



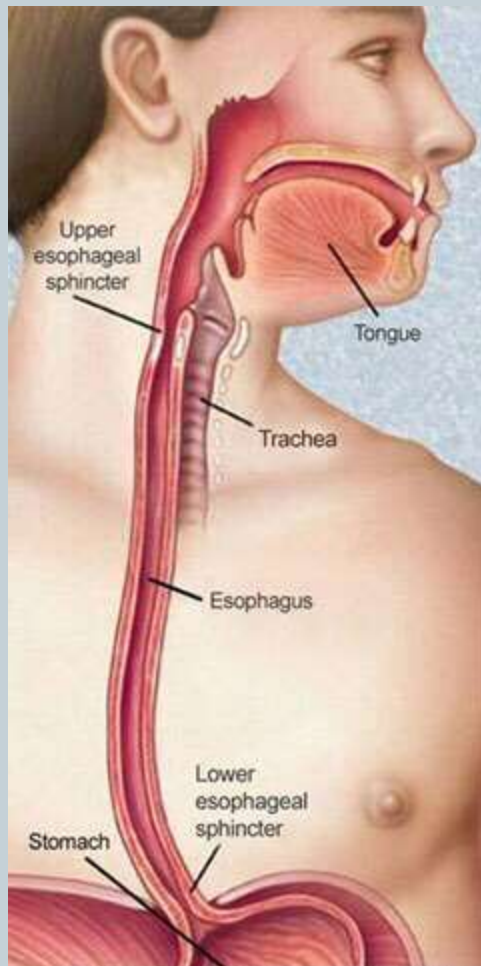
• BARIUM STUDIES

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BARIUM SWALLOW

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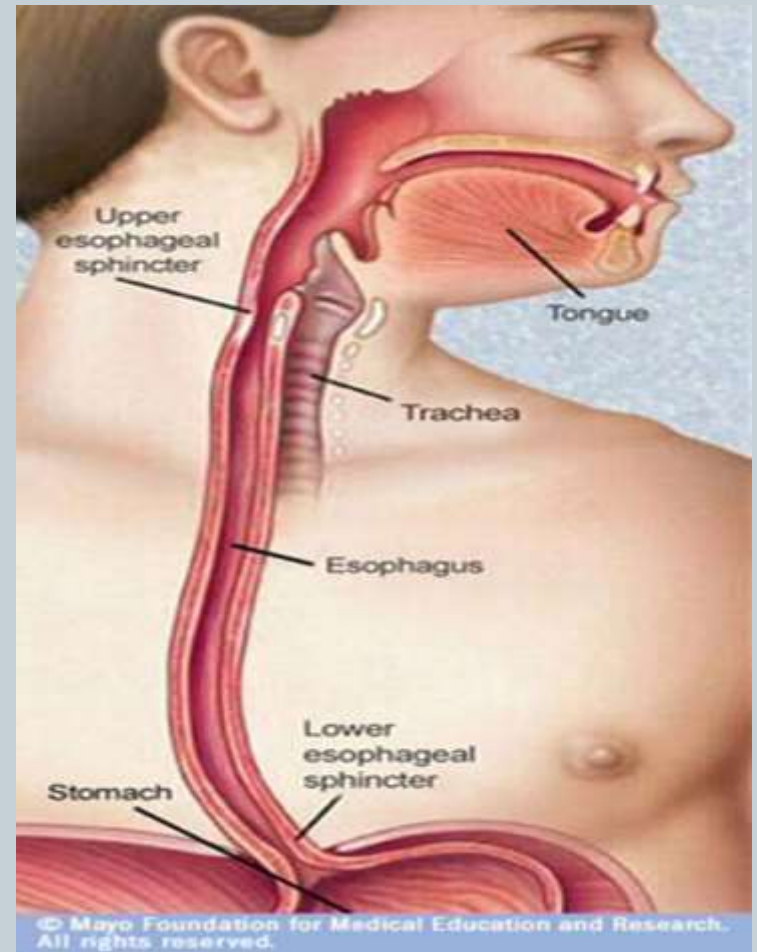
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Barium swallow is a radiological study of pharynx and esophagus up to the level of stomach with the help of contrast.

