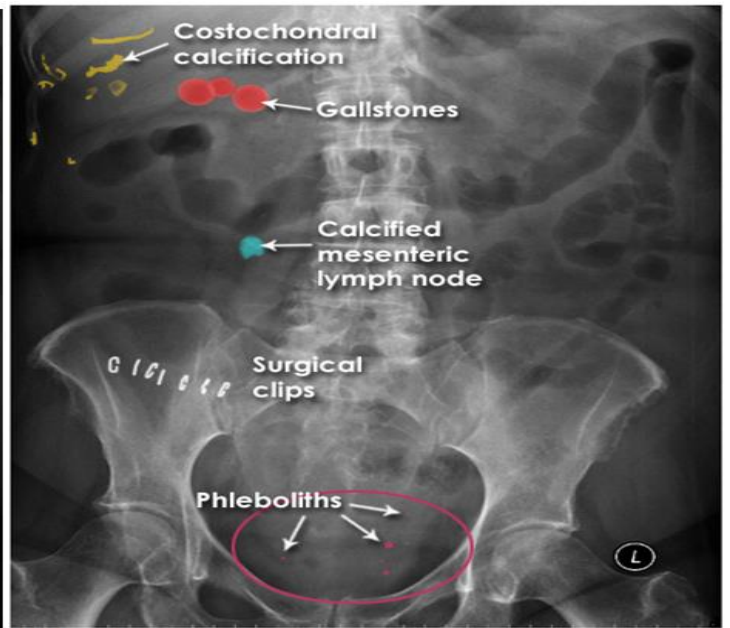
The lower ribs, lumbar vertebrae and sacrum are highlighted.

Bones can be used as landmarks for invisible soft tissue structures. Note the transverse processes of the lumbar vertebrae act as landmarks for the course of the ureters (arrowheads). The vesico-ureteric junctions(\*) are located at the level of the ischial spines (arrows).

### D) How to assess the film: Calcification

- ♣ Calculi (look in kidney, ureters & bladder)
- ♣ Phleboliths "calcified vein" (usually within pelvis, look like silt)
- ♣ Appendicoliths (caused by faeces in appendix, may suggest appendicitis)
- ♣ Lymph nodes
- ♣ Aortic calcification (aortic calcification is normal as age increases but you must check the aorta as asymmetry of the walls suggests aortic aneurysm)





Costo-chondral calcification "along the ribs" is normal.



Calcified lymph nodes



Calcification of aorta and iliac vessels

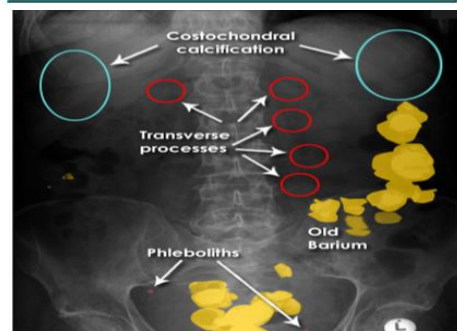


**Residual contrast**

The large areas of very high density seen in the descending colon and rectum are caused by residual contrast material in this patient who had a Barium enema 10 days previously.

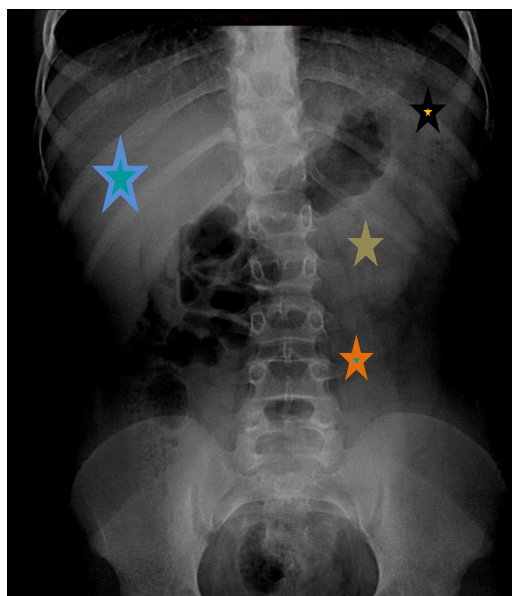
Also note costo-chondral calcification, and phleboliths.

Do not mistake the tips of the transverse processes for ureteric calculi.



### E) How to assess the film: Soft Tissue

- ♣ Trace soft tissue outline for any clues as to pathology (e.g. obesity, trauma sites, abdo drains etc)
- ♣ Also look for:
  - Psoas muscles
  - Kidneys (left is higher and slightly bigger than the right)
  - Liver (difficult to see but may be identifiable by lack of bowel in RUQ)
  - Spleen (difficult to see)
  - Bladder (visible if full, not always visible if empty) – a full bladder may hint that you are looking for an acute problem, rather than a chronic one
  - Uterus (causes a dent in the top of the bladder on IVU)



**Psoas muscles**  
**Kidneys**  
**Liver**  
**Spleen**



**Liver on abdominal X-ray**  
 The liver lies in the right upper quadrant (RUQ) and is seen as a bland area of grey on an abdominal X-ray.  
 The superior edge of the liver forms the right hemidiaphragm contour (arrowhead).  
 In this patient the breast shadow (red line) overlies the liver, and markings of the right lung are visible behind the liver.  
 The gallbladder is only rarely visible on an abdominal X-ray. Its position is very variable. This patient has had a cholecystectomy. The clips mark the previous location of the gallbladder.

**Kidneys on abdominal X-ray**  
 Natural contrast between the kidneys and the low density retroperitoneal fat that surrounds them means they are often visible on an X-ray of the abdomen.  
 They lie at the level of T12-L3 and lateral to the psoas muscles. The right kidney is usually slightly lower than the left due to the position of the liver.



**Bladder abdominal X-ray**  
 The bladder has variable appearance depending on how full it is. It has the same density as other soft tissue structures, due to its water content.





**Psoas edges on abdominal X-ray**

The psoas muscles (**red**) arise from the transverse processes of the lumbar vertebrae (arrowheads) and combine with the iliacus muscles. Together these powerful muscles form the iliopsoas tendon, which attaches to the lesser trochanter of the femur (\*). The iliopsoas muscles are the flexors of the hip.

An abdominal X-ray often demonstrates the lateral edge of the psoas muscles as a near straight line. The iliacus muscles are not visible, as they lie over the iliac bones of the pelvis.



**Lung bases on abdominal X-ray**

The lung bases, which pass behind the liver and diaphragm in the posterior sulcus of the thorax, may be visible on some abdominal X-rays.

It is worth checking the lung bases as some patients with lung pathology present with abdominal symptoms.

If there is consolidation suspected from the abdominal X-ray then a review of the patient's respiratory system is necessary.

Costophrenic angle (\*)



**Navel jewellery artifact**

Ideally all jewellery that overlies anatomically important structures should be removed prior to acquiring an X-ray





Multiple "Air-Fluid" levels mostly in the central with dilated bowel wall diameter indicating OBSTRUCTION

Dilated small bowel loops indicating OBSTRUCTION



The whole bowel is Air-filled and dilated in the center mostly, Small bowel OBSTRUCTION

# Fluoroscopy:

Upper gastrointestinal tract radiography, also called an upper GI, is an x-ray examination of the pharynx, esophagus, stomach and first part of the small intestine (also known as the duodenum) that uses a special form of x-ray called fluoroscopy and a contrast material called barium.

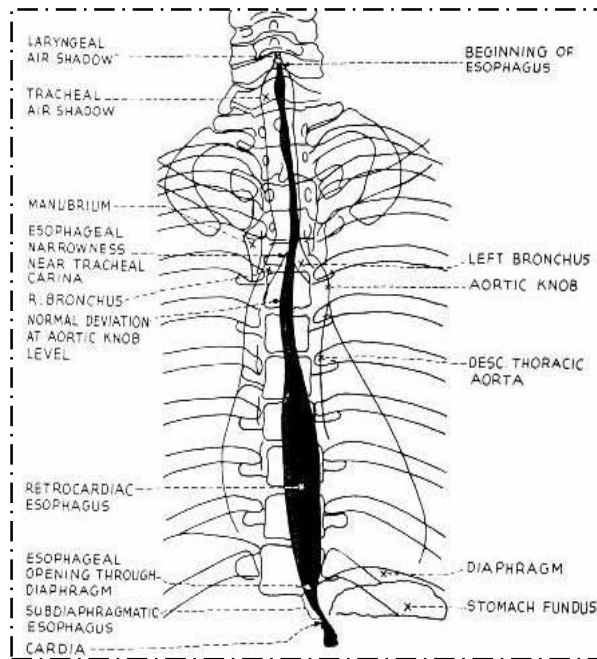
- ◆ Barium **swallow** -----> Esophagus
- ◆ Barium **meal** -----> Stomach
- ◆ Barium **follow through** ----> Small bowel
- ◆ Barium **enema** -----> Large bowel

✓ Indications:

- ◆ Assessing the mucosal outline
- ◆ Abdominal pain
- ◆ Gastro esophageal reflux
- ◆ Masses
- ◆ Inflammatory bowel diseases
- ◆ Post-surgical leak

✓ Contraindications:

- ◆ Pregnancy
- ◆ Bowel obstruction
- ◆ Bowel perforation “with Barium” it causes peritonitis with mortality of 50%



## A) Barium Swallow:

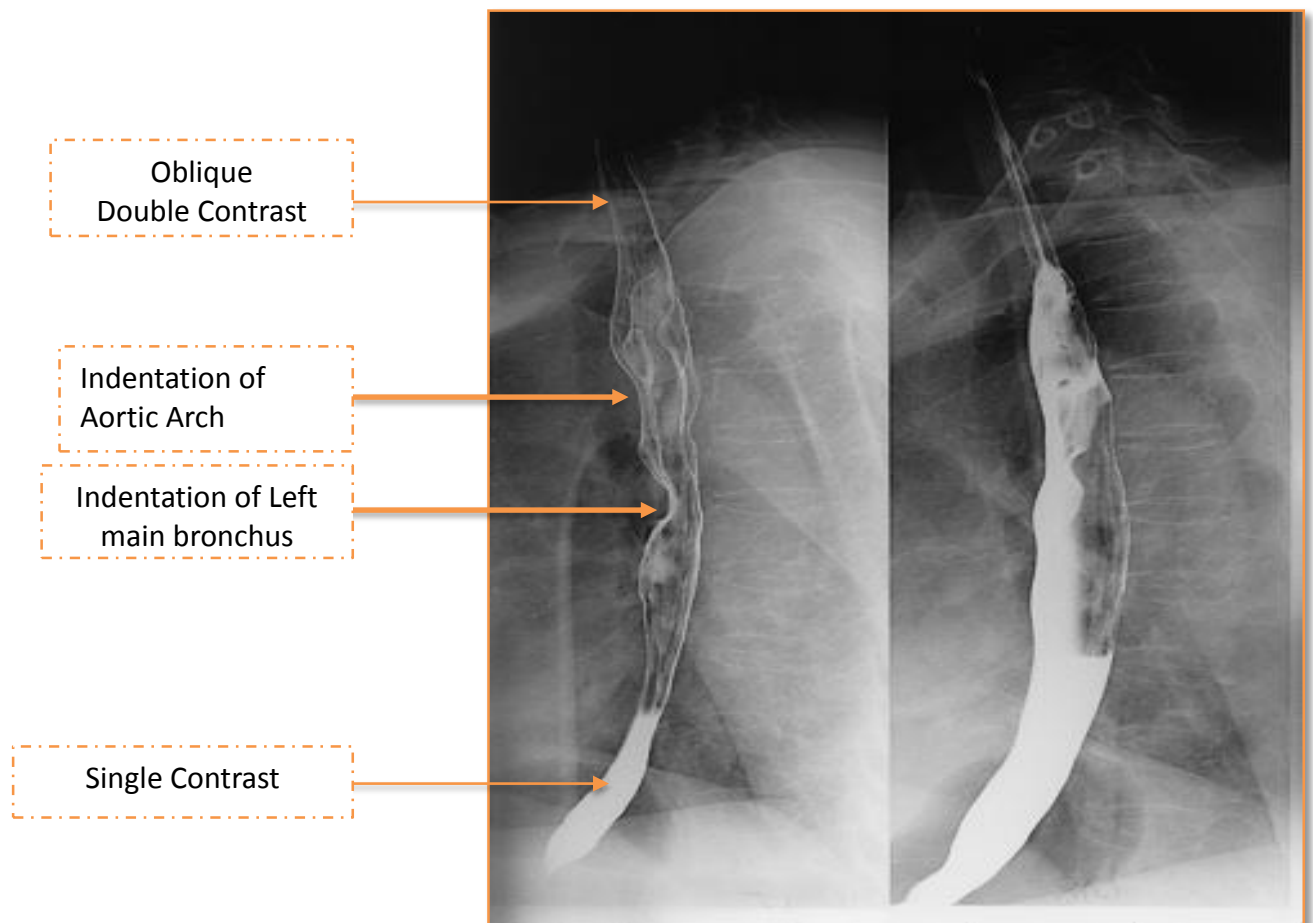
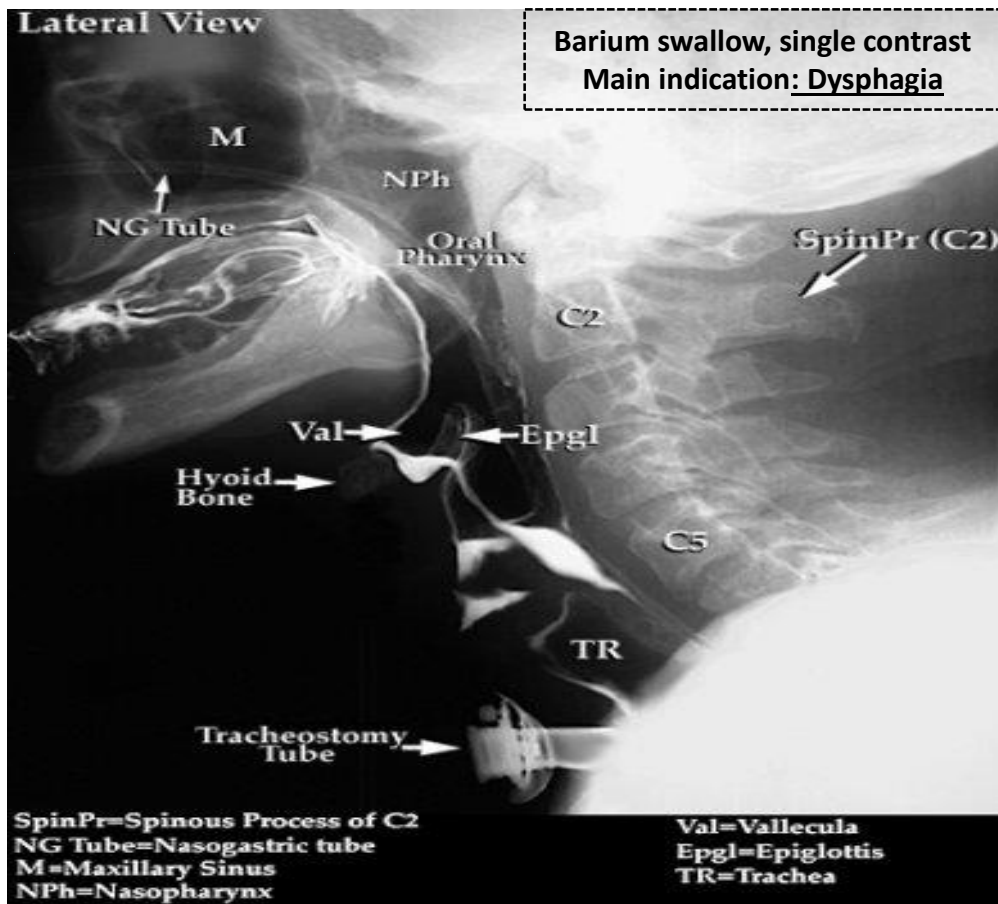
- ◆ Single contrast study, used mainly to look at the oesophagus.
- ◆ Liquid barium is swallowed in an upright and prone position and radiographs are taken during the oesophageal phase of transit. **Esophageal indentations should be known to avoid mistaking it by compressing mass. the photos are taking during swallowing so we should observe the patients while taking the photos.**

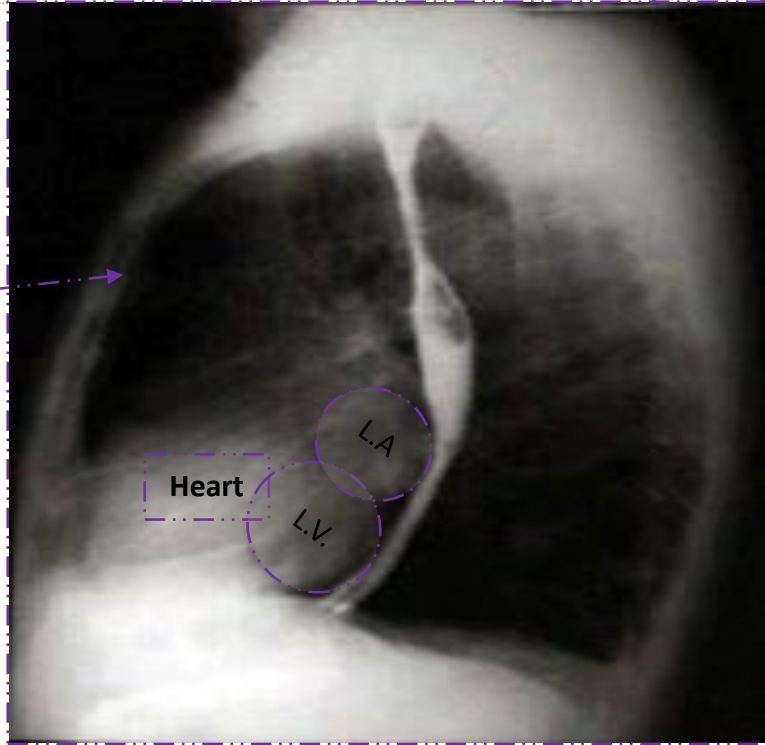
Normal indentations:  
Aortic arch, left atrium, left ventricles and left main bronchus

**Cricopharyngeus Muscle**  
At level of C5-C6,  
Part of upper esophageal sphincter (UES)

**Esophagus**







Double Contrast  
These indentations  
are seen only in lateral  
view or oblique



Indentation of L.  
main bronchus

Double Contrast

Single Contrast



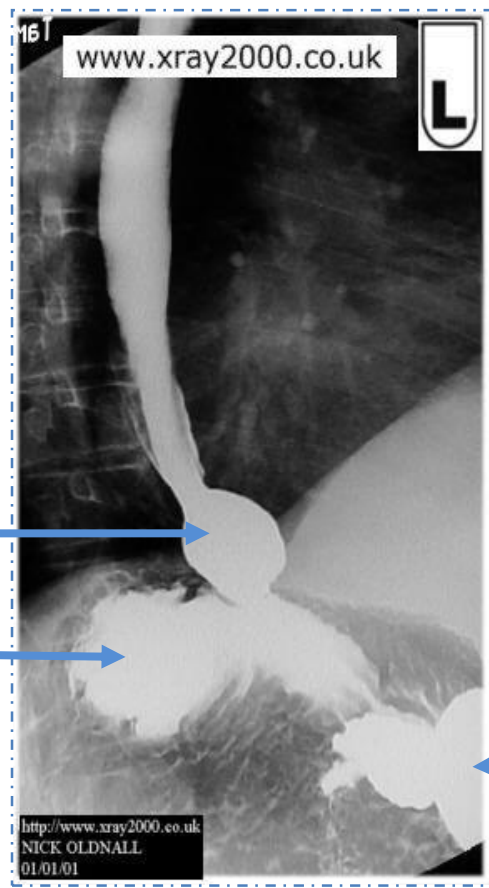


Single contrast

**Ampulla**  
Normal Variant  
should be differentiated  
from hernia by  
visualizing the  
mucosa "double  
contrast"

**Fundus**

Aortic Arch



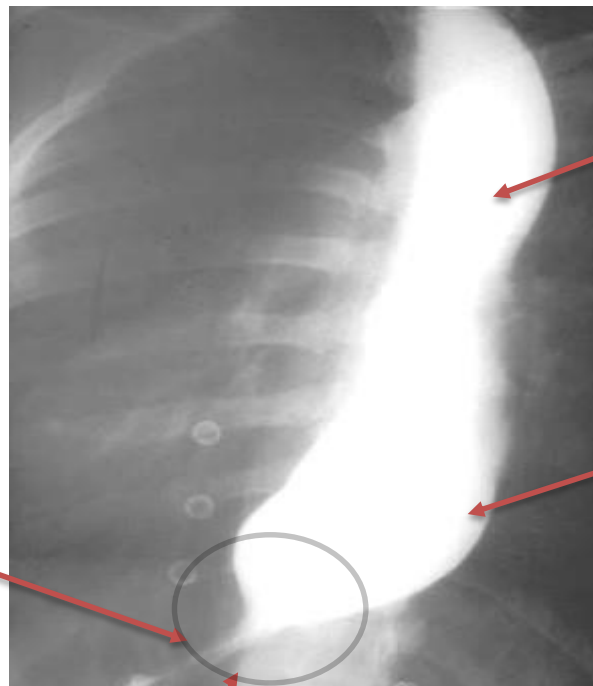
Body



**Narrowing:**  
Could be peristalsis  
So other shot is advised.  
If it is in all films >  
abnormal.  
If it is only one film >  
peristalsis

Double contrast

**Single contrast**  
 Narrowing is an abnormality but we have to differentiate if it's benign or malignant. Benign narrowing is regular "or smooth" while malignant one is irregular.

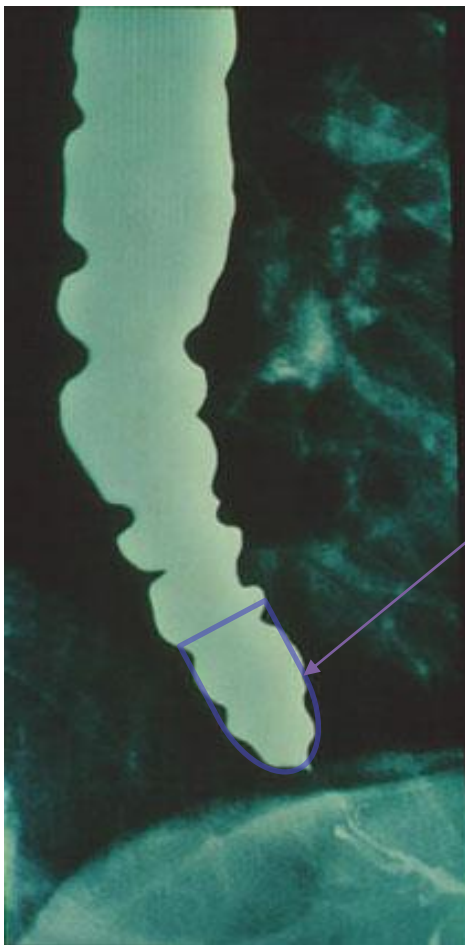


Esophagus

Proximal Dilatations

Narrowing (Stricture)

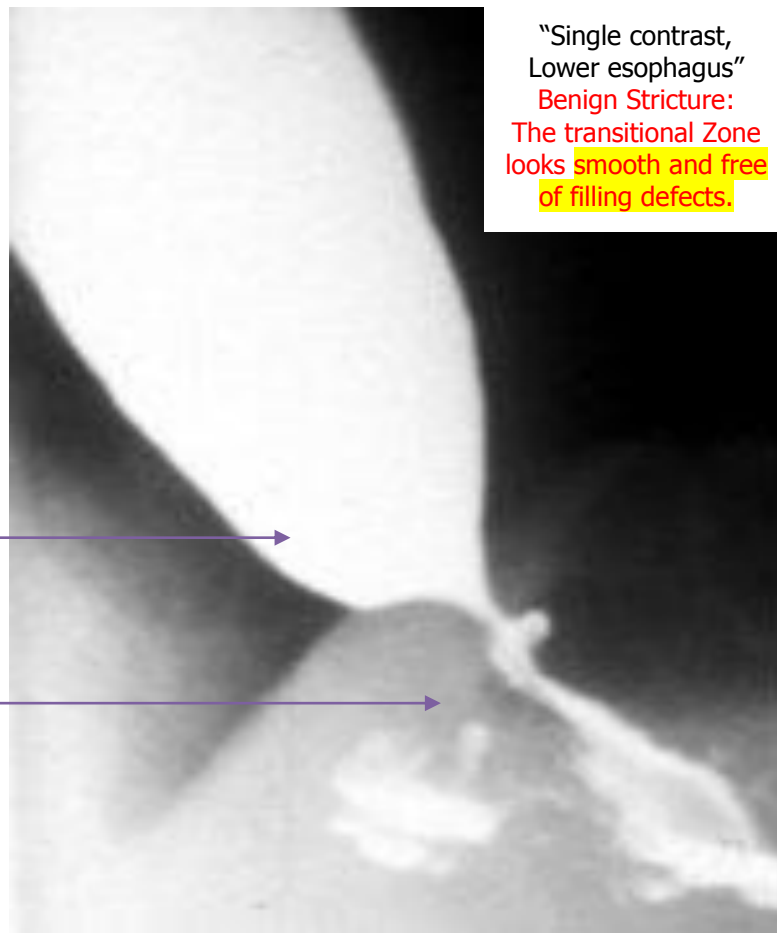
**Bird Peak Sign**  
**DDx: Achalasia** "Most common benign lesion in the esophagus"



"Single contrast, Oblique"  
 Irregular Wall & Dilatation:  
 Tertiary Contraction (Pathological non-propulsive Contraction)

Funnel Shape (Achalasia)

**Note(s):**  
 Barium swallow in this patient with achalasia reveals a smooth distal tapering caused by the **hypertensive lower esophageal sphincter** that straddles the diaphragm, and **multiple non-Peristaltic contractions** throughout the body of the esophagus. This radiographic appearance sometimes has been called "vigorous achalasia". This term has little value, however, because recent studies suggest that patients with so-called vigorous achalasia cannot be distinguished clinically from non-vigorous achalasia.



Proximal Dilatations

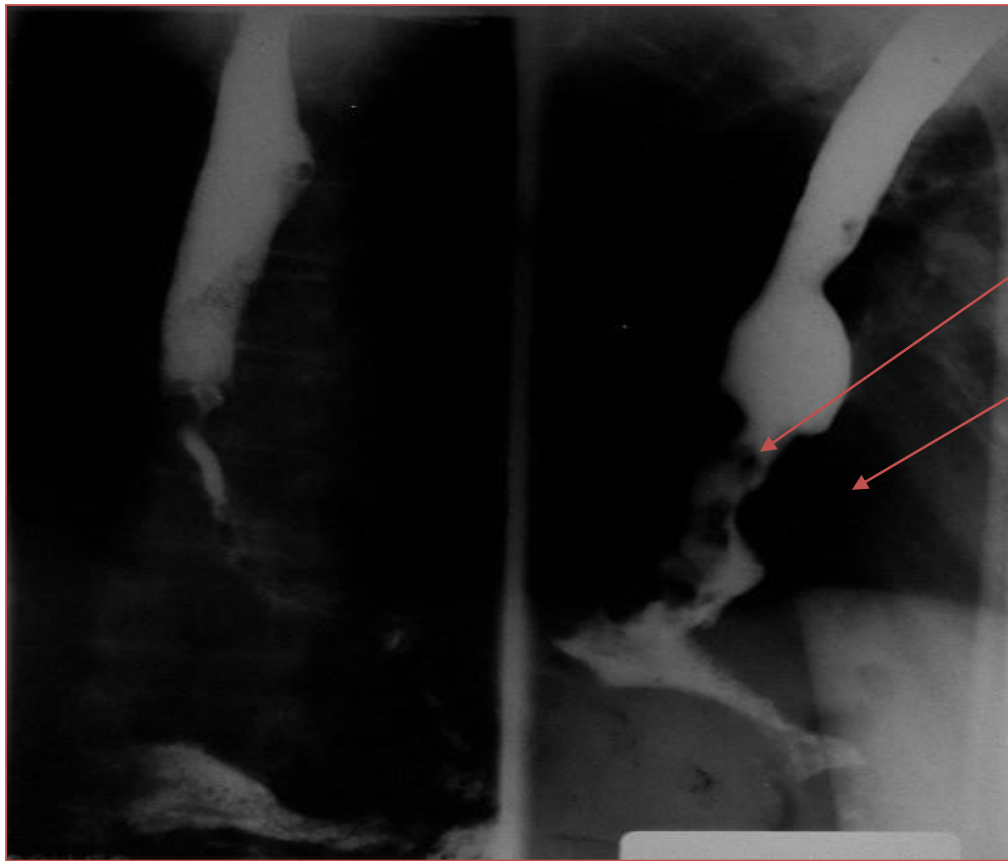
Distal Narrowing



DDx:  
Adeno CA  
Sq. Cell CA

Filling Defect

"Single contrast"  
Malignant Stricture:  
\*The transitional Zone looks irregular & ill defined  
\*Presence of many filling defects  
\*Shouldering "narrow area and dilated area" as shoulders.



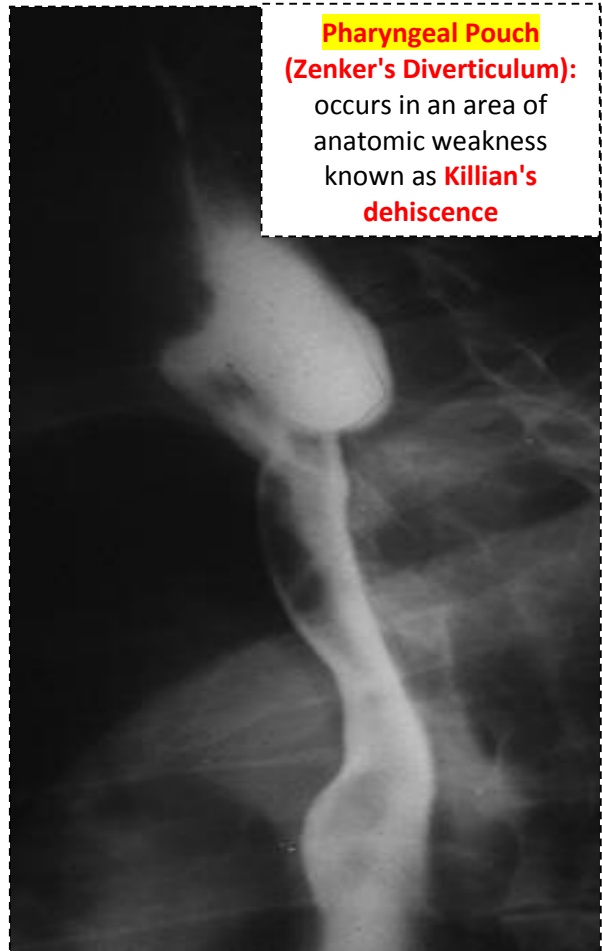
“Single contrast, Oblique”  
Filling Defect

**Malignant Stricture**

Long Irregular  
Narrowing



“Single contrast, oblique”  
Well Defined  
Contrast Filled left  
cervical level sac



**Pharyngeal Pouch (Zenker's Diverticulum):**  
occurs in an area of anatomic weakness known as **Killian's dehiscence**



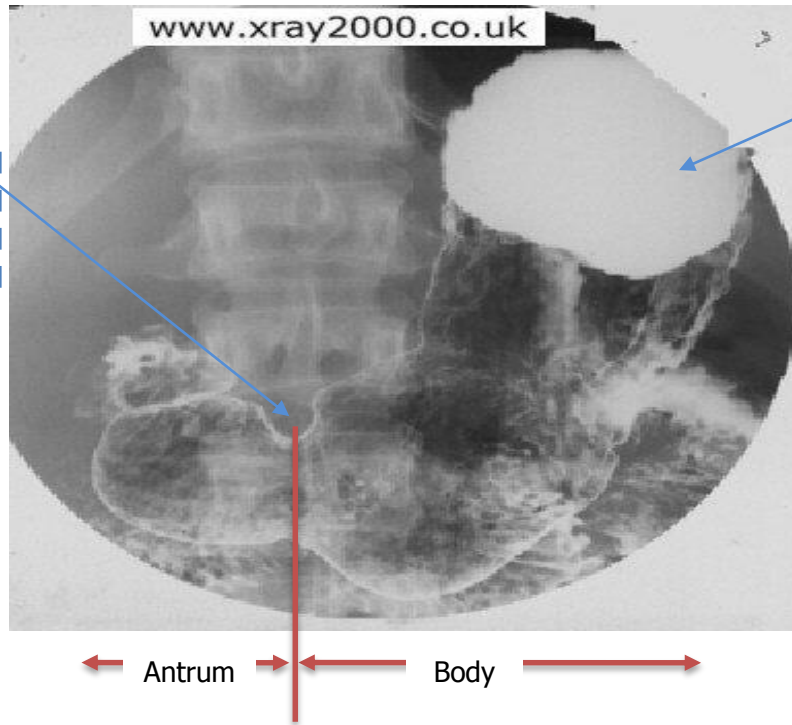
Irregular Multiple Filling Defects with narrowing.  
It is not a malignancy because it is occupying the whole lining