ANATOMY OF ESOPHAGUS:

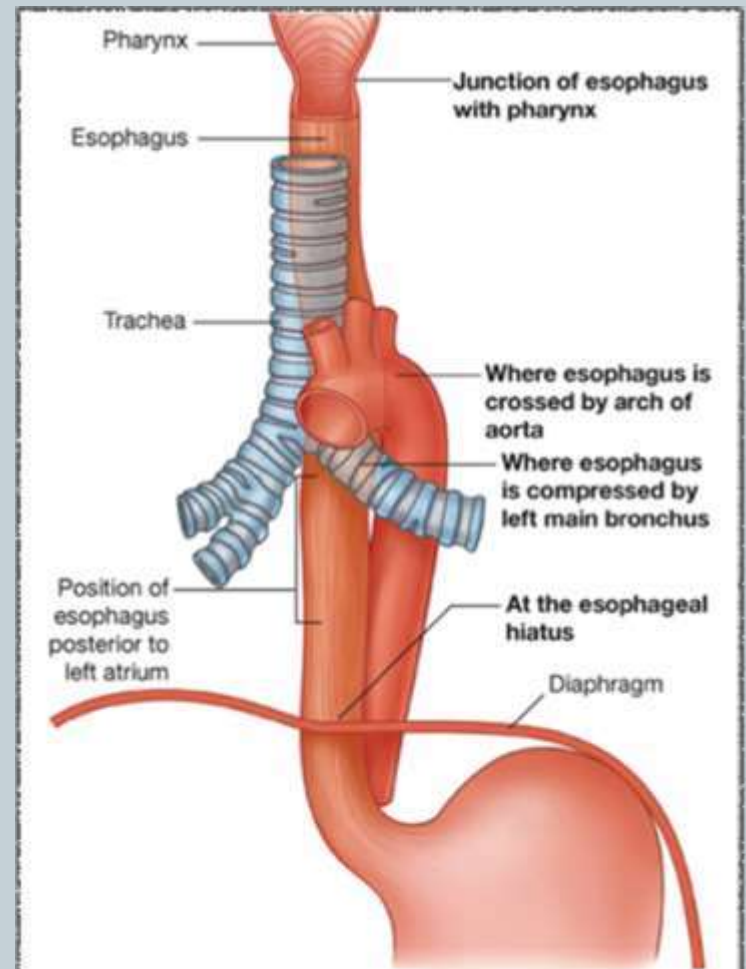
Flattened muscular tube, size 18 to 26cm beginning at lower border of cricoid cartilage (opp 6th cervical vertebra) and ending at cardiac orifice of stomach (opp 11th thoracic vertebra)

Divided into 3 anatomical segments i.e. cervical, thoracic & abdominal



ESOPHAGEAL CONSTRICTION:

- Superiorly: level of Cricoid cartilage, juncture with pharynx
- Middle: crossed by aorta and left main bronchi
- Inferiorly: diaphragmatic sphincter



Drake: Gray's Anatomy for Students, 2nd Edition.
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INTRODUCTION:

- It is a medical imaging procedure used to examine upper gastrointestinal tract, which include the esophagus and to a lesser extent the stomach.
- The contrast used is barium sulfate.

CONTRAST:



- TYPES OF CONTRAST STUDY
 - (i) SINGLE CONTRAST STUDY
 - (ii) DOUBLE CONTRAST STUDY
- Barium Sulfate is used (barium Carbonate is toxic)
- Barium has atomic no 56 and is radio-opaque
- Barium is inert and non-toxic

INDICATIONS:



- Dysphagia
- Heart burn, retrosternal pain, regurgitation & odynophagia.
- Hiatus hernia
- Reflux esophagitis
- Stricture formation.
- Esophageal carcinoma.
- Motility disorder like
- Achalasia
- diffuse esophageal spasms.
- Pressure or invasion from extrinsic lesions.
- Assessment of abnormality of
 - i. pharyngo esophageal junction including zenkers diverticulum
 - ii. cricoid webs
 - iii. cricopharyngeal Achalasia.

CONTRAINDICATIONS:

- Suspected leakage from esophagus into the mediastinum or pleura and peritoneal cavities (Diatrazole Meglumine - 66% to be used)
- Tracheo-esophageal fistula (Diatrazole Meglumine -66% to be used)
- Recent Biopsy

XRAY VIEWS:



- SOFT TISSUE NECK – AP & LATERAL
- NECK-AP & LATERAL
- THORAX-RAO (right anterior oblique) VIEW

TECHNIQUE:



- Single Contrast Study:
 - Contrast 90-100%W/V
 - Approx. 20 ml of contrast given & asked to swallow by patient.
- Double contrast Study:
 - Contrast high density, low viscosity (200-250%W/V)
 - 15-20 ml given & asked to swallow.
 - Then effervescent powder given with another mouthful of barium.
 - In erect posture gas tend to stay up so adequate distention stays longer time.
 - Inj. buscopan I.V given before the procedure to keep esophagus distended for longer time



SPECIFIC CONDITIONS

ESOPHAGEAL WEB:

A shelf like projection is seen in upper part of cervical esophagus causing short segment narrowing, however contrast is seen passing distally.