- Single contrast
- Differential Diagnosis Multiple Esophageal Filling Defects:
  1. Fungal Infx.
  2. Polyps.
  3. Esophageal Varice
  4. Food Particles



Single contrast  
Irregular Multiple Filling Defects in longitudinal pattern:  
**(Esophageal Varices)**  
Confirmed by endoscopy or CT  
DDx the same as the previous

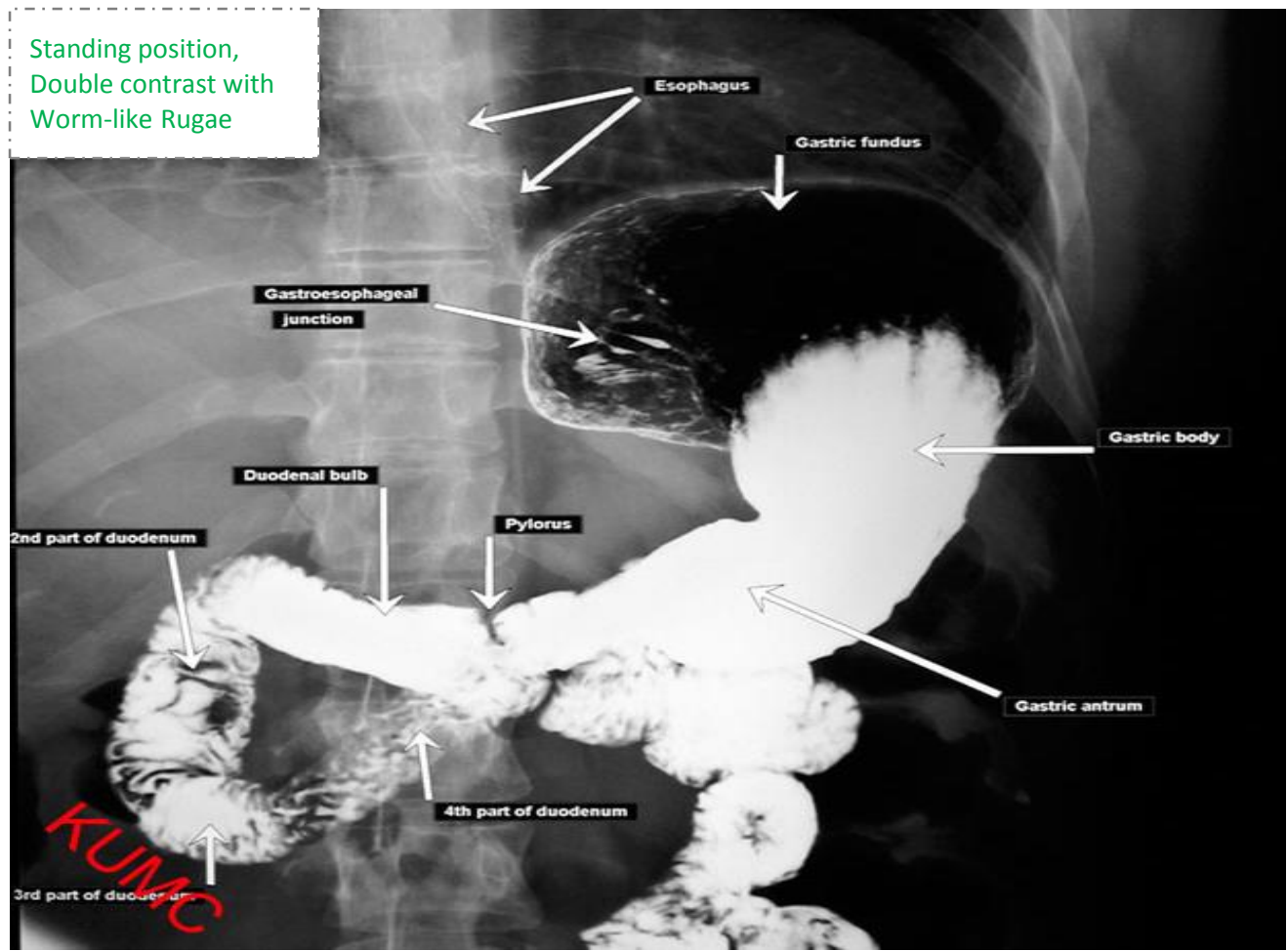
# Barium Meal:

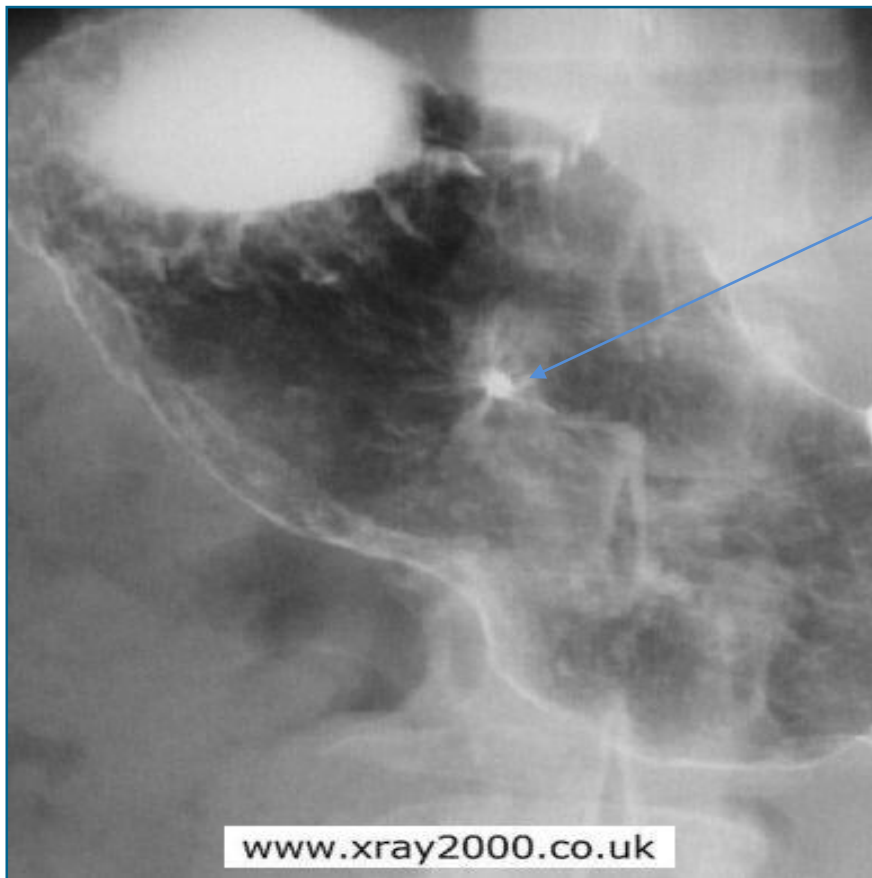
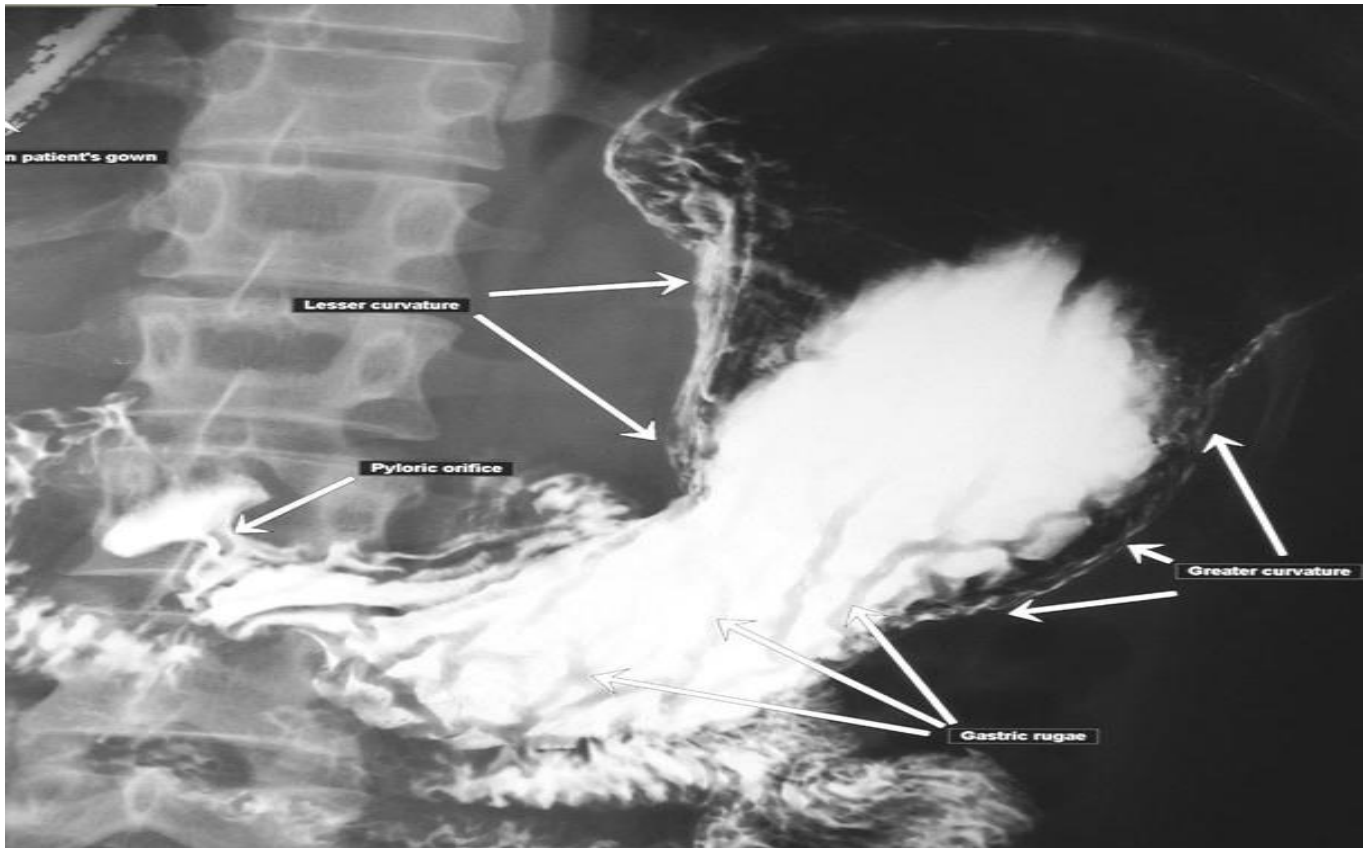


Angular Notch  
Incisura  
Angularis

"Double  
contrast, Barium  
meal, Supine  
Position":  
Note Barium  
Distribution in the

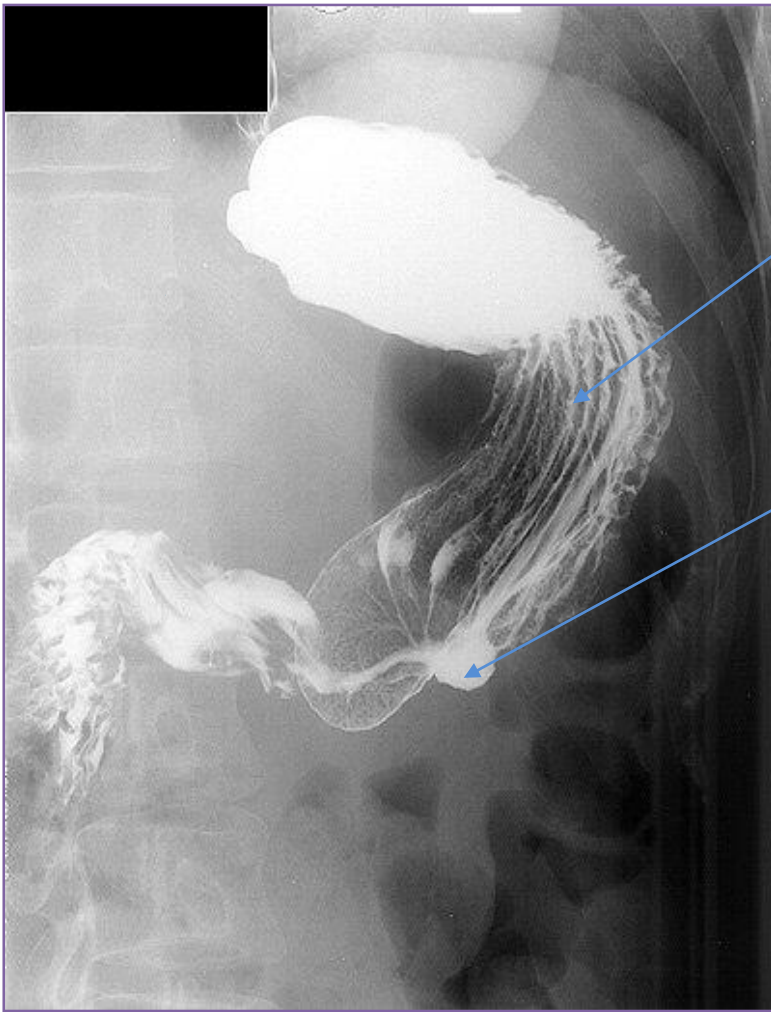






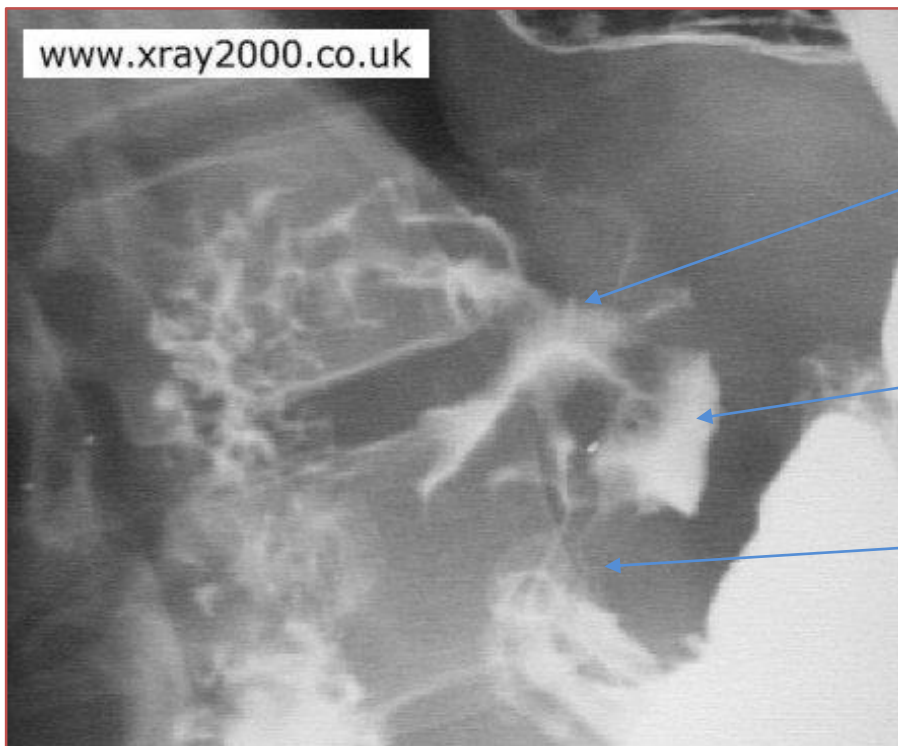
"Barium meal, Double contrast"  
Contrast Filled "focal"  
surrounded by area of  
**Speculated** Lesion  
**(Gastric Ulcer)**





"Barium meal, Double contrast"  
**Rugae**

Contrast Filled **Outpouching** at the Greater Curvature  
**(Malignant Gastric Ulcer)**  
Filling defect inside the lumen as the polyps which will not allow the contrast to be filled, whereas out-pouch is extra-luminal filling with contrast.  
Speculation could present in malignancies but to confirm malignancy with speculation you need to see a Mass.  
Also the ulcer would be not out-pouched.