DIFFUSE OESOPHAGEAL SPASM

- Barium swallow shows irregular areas of narrowing and dilatation -----
“corkscrew” “rosary bead” esophagus.

The esophageal muscle is hypertrophied, but histologically normal.



ACHALASIA CARDIA



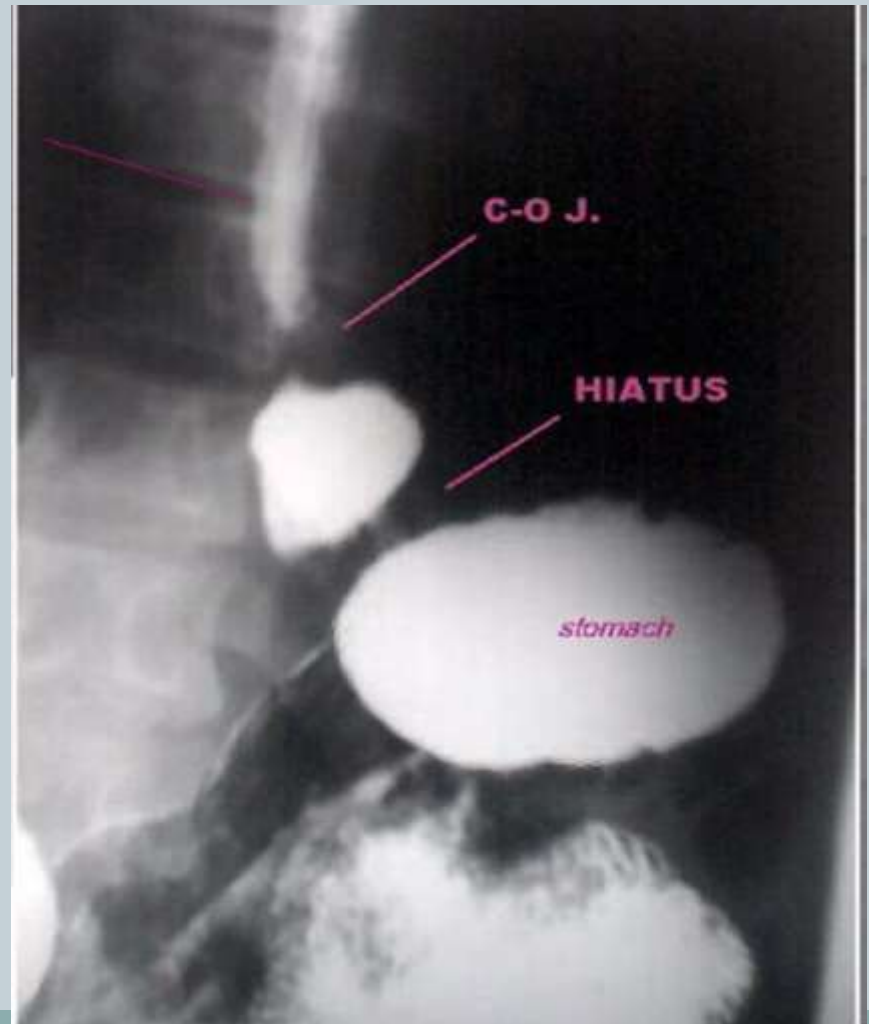
- Barium swallow showing dilatation of the esophageal body
- A “bird-peak ” like tapering of the esophagus at the lower esophageal end.



HIATUS HERNIA:



- Displacement of the cardio-esophageal junction above the esophageal hiatus
- Part of the stomach is present in the chest
- Reflux of barium into the esophagus



ESOPHAGEAL VARICES:

- Mild dilatation of the esophagus with multiple persistent filling defects in the lower third of the esophagus.



BARRETT'S ESOPHAGUS:

The reticular mucosa is characteristic of Barrett's columnar metaplasia, especially with the associated web-like (arrow) stricture.



ZENKER'S DIVERTICULUM:

A Zenker's diverticulum is a pulsion hypo pharyngeal false diverticulum with only mucosa and sub mucosa protruding through triangular posterior wall weak site (Killian's dehiscence) between horizontal and oblique components of cricopharyngeus muscle.

The esophagogram shows contrast filled out pouching from posterior wall of esophagus at the level of cricopharyngeus.



CANDIDA ESOPHAGITIS

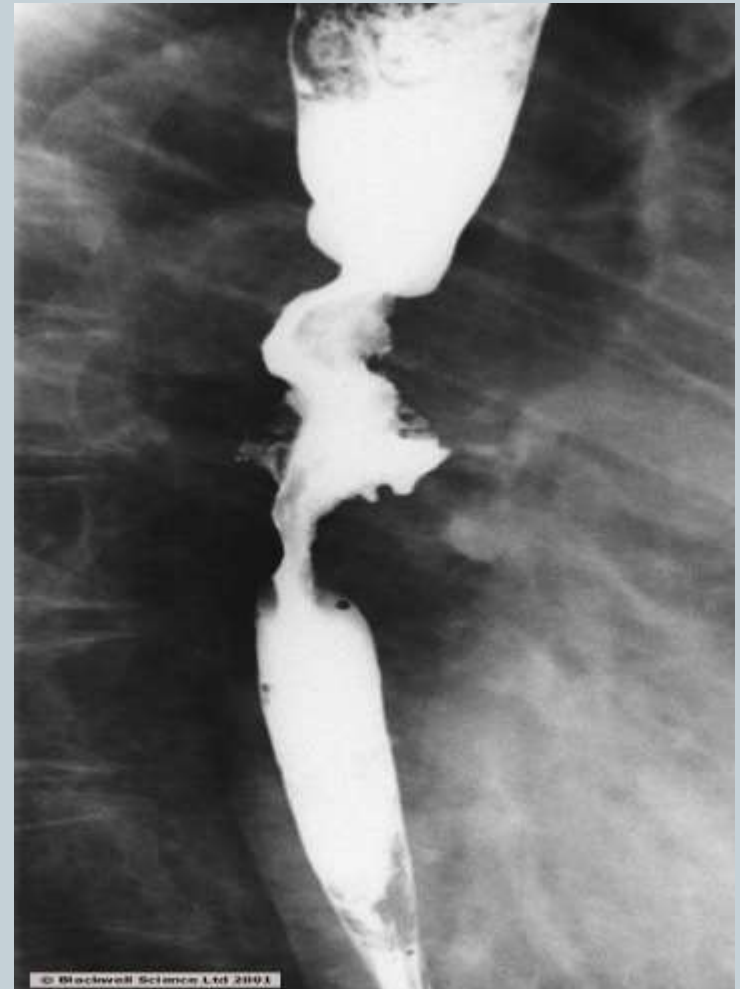
Shaggy esophagus associated with Candida infection , image "A" depicts the longitudinally oriented plaque-like lesions visible in Candida esophagitis , image "B" depicts the granular appearance of the esophageal mucosa secondary to edema and inflammation



CA ESOPHAGUS



- Irregular long segment narrowing with proximal and distal end shouldering and dilatation with hold up of contrast in proximal esophagus
- However contrast is showing passing distally





BARIUM MEAL

BARIUM MEAL:



- Barium meal is radiological study of lower esophagus, stomach and duodenum.
- Done by oral administration of contrast media barium sulphate.

INDICATIONS:



- 1. Dyspepsia
- 2. Weight loss
- 3. Upper abdominal mass
- 4. Gastrointestinal hemorrhage or unexplained iron deficiency anemia
- 5. Partial obstruction

CONTRAINDICATIONS:



- Complete large bowel obstruction
- Suspected Perforation
(Diatrizole Meglumine used)

CONTRAST:



- 150 ml of high density barium 250 % W/V (Double contrast) and 80-100% W/V (single contrast)

METHODS :




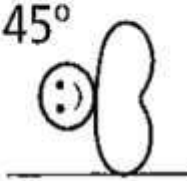




- 1. Double contrast: Method of choice to demonstrate mucosal pattern.
- 2. Single Contrast:
 - a) Children -since it usually is not necessary to demonstrate mucosal pattern
 - b) Very ill adults – to demonstrate gross pathology only

PROCEDURE







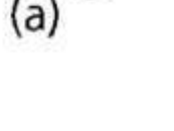
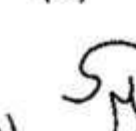
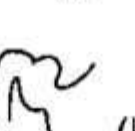

Patient swallows effervescent agent (only in double contrast)

- High density barium(250% w/v) is swallowed while lying on the left side. Then turn to the supine position. If reflux is observed spot films are taken
- A hypotonic agent –Buscopan(20 mg I.V) is administered
- Patient rolled from side to side so barium coats mucosal surfaces by washing mucus from the gastric mucosa

SEQUENCES OF FILMS FOR BARIUM MEAL EXAMINATION:

Film	RAO	Supine	LAO	Left lateral tilted head up
Position				
Image				
Demonstrates	Antrum + greater curve	Antrum + body	Lesser curve en face	Fundus

SPOT FILMS FOR DUODENAL LOOP:

Film	Prone	Spot views of cap			
		Prone	RAO	Supine	LAO
Position					
Image					
Demonstrates	Duodenal loop				