Speculated Mass

Ulcer

Pylorus

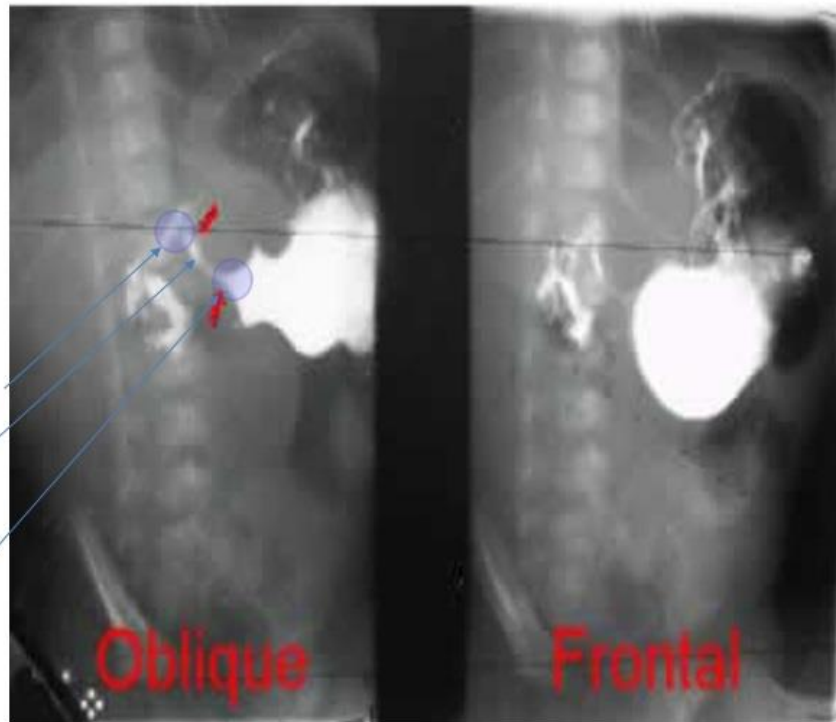
### Barium Meal, Double Contrast (Erect Position)

**DDx:**  
Pyloric Stenosis

Mushroom's Sign  
(or apple core Sign)

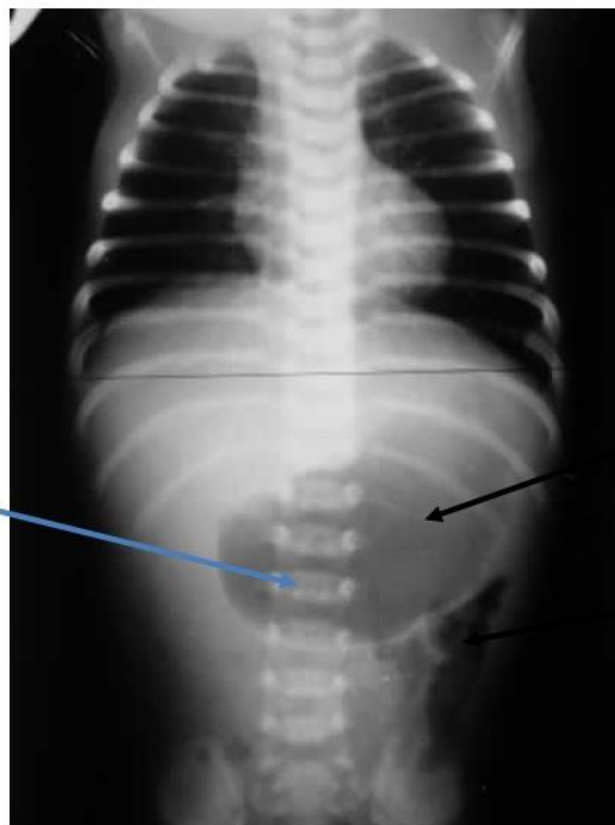
String's Sign

Shoulder's Sign



### Barium Meal, Double Contrast

Single Bubble Sign  
**DDx: Gastric Output  
Obstruction (GOO)  
(Pyloric Stenosis)**



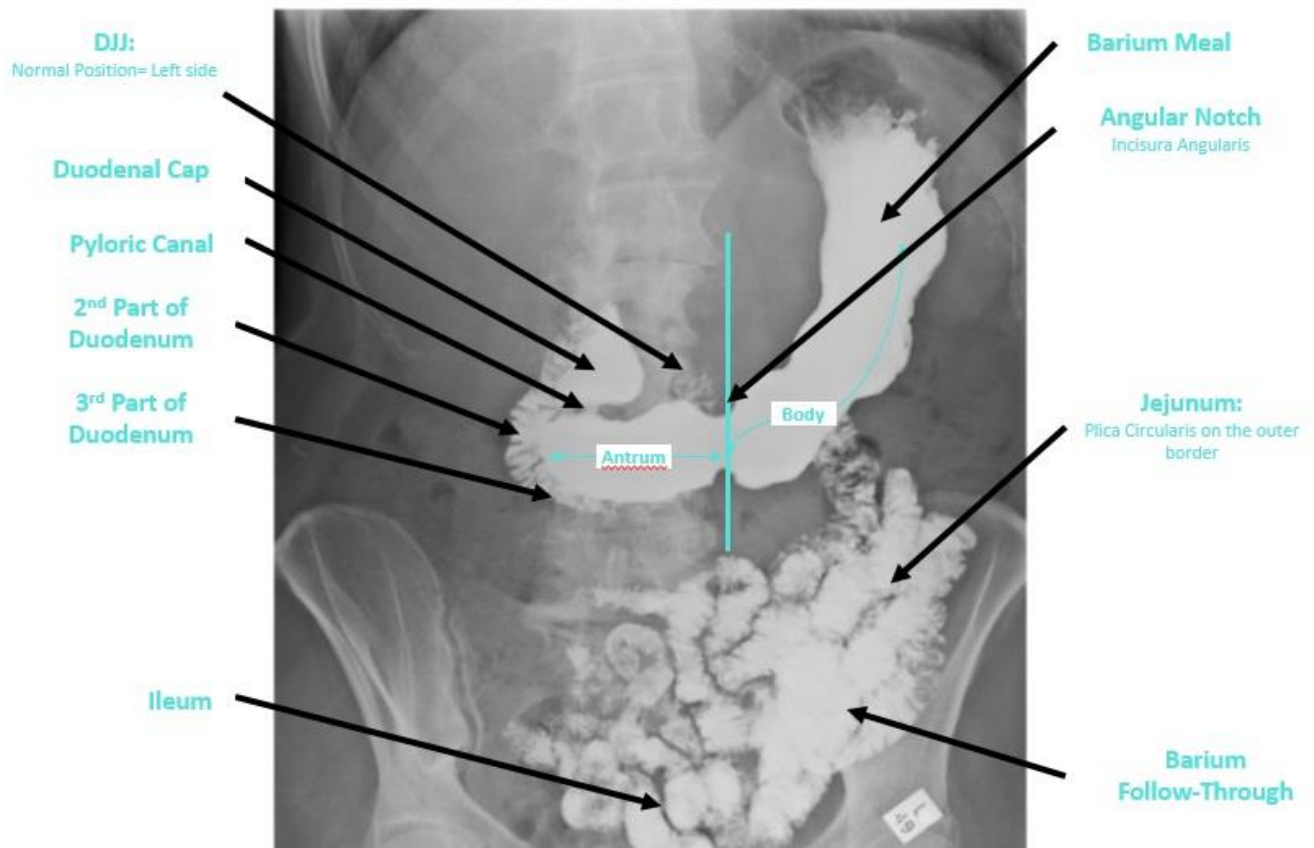
Distended  
Stomach

Gas in Descending  
Colon  
(partial obstruction)

## Barium meal + Follow Through:

- Used to examine duodenum, jejunum and ileum.
- Like a barium swallow but images taken every 20 minutes or so for 2-3 hours.
- Small bowel follow-through may reveal evidence of disorders such as Crohn's disease, Coeliac disease or small bowel tumours.

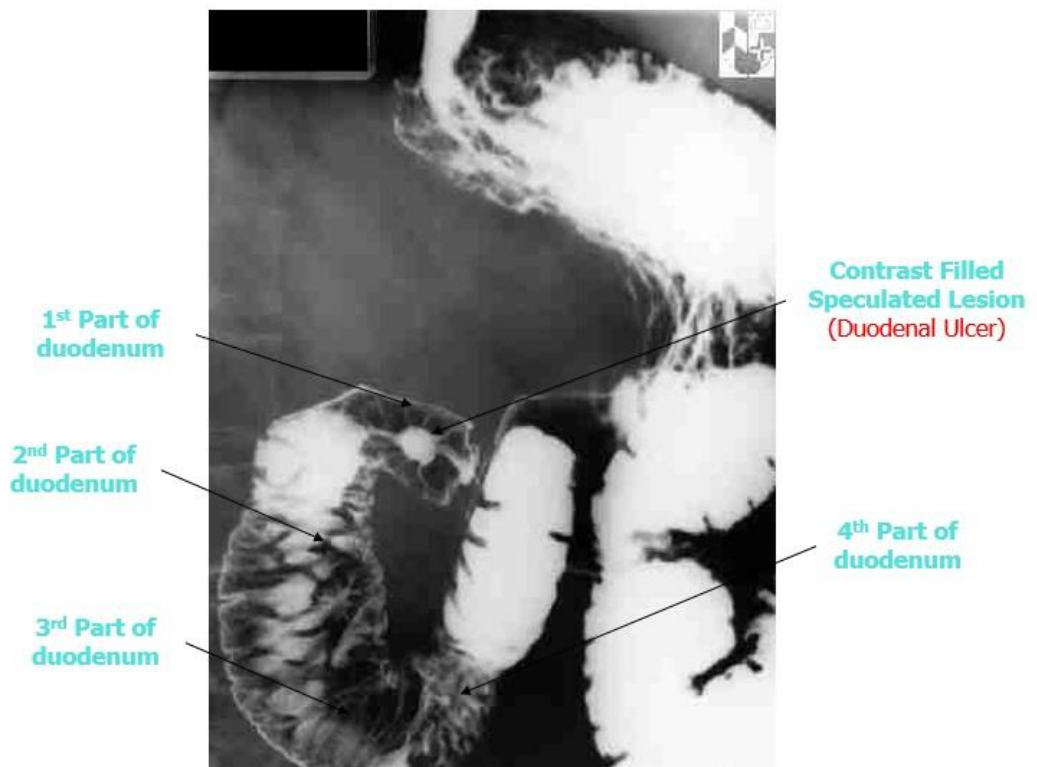
### Barium Meal + Follow-Through (Erect Position)



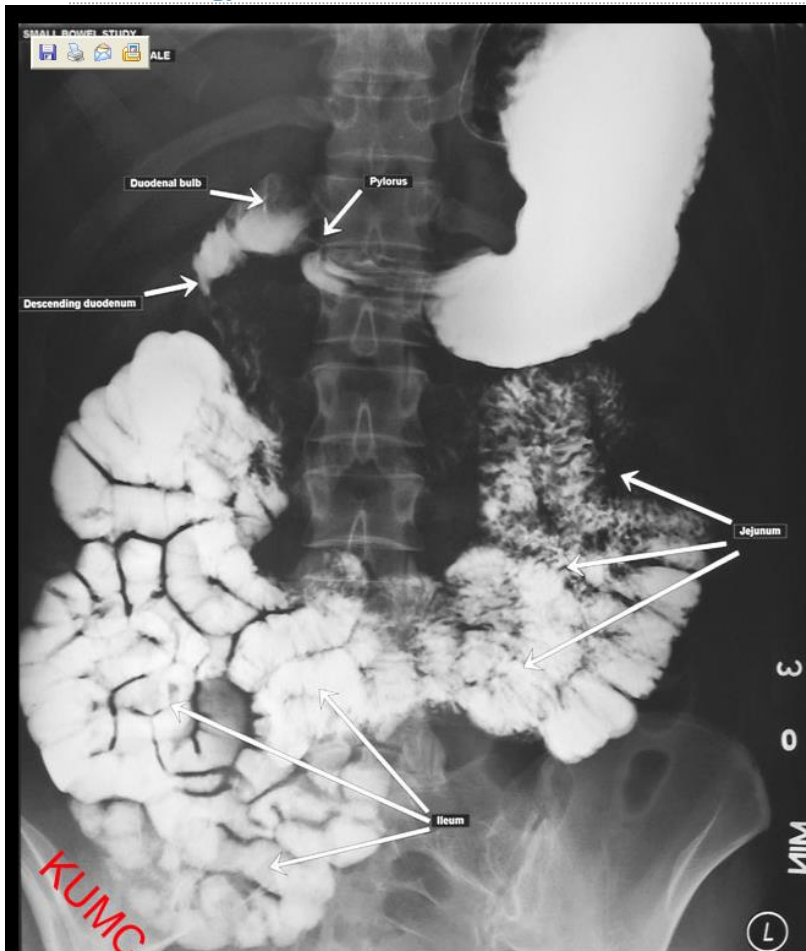
## Barium Follow-Through to Cecum (Erect Position)



## Barium Meal + Follow-Through







## Small Bowel Enema:

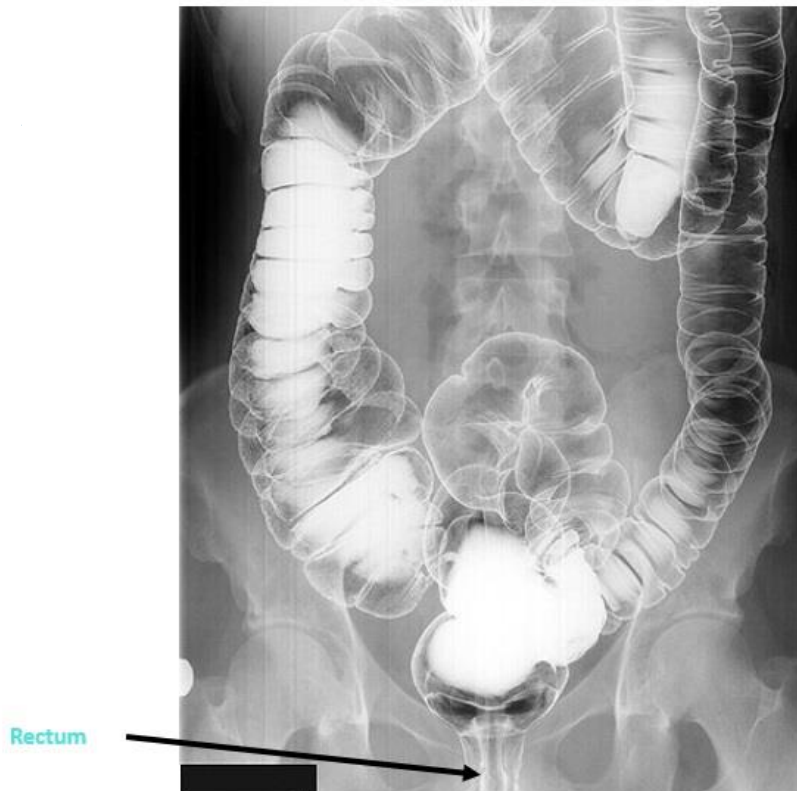


**A Modified Follow-Through which is called Small Bowel Enema note that the bowel is more distended here**

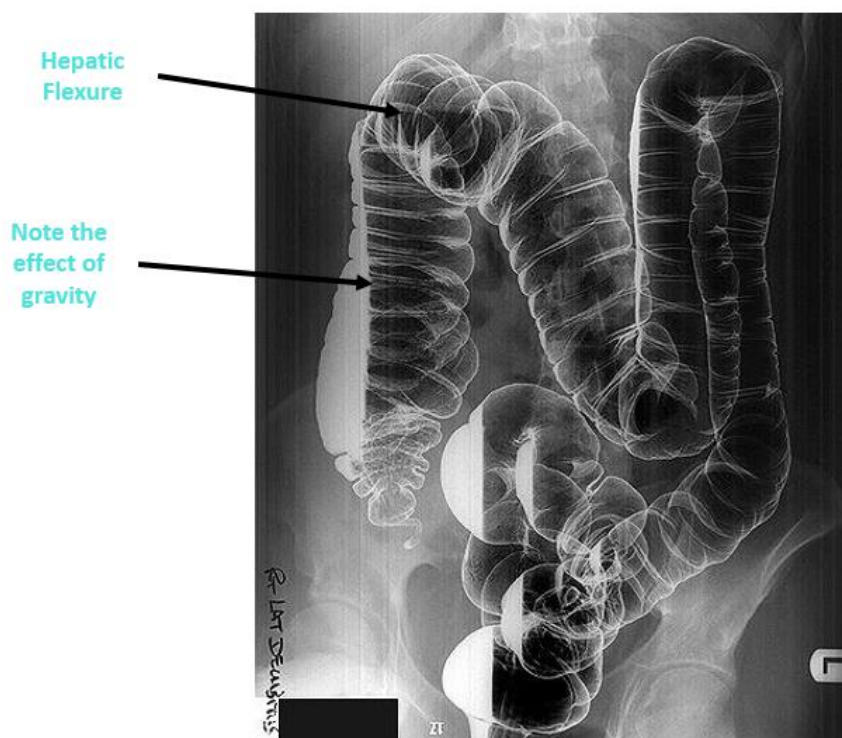
This procedure involves inserting a thin tube through the mouth, esophagus and past the stomach to inject barium, methylcellulose and water into the small bowel. This allows for better visualization of the small bowel than can be seen during a small bowel follow-through