Caps



SPECIFIC CONDITIONS

EROSIVE GASTRITIS

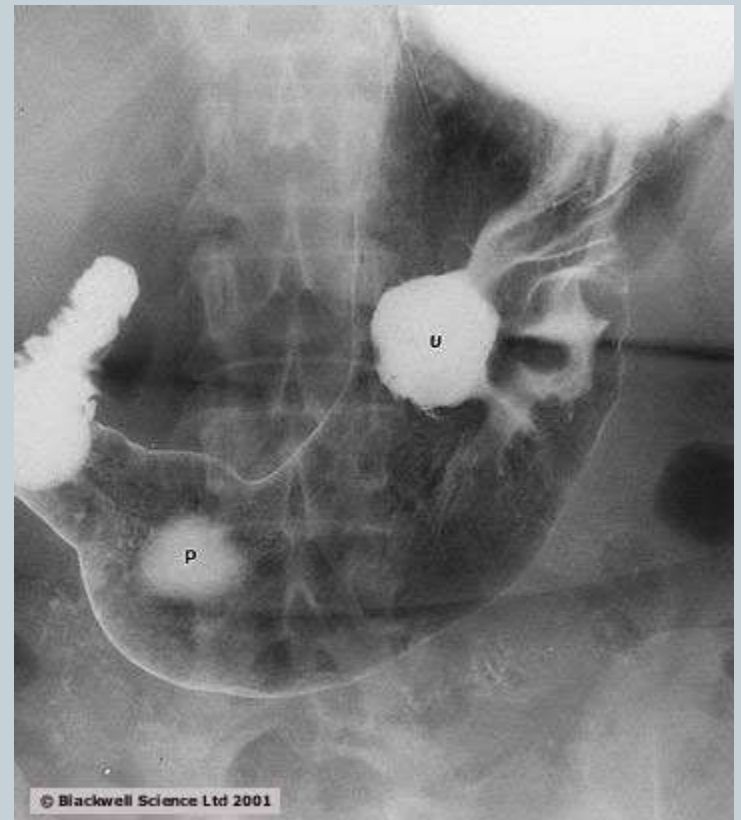
- Central pool of barium surrounded by a radiolucent halo



GASTRIC ULCER



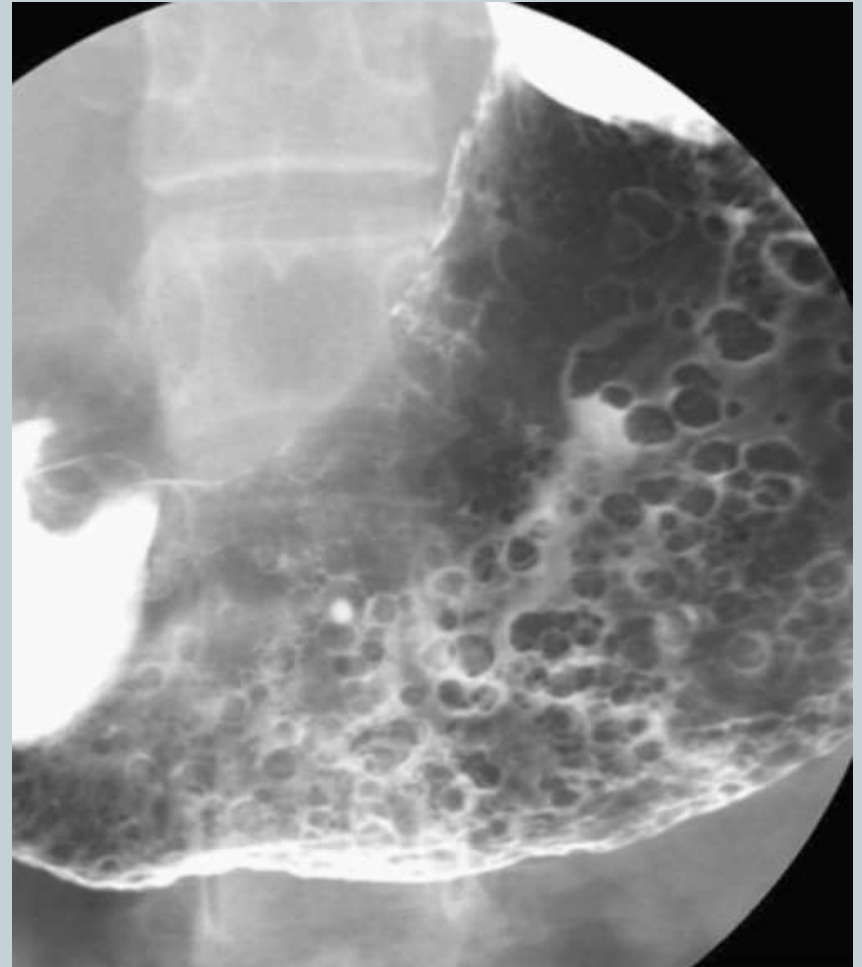
- Pooling of barium within ulcer crater with mildly thickened rugae



GASTRIC POLYP

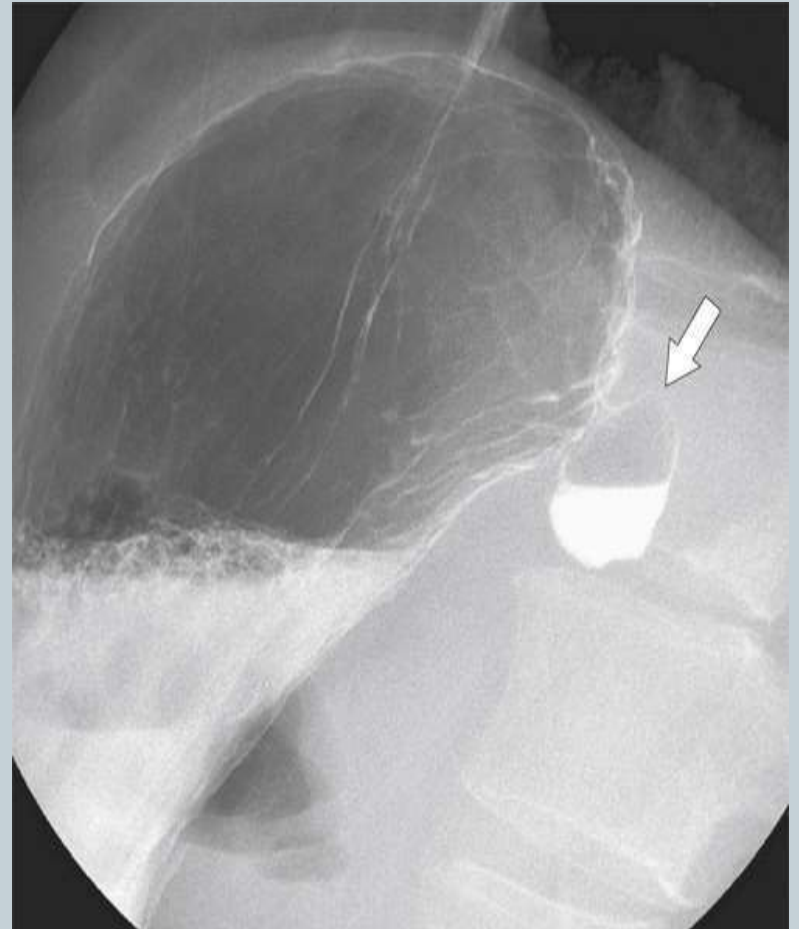


- Multiple well defined filling defects with a surrounding ring of barium are noted along the dependent wall of stomach suggesting multiple gastric polyps



GASTRIC DIVERTICULUM

- An out pouching is noted from the greater curvature of stomach showing air contrast level in it suggestive of gastric diverticulum



PYLORIC STENOSIS

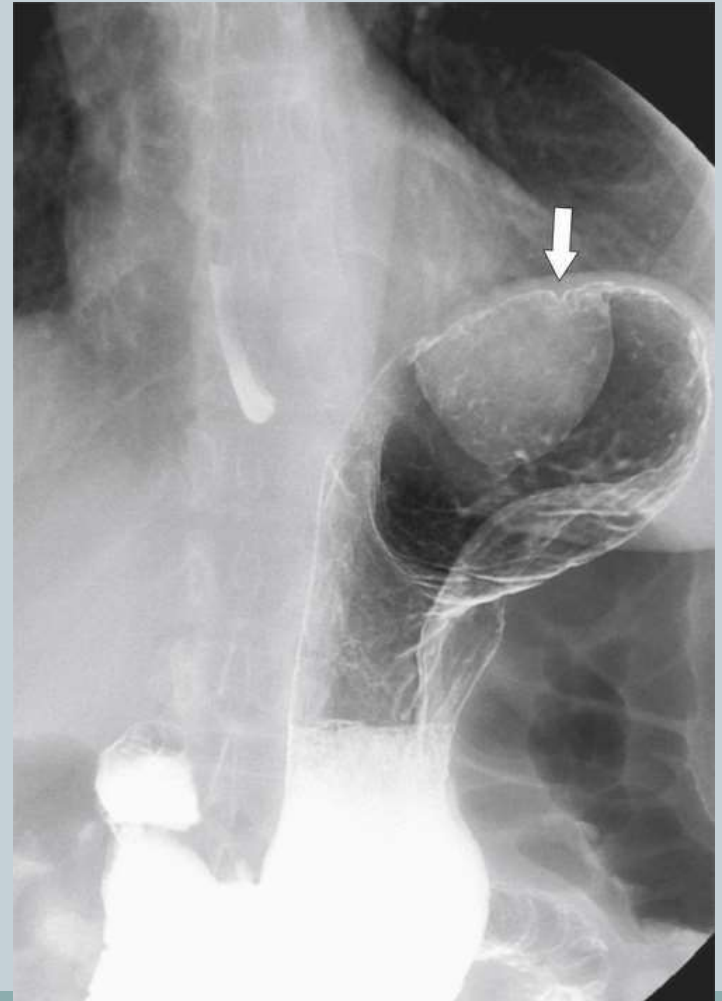
- Grossly dilated stomach with a streak of contrast passing through narrow elongated pylorus suggestive of pyloric stenosis