### Barium Enema, Double Contrast (Supine Position)

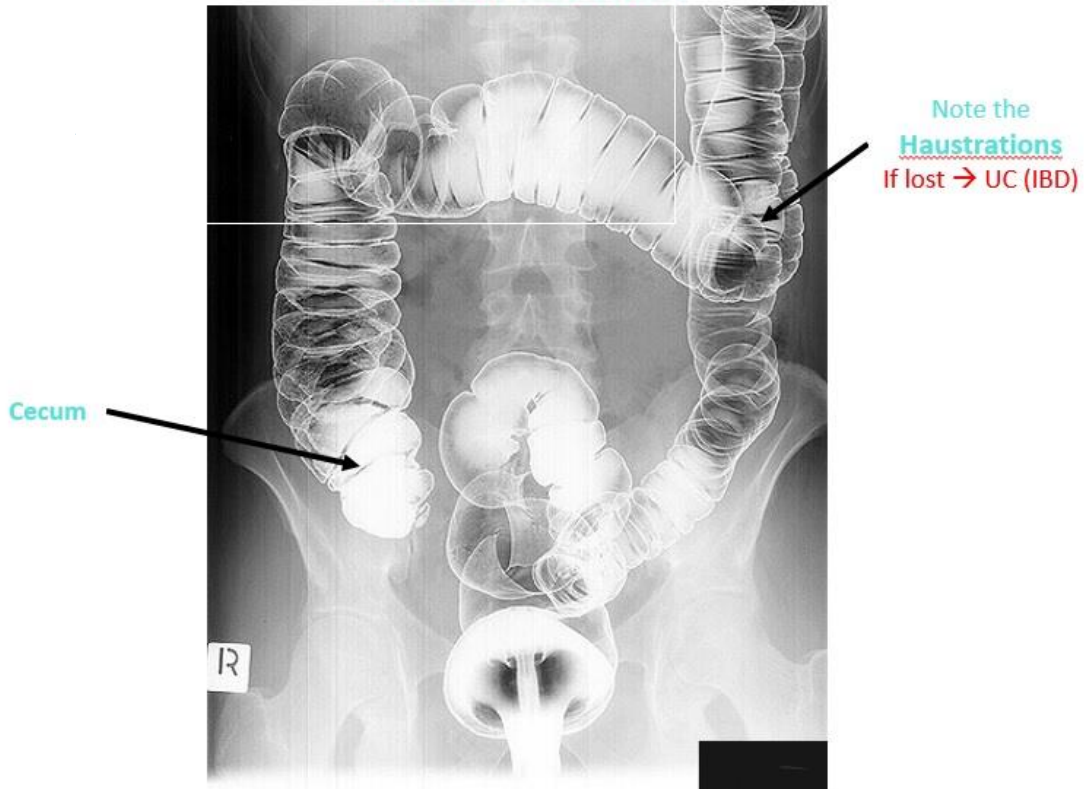


### Barium Enema, Double Contrast (Right Lateral Decubitus)

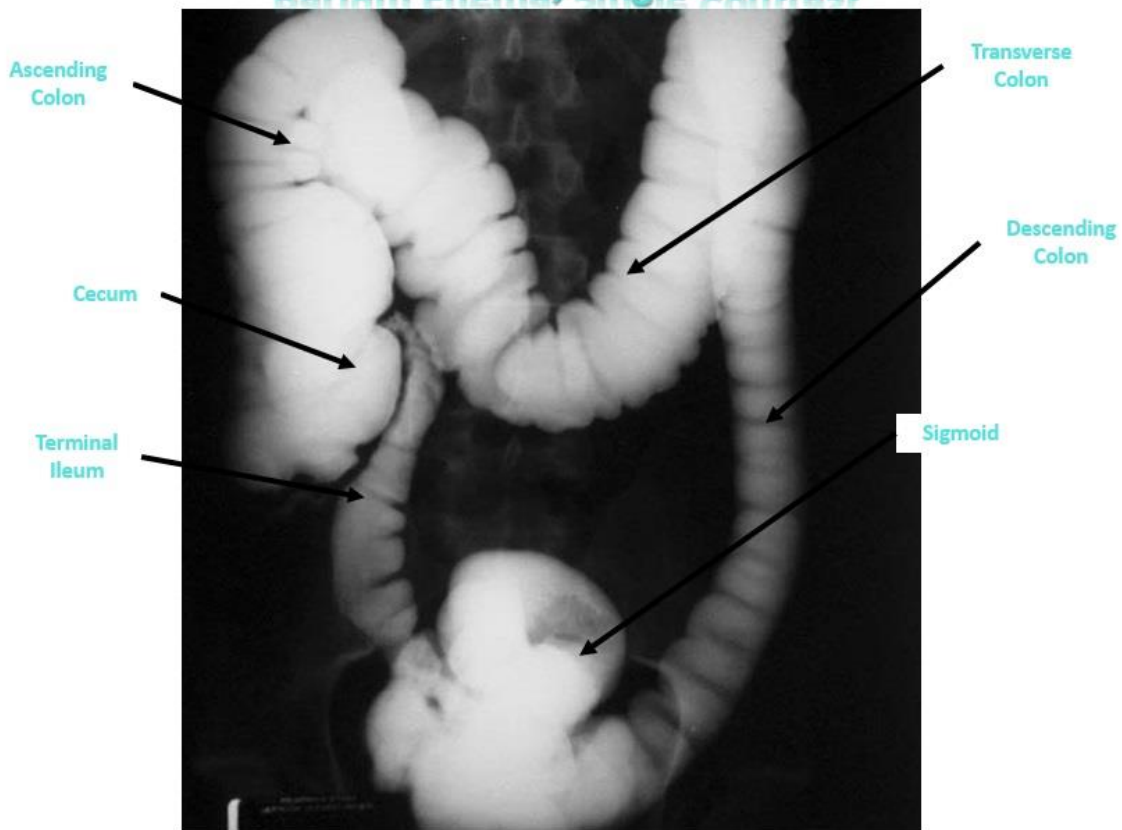


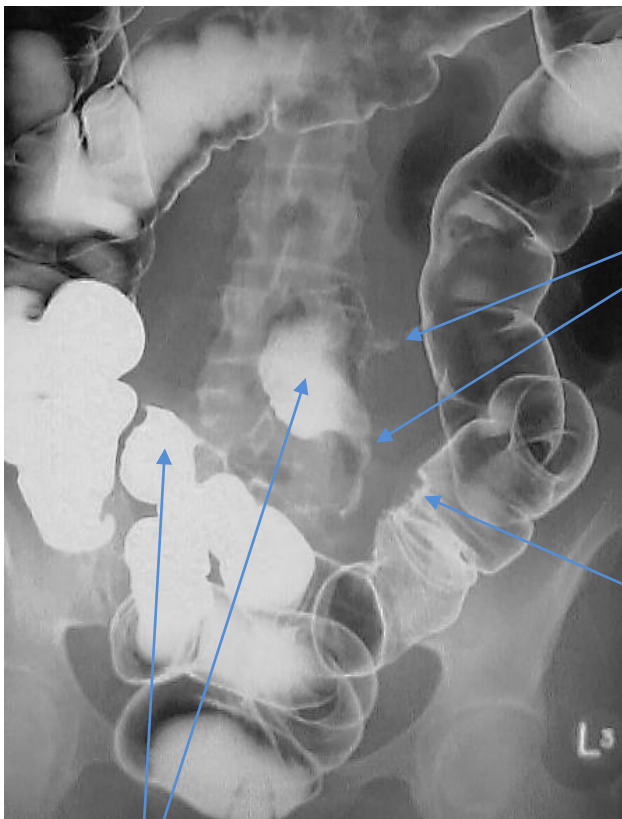


### Barium Enema, Double Contrast (Prone Position)



### Barium Enema, Single Contrast





Strictures in Small intestines

Skip Lesions & lesions in Small intestines  
DDx: Crohns' Disease

asymmetrical puckering of the mucosal surface, without stricturing

Normal segments



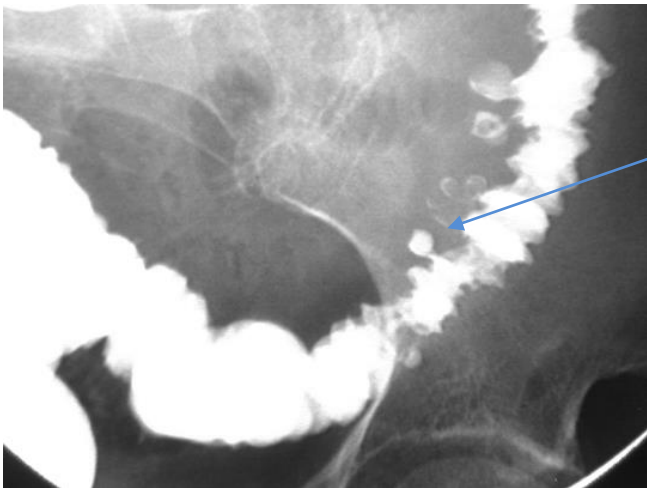
Differential Diagnosis of Terminal Ileum Narrowing:  
1. Tumor → Lymphoma  
2. Iatrogenic → Adhesion  
3. Inflammatory (IBD)

Smooth narrowing of the terminal ileum No visible mucosal fold thickening or Ulceration



Multiple Filling Defects  
Cobble Stone appearance  
DDx: Crohn's Disease

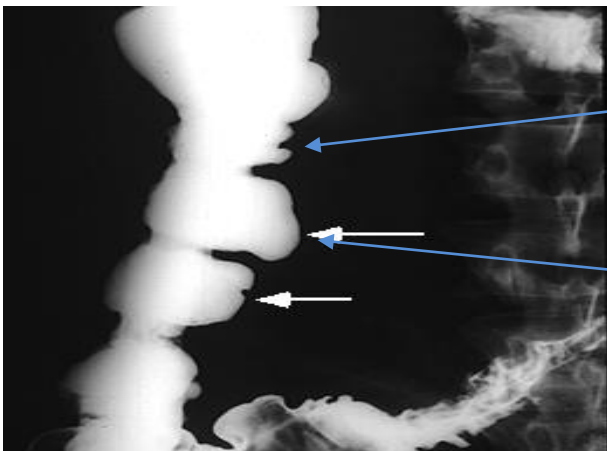
There is abnormal wall thickening, luminal narrowing, and cobblestoning involving a long segment of the distal ileum including the terminal ileum



Contrast Filled Sacs (outside the Lumen)



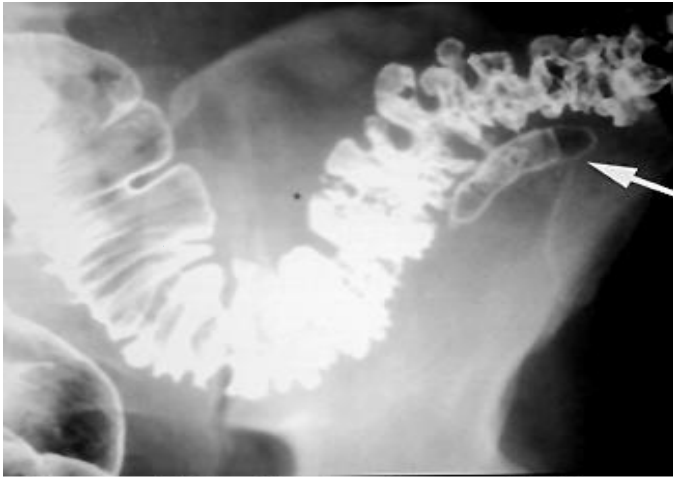
**Diverticulosis in Descending & Sigmoid Colon**



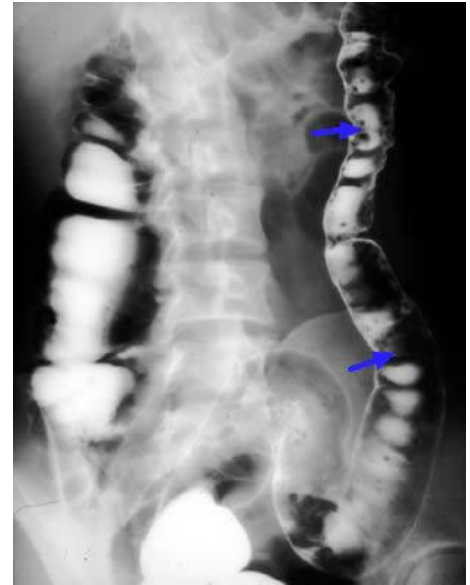
Pseudopolyps

Pseudodiverticulum

**Chronic Crohn's colitis** Barium enema demonstrates sacculations along the medial border of the ascending colon (arrows) produced by scarring and fibrosis in a patient with Crohn's disease. Courtesy of Jonathan Kruskal, MD, PhD.

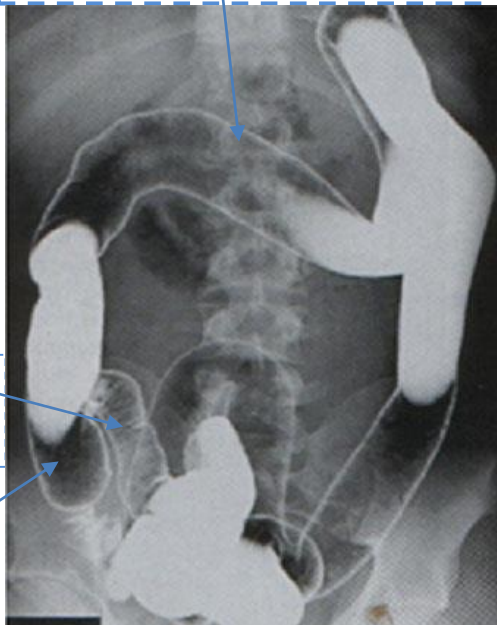


**Intramural diverticular abscess** Double contrast barium enema in a patient with numerous sigmoid colon diverticulæ demonstrates an air-containing intramural abscess cavity (arrow). Courtesy of Jonathan Kruskal, MD, PhD.