BENIGN TUMOR

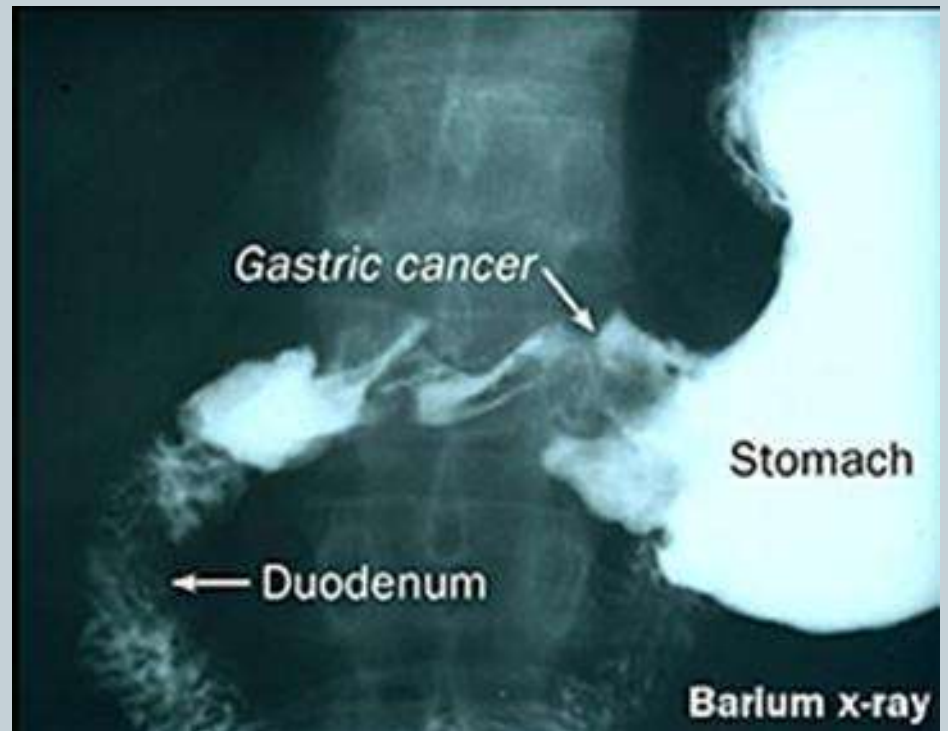


- A well defined lesion seen projecting from fundus of stomach making obtuse angle with the wall and surrounding normal mucosa suggestive of benign GIST.



GASTRIC CARCINOMA

- Marked mucosal irregularity is noted involving lower end of lesser curvature and gastric antrum causing marked luminal narrowing with only streak of contrast passing distally suggestive of neoplastic etiology.



BARIUM FOLLOWTHROUGH





- Barium Follow Through is designed to demonstrate the small bowel from the duodenum to the ileocecal region encompassing the duodenum , jejunum and ileum including the junctions superiorly with the stomach and inferiorly with the ascending colon.
- Also known as barium meal follow through (BMFT) & small bowel follow through (SBFT).