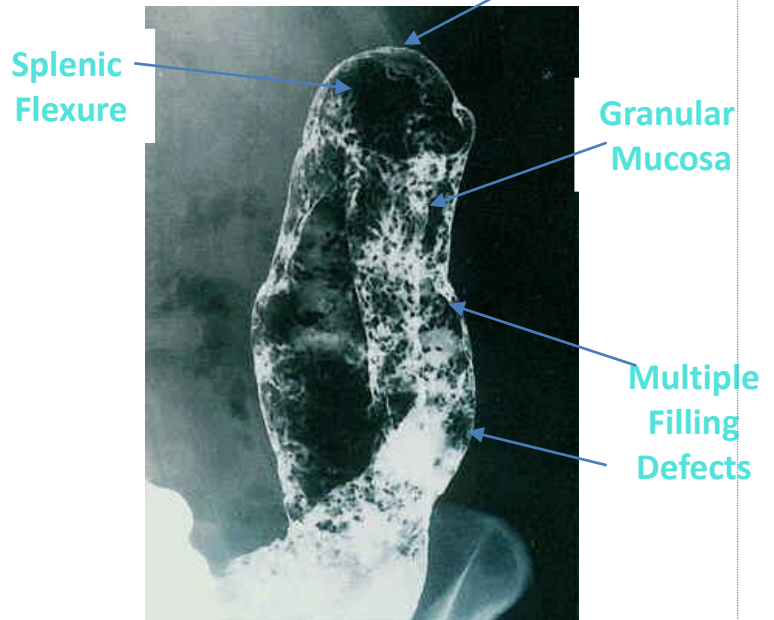
**Multiple Small & Round Filling Defects**  
**DDx: Multiple Polyps**

**Loss of Haustrations**  
**LEAD PIPE SIGN**



**DDx:**  
**Ulcerative Colitis (Pancolitis)**

**Loss of Haustrations**

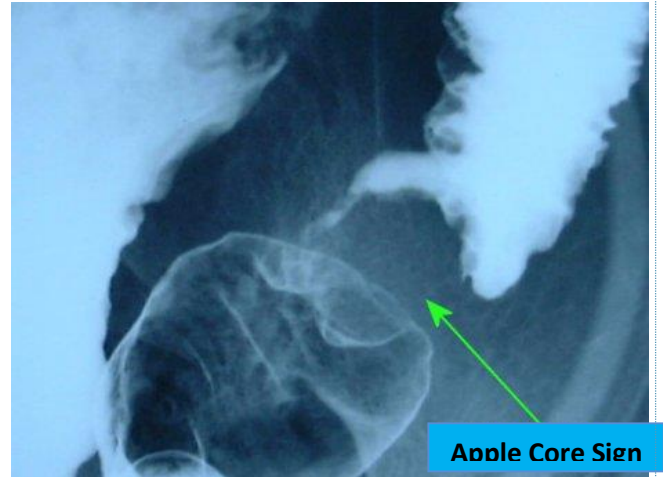


**DDx:**  
**Ulcerative Colitis (Total colitis)**





**DDx:**  
Colon CA



**DDx:**  
Sigmoid Colon CA



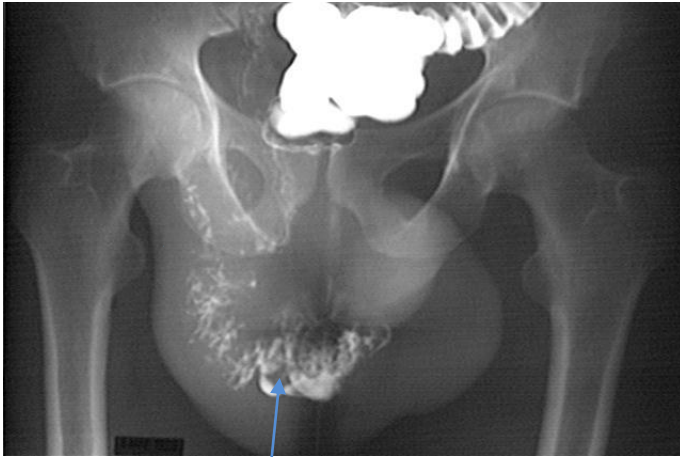
**Cancer of the colon** Double contrast barium enema shows an apple-core lesion surrounding the lumen of the descending colon. Courtesy of Jonathan Kruskal, MD.

**DDx:**  
Colon CA



**Sigmoid cancer developing in ulcerative colitis** Barium enema study demonstrates a focal stricture in the sigmoid colon caused by an infiltrating cancer. The adjacent bowel is featureless and folds are absent, findings characteristic of chronic ulcerative colitis. Courtesy of Norman Joffe, MD.

**A Sigmoid Stricture is always considered malignant until proven otherwise**

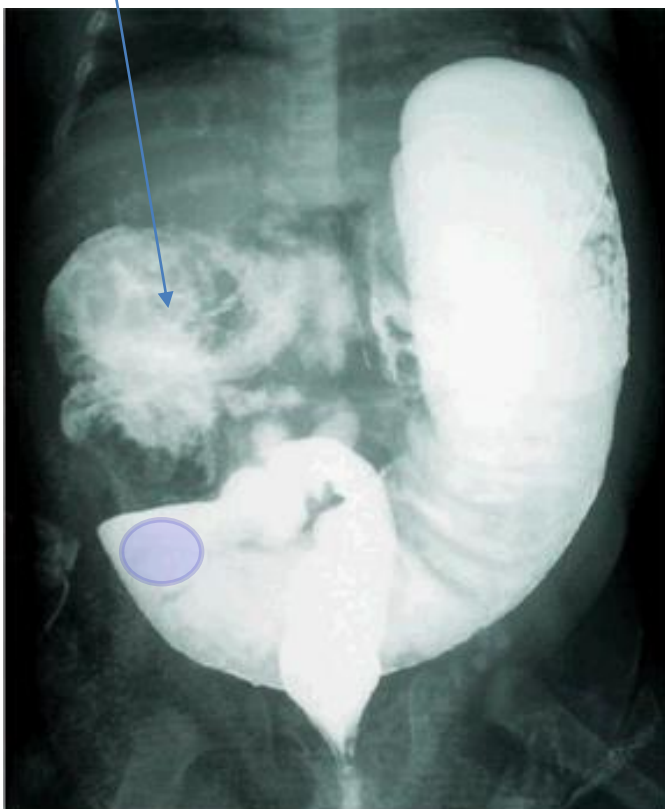


A huge right indirect hernia in the scrotum



A huge mass that has displaced the intestines (Splenomegaly)

Meconium



**Hirschsprung's disease** Barium enema of an infant with Hirschsprung's disease showing the transition zone between the lower aganglionic bowel and the normal colon above. Courtesy of George D Ferry, MD.

**DDx:**

**Hirschsprung disease (HD)** which is more definitively diagnosed by means of contrast enema examination, which can show the presence of a transition zone, irregular contractions, mucosal irregularity, and delayed evacuation of contrast material, among other findings

Although the hallmark of the diagnosis is the presence of transition zone but it's absence exclude the disease

**Transition Zone**

**According to the Transition Zone:**

- Rectum → **Ultra Short**
- Rectosigmoid → **Short**
- Transverse Colon → **Long**
- Beginning of the Colon → **Total (microcolon)**

## Computed Tomography (CT):

### ❖ INDICATIONS

- Abdominal pain
- To look for bowel obstruction cause
- To diagnose intra-abdominal masses
- Trauma

### ❖ CONTRAINDICATIONS:

- **Pregnancy.**
- No IV contrast in renal failure
- Unstable patients (severe trauma/ICU)

### ❖ ADVANTAGES:

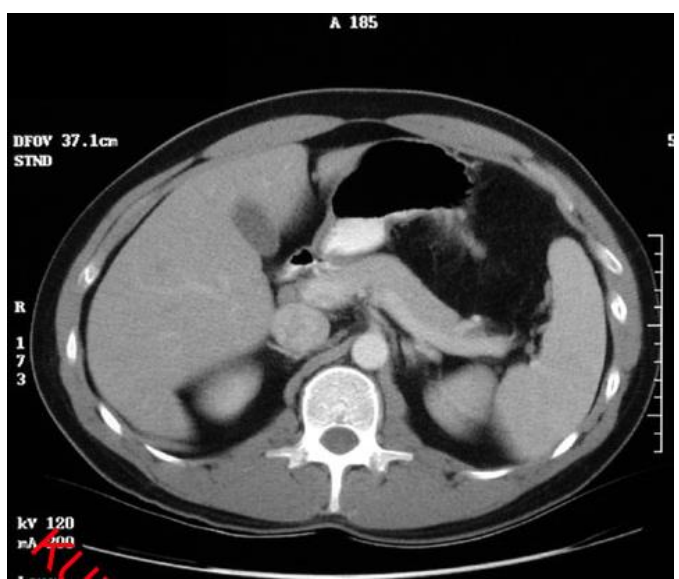
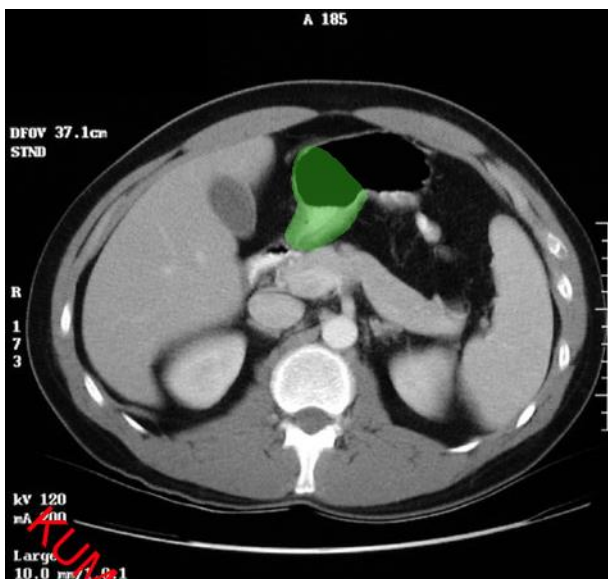
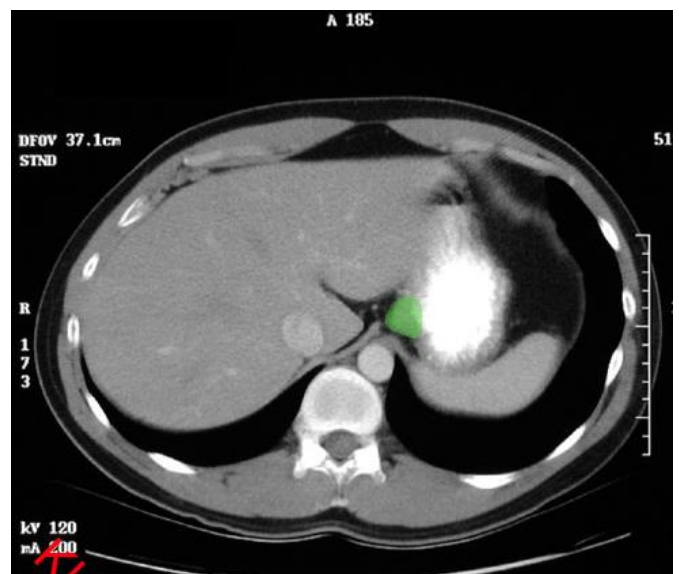
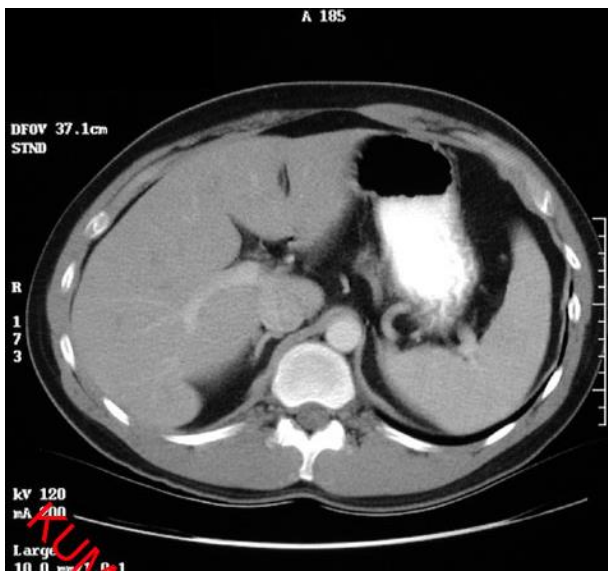
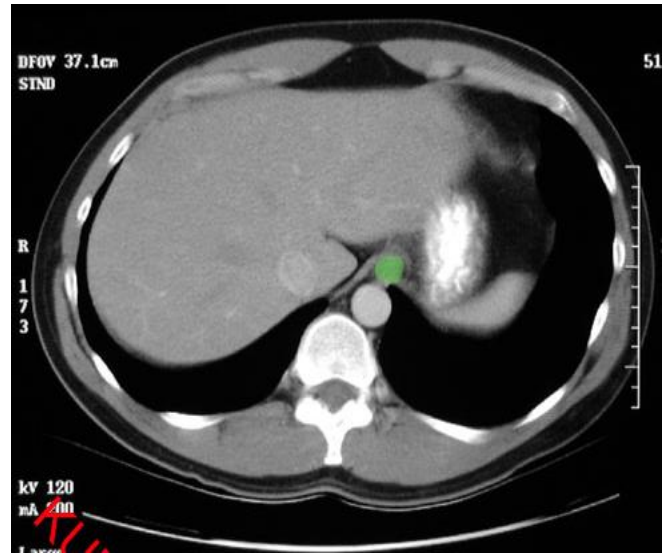
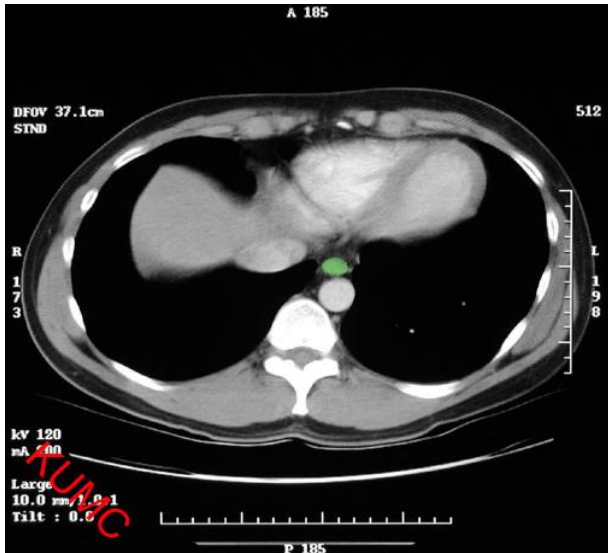
- Available
- Short scan time
- Much more soft tissue and bone details
- **Excellent** in diagnosing **extra-luminal lesions**
- **Excellent** in diagnosing the **cause of bowel obstruction**

### ❖ DISADVANTAGES:

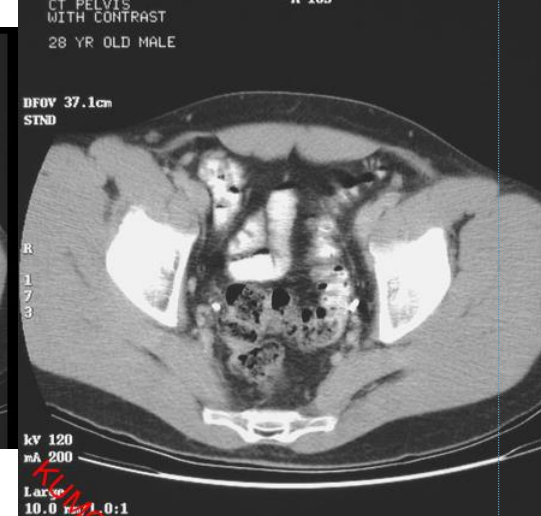
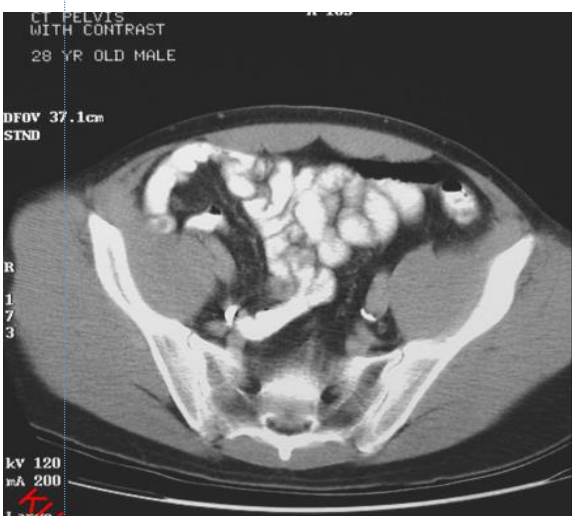
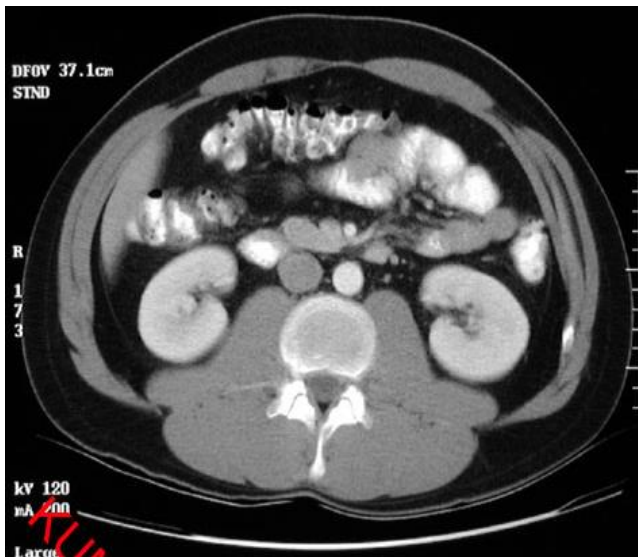
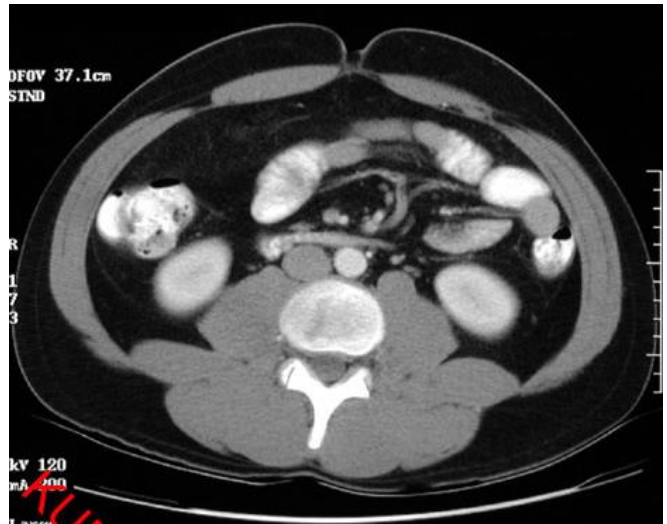
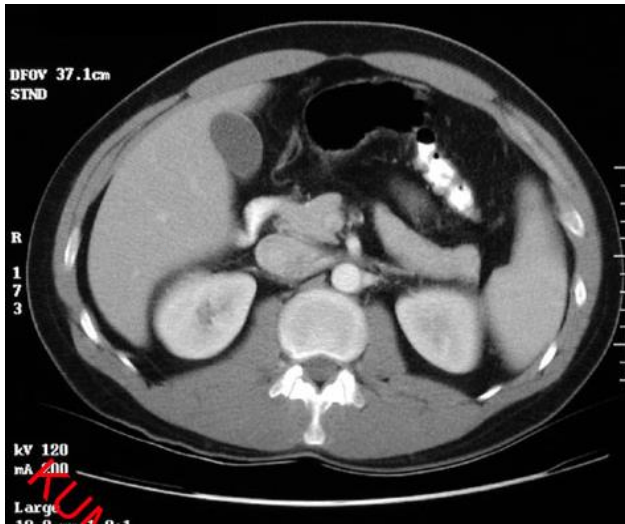
- Radiation
- Sometimes need intra venous contrast (renal disease)
- Relatively expensive











## MRI:

### ❖ INDICATIONS

- Abdominal **solid organ masses**
- Inflammatory bowel disease

### ❖ CONTRAINDICATIONS:

- uncooperative patients
- Early pregnancy (relative contraindication)
- No IV contrast renal failure (relative contraindication)

### ❖ ADVANTAGES:

- Relatively safe in pregnancy (no radiation)
- Give much more soft tissue details
- Excellent in diagnosing abdominal solid organ lesion: liver, spleen, kidneys

### ❖ DISADVANTAGES:

- Expensive
- Long scanning time
- Sensitive to motion



CT Scan



MRI

- 3.Right lobe of the liver.
- 7.Stomach.
- 8.psoas Muscle.
- 9.Descending colon.



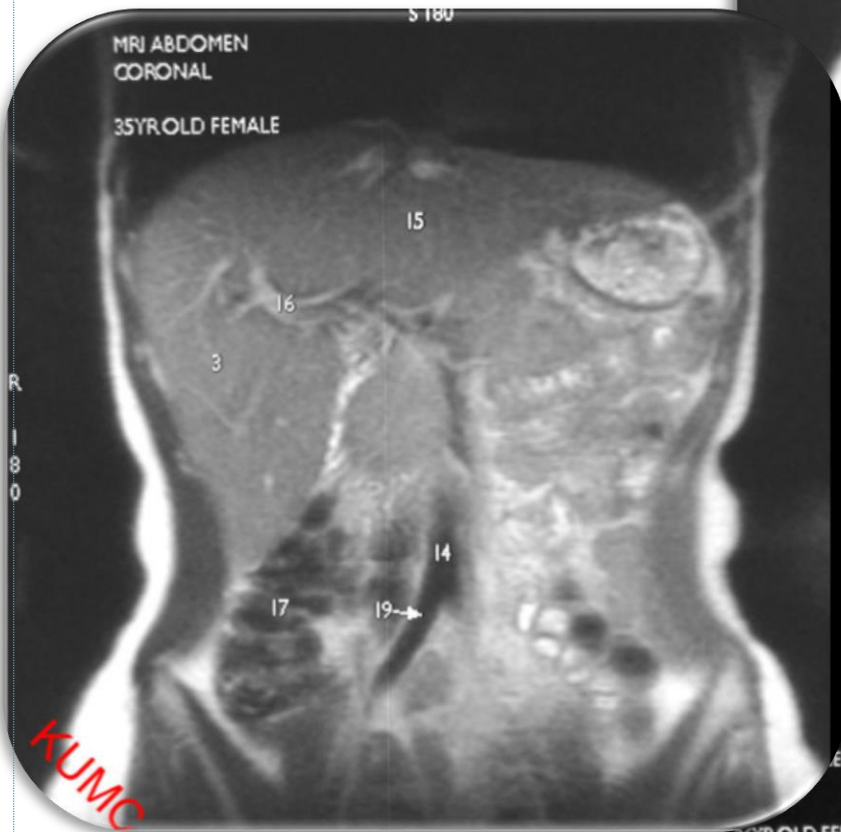
- 10.Splenic Flexure of the Colon.
- 11.Jejunm.

- 7.Stomach .
- 11.Jejunm.
- 12.Hepatic Veins.





- 3.Liver.
- 7.Stomach.
- 21.Transverse Colon.



- 3.Right lobe of the liver.
- 14.Aorta.
- 15.Left lobe of the liver.
- 16.Portal vein .
- 17.Ascending Colon.
- 19. Right common iliac Artery.

- 3.Aorta.
- 4.Liver.
- 5.Left Hepatic Vein.
- 6.Middle Hepatic Vein.
- 7.Right Hepatic Vein.
- 8.IVC.
- 9.Stomach.



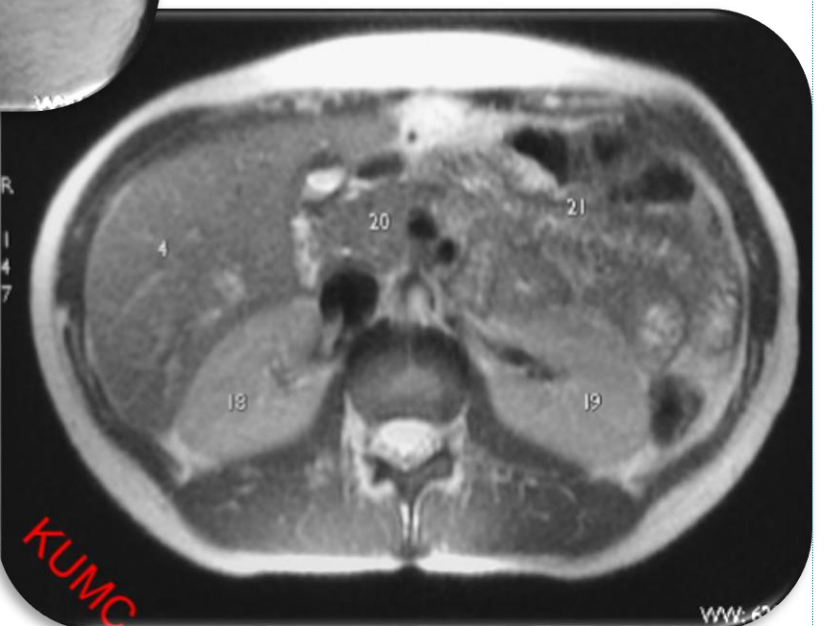


- 3.Aorta.
- 8.IVC.
- 9.Stomach.
- 10.Spleen.

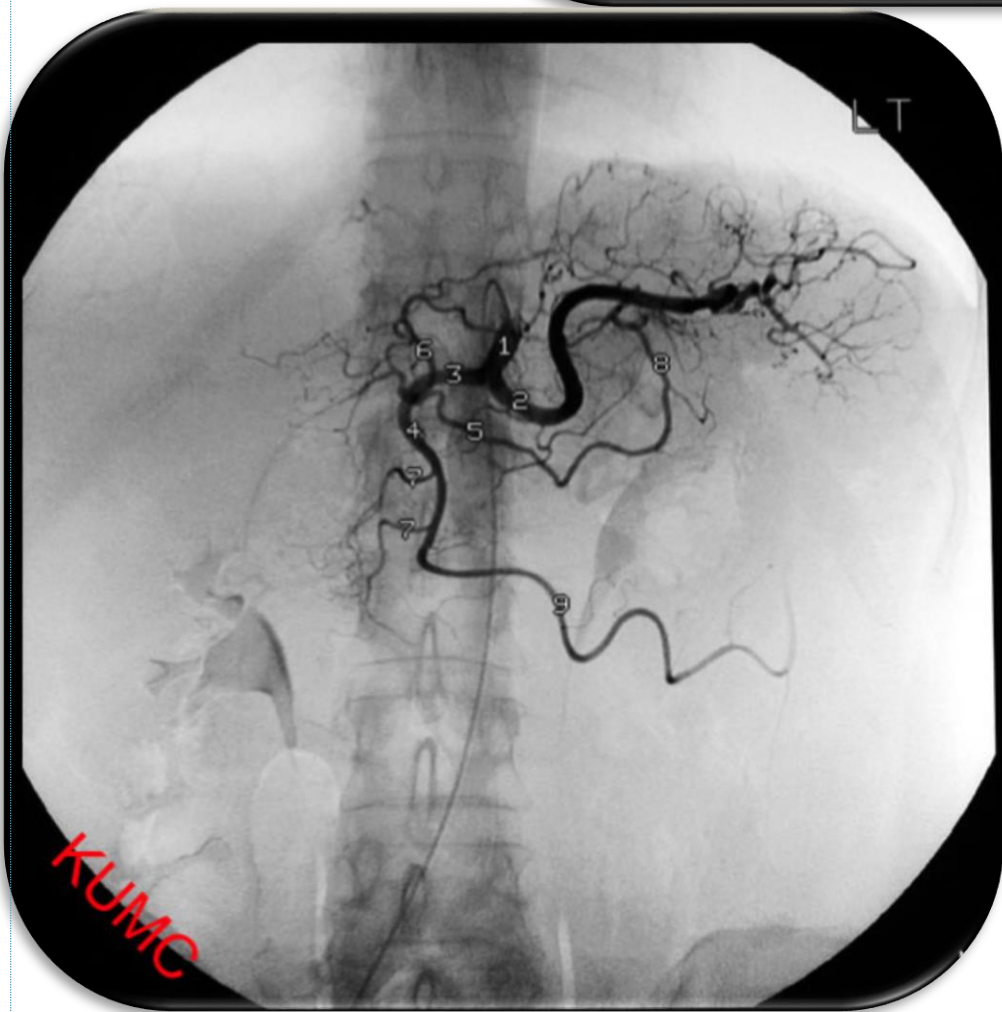
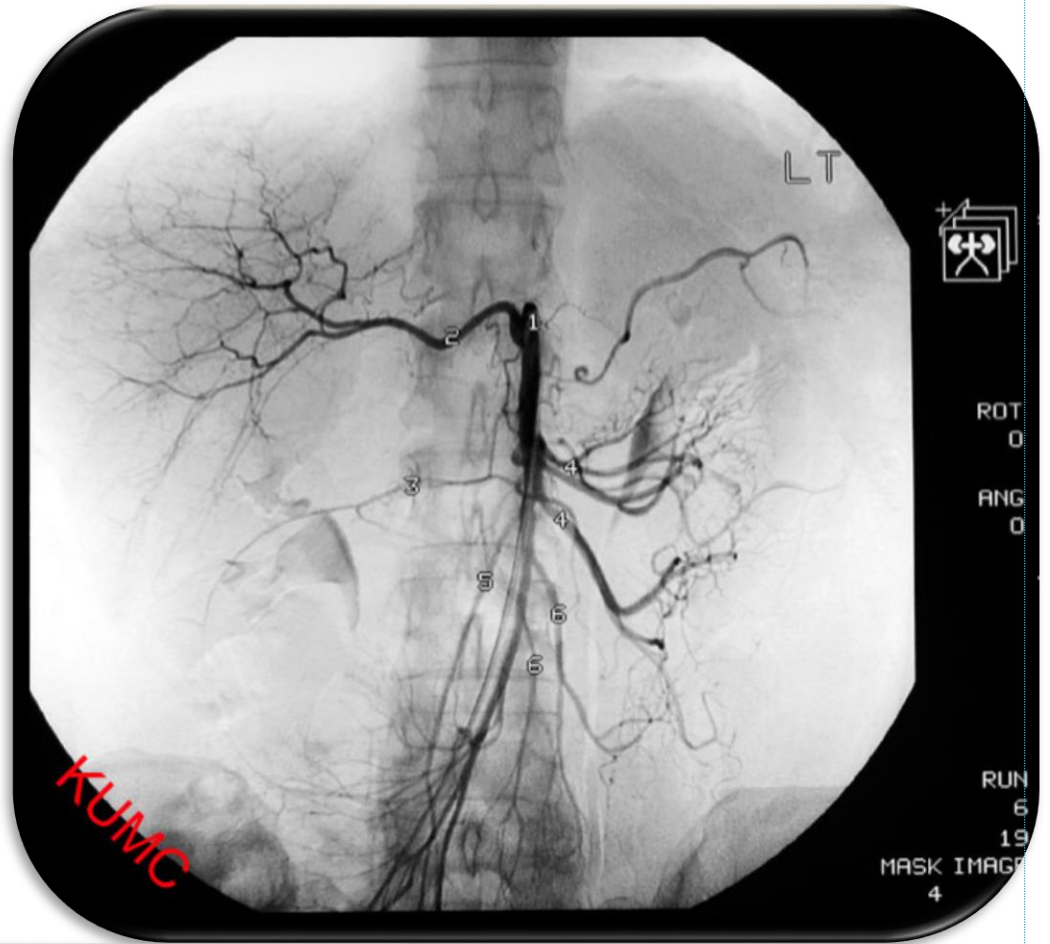


- 4.Vagina.
- 6.Pubic Bone.
- 11.Anal Canal.
- 13.Urethra.
- 14.Endometrium.

- 4.Liver.
- 18.Right Kidney.
- 19.Left Kidney.
- 20.Head of Pancreas.
- 21.Jeunm.

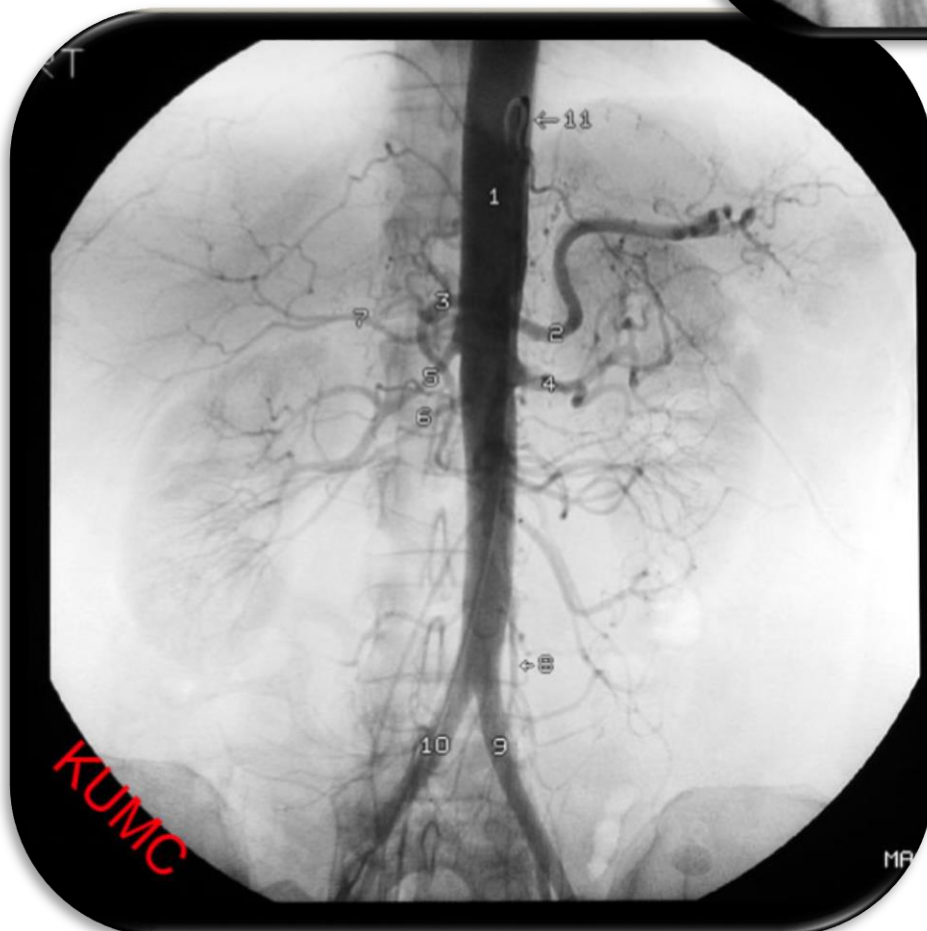


- 1.Superior Meseteic Artery(SMA).
- 2.Replaced R.Hepatic A.
- 3.R.Colic A.
- 4.Jejunal (Intestinal) A.
- 5.ileocolic A.
- 6.ileal (Inetestinal) A.



- 1.Celiac Trunk.
- 2.Splenic A.
- 3.Common Hepatic A.
- 4.Gastroduodenal A.
- 5.R.Gastric A.
- 6.L.Hepatic A.
- 7.Pancreaticoduodenal A.
- 8.L.Gastric A.
- (Origin:Celiac)
- 9.R.Gastroepiploic A.
- \*R.Hepatic A. is replaced, originate off SMA(normal Variant)

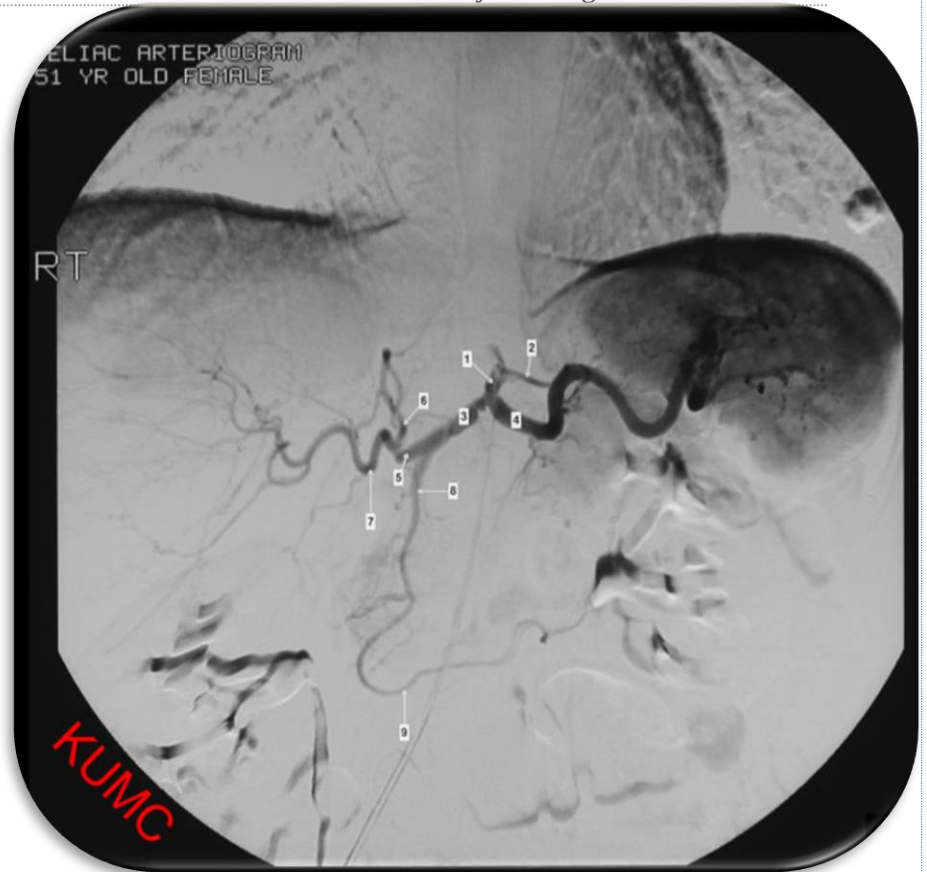
- 1. Abdominal Aorta.
- 2. Celiac Trunk.
- 3. Splenic A.
- 4. Common Hepatic A.
- 5. S. Mesenteric A.
- 6. I. Mesenteric A.
- 7. Catheter in the aortis lumen.



- 1. Abdominal Aorta.
- 2. Splenic A.
- 3. C. Hepatic A.
- 4. L. Renal A.
- 5. R. Renal A.
- 6. Accessory R. Renal A.
- 7. R. Hepatic A.
- 8. I. Mesenteric A.
- 9. L. Iliac A.
- 10. R. Iliac A.
- 11. Catheter.

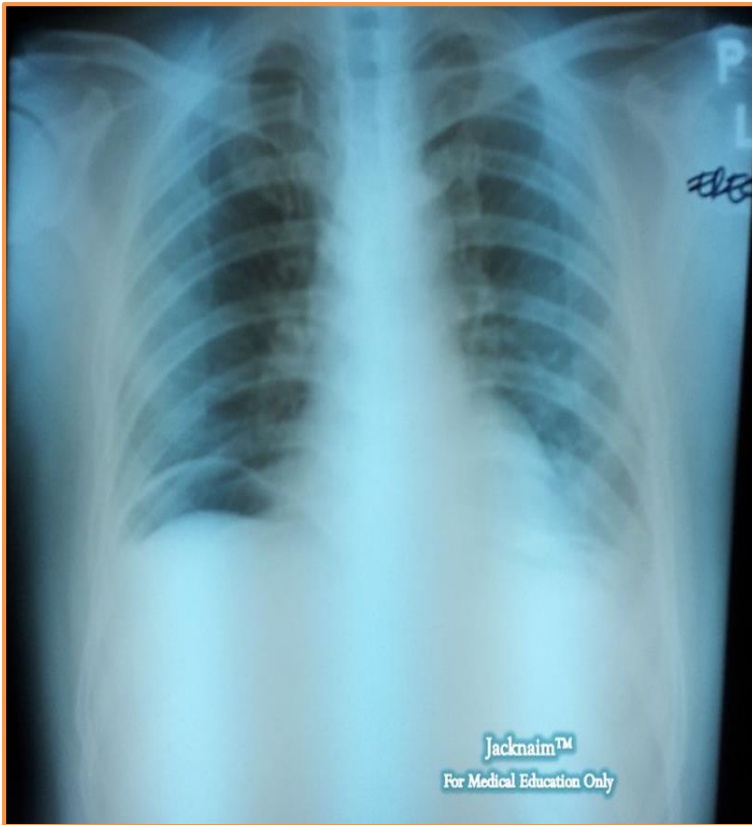


- 1.Celiac A.
- 2.L.Gastric A.
- 3.C.Hepaticc A.
- 4.Splenic A.
- 5.Hepatic A. Proper.
- 6.L. Hepatic A.
- 7.R.Hepatic A.
- 8.Gastroduenal A.
- 9.R.Gastroepiploic A.



- 1.S.Mesenteric A.
- 2.M.Colic A.
- 3.R.colic A.
- 4.Jejunal A.
- 5.ileocolic A.
- 6.Marginal A.
- 7.Colic branch of ileocolic A.
- 8.ileal branch Of ileocolic A.
- 9.ileal A.



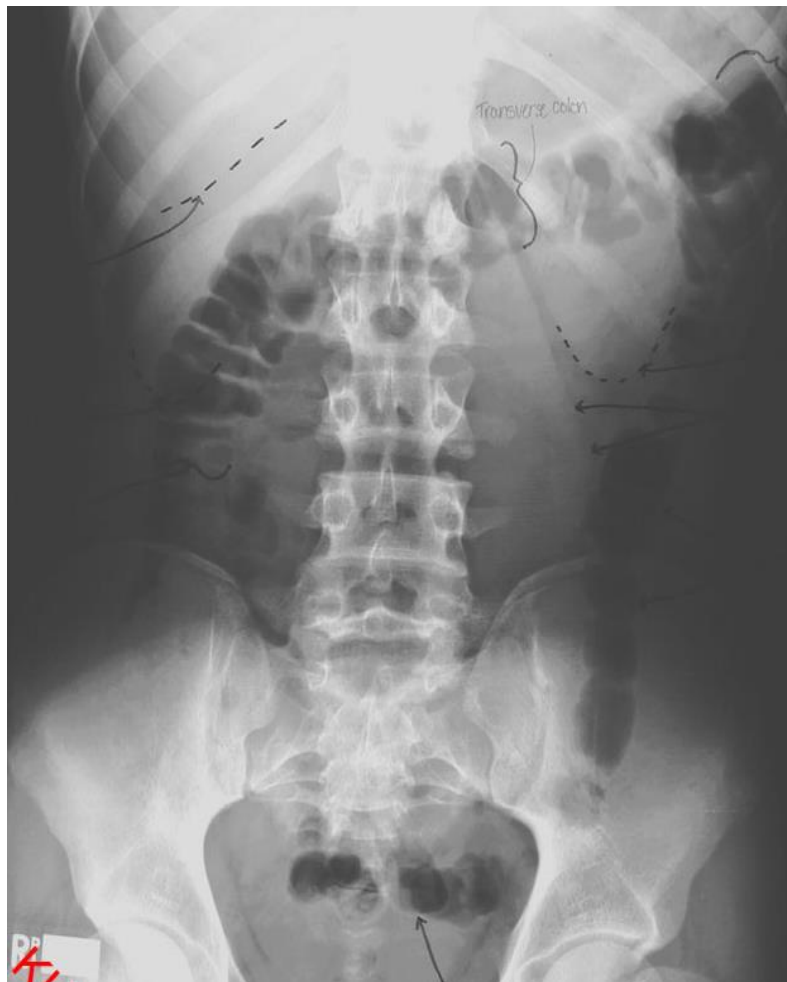


**Note(s):**

Gas under diaphragm is synonym with **pneumoperitoneum** which could be due to many reasons. Most of it is due to perforated viscus. Apart from that, other condition may also occur. Therefore, correct history taking and good physical examination may aid in making a diagnosis.

DDx:

- 1) Perforated viscus.
  - a) GI Malignancies
  - b) Perforated ulceration of GI Tract
- 2) Subphrenic abscess with gas.



	Advantages	Disadvantages
<b>X-ray</b>	<ul style="list-style-type: none"> <li>♠ Widely available</li> <li>♠ Cheap</li> <li>♠ Excellent in diagnosing <b>free air in the abdomen</b></li> <li>♠ Good in diagnosing bowel <b>obstruction &amp; stones/calcifications</b></li> </ul>	<ul style="list-style-type: none"> <li>♠ Radiation</li> <li>♠ Poor soft tissue details</li> </ul>
<b>Fluoroscopy</b>	<ul style="list-style-type: none"> <li>♠ Available</li> <li>♠ Relatively cheap</li> <li>♠ Excellent in <b>evaluation the bowel lumen and mucosa</b></li> </ul>	<ul style="list-style-type: none"> <li>♠ Radiation</li> <li>♠ Poor for evaluating extra-luminal pathologies</li> </ul>

## IMPORTANT NOTES FROM EXTERNAL RESOURCES

### Notes

Link	Jacknaims notes
More photos	<a href="http://www.radiologymasterclass.co.uk/tutorials/tutorials.html">http://www.radiologymasterclass.co.uk/tutorials/tutorials.html</a>
Quizzes	<a href="http://www.radiologymasterclass.co.uk/tests/quizzes.html">http://www.radiologymasterclass.co.uk/tests/quizzes.html</a>

## SUMMARY

1. Every image should be assessed from different aspects: Bone, Soft tissue/Solid Organs, Calcification, Gas pattern & Artefacts.
2. Small bowel: central in the abdomen. Jejunum has 'valvulae conniventes' "feathery pattern", ileum is characteristically featureless. Calibre not exceed 2.5–3 cm.
3. Large bowel: normally contains semifluid material containing multiple pockets of gas. Haustral folds of the colon may be seen.
4. Sacro-iliitis < Crohn's disease , GI ulcers < Paget's.
5. Multiple "Air-Fluid" levels with dilated bowel wall diameter indicating obstruction.
6. Oesophageal narrowing which is regular "Achalasia"
7. Malignant Stricture: looks Irregular with many filling defects and Shouldering.
8. Pharyngeal Pouch "Zenker's Diverticulum"
9. Contrast Filled "focal" surrounded by area of Speculated Lesion (Gastric Ulcer)
10. Contrast Filled "focal" surrounded by area of Speculated Lesion with out-pouching (Gastric malignancy)
11. Pyloric Stenosis have three signs :1.apple core(Mushroom) sign.2.String sign 3. Shoulder sign .
12. Absent Haustrations In UC is Diagnostic.
13. Terminal Ileum Narrowing can be caused by (tumors:Lymphoma, Adhesions ,IBD).
14. Crohn's Diseases features on Xray is Cobble stone appearance,multiple filling defects and wall thickening ( Chronic Crohns: Saccultions: Pseudopolyps,pseudodiverticulum)
15. In Diverticulosis there's contrast filled sacs.
16. Apple core is a finding of colonic cancer.
17. In Hirschsprung Disease there's a prominent Transition zone .
18. CT scan indicated to Diagnose Abdominal obstruction and Masses.
19. MRI is Indicated in case of IBD and intrabdominal organ masses or enlargement in liver, kidney and spleen.

## Questions

- 1) A contraindication of perforation is ..... and it causes ..... ?
  - a. X-ray, peritonitis
  - b. Fluoroscopy, malignancy
  - c. Fluoroscopy, peritonitis
  - d. Fluoroscopy with barium, peritonitis
  
- 2) Presence of speculations without out-pouch is suggestive of..... ?
  - a. Malignancy
  - b. Diverticulum
  - c. Achalasia
  - d. Ulcer
  
- 3) The best to evaluate the luminal abnormalities of GI, you will order ..... ?
  - a. X-ray
  - b. Fluoroscopy with barium only
  - c. Fluoroscopy with double contrast
  - d. Angiography
  
- 4) Irregular narrowing with many filling defects would suggest ..... ?
  - a. Ulcer.
  - b. Achalasia.
  - c. Malignancy.
  - d. Zenker's Diverticulum



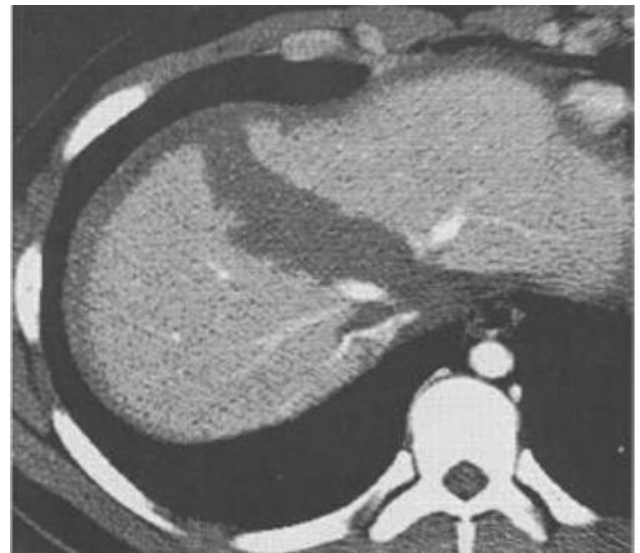
5) A 55 yo Male presented to the ER with abdominal Pain ,Vomiting and constipation.3 months earlier he had a pelvic surgery. A Barium meal and follow through was done.whats the most likely diagnosis?

- a. Small bowel Tumor.
- b. Large Bowel Tumor
- c. Adhesions and Fibrosis.
- d. Gall stone ileus.



6) A CT scan of the abdomen was done for this 20 yo man who had a motor vechicle accident.Whats the most likely diagnosis.

- a. A Subcapsular liver hematoma.
- b. A Laceration of the liver.
- c. Active Extravasation from hepatic artery
- d. A bile Leak.



**432 Radiology Team Leaders**

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**Answers:**

1<sup>st</sup> Q: d

2<sup>nd</sup> Q: d

3<sup>rd</sup> Q: c

4<sup>th</sup> Q: c

5<sup>th</sup> Q:c

6<sup>th</sup> Q:b