INDICATIONS:



- Pain
- Diarrhea
- Anemia
- Gastrointestinal bleeding
- Malabsorption
- Crohn's Disease

• CONTRAINDICATIONS :

- Complete obstruction
- Suspected perforation

METHODS:



- Single Contrast
- Double Contrast (with addition of an effervescent agent)
- Note: Double contrast technique is normally adopted

CONTRAST MEDIUM:

- Single Contrast 300-400 ml of 50-60% w/v Barium suspension
- Double Contrast 300-400 ml of 80-100% w/v Barium suspension

PROCEDURE:

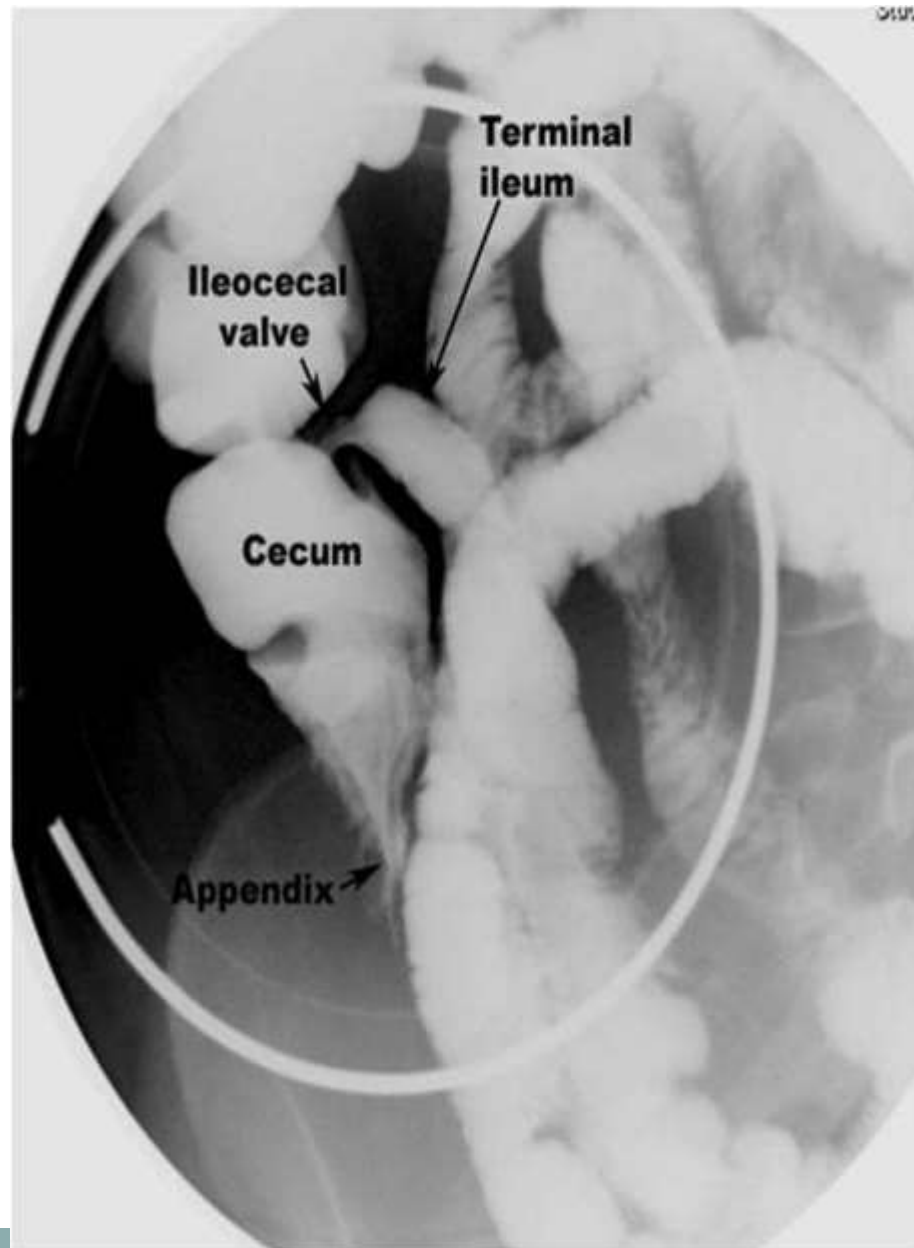


- Barium sulphate solution 80-100% w/v 300 ml (150 ml if performed immediately after barium meal)
- Usually given in 10-15 min increments or full at once
- In situations where barium is contraindicated, non-ionic water soluble solutions are used.

FILMING:



- Prone PA films of the abdomen are taken.
- The first radiograph is taken 10 min following the drink, with the second image at 30 min stage. Then the radiographs are taken at 30 min intervals until the barium has reached terminal ileum.
- Pressure on the abdomen helps to compress abdominal contents so that the loops of small bowel are separated. Thus for better radiographic quality, prone position is used.
- Spot films of the terminal ileum are taken supine.



15 min post
contrast
film



30 min post
contrast



1 hour post
contrast
film



Barium Meal + Follow-Through:



ADVANTAGES:



- Easily performed.
- No discomfort/intubation to the patient.
- It is a physiological process. Hence transit time can be assessed.

DISADVANTAGES :

- Overlapping of Barium filled bowel loops in the pelvis.
- Poor distension of bowel loops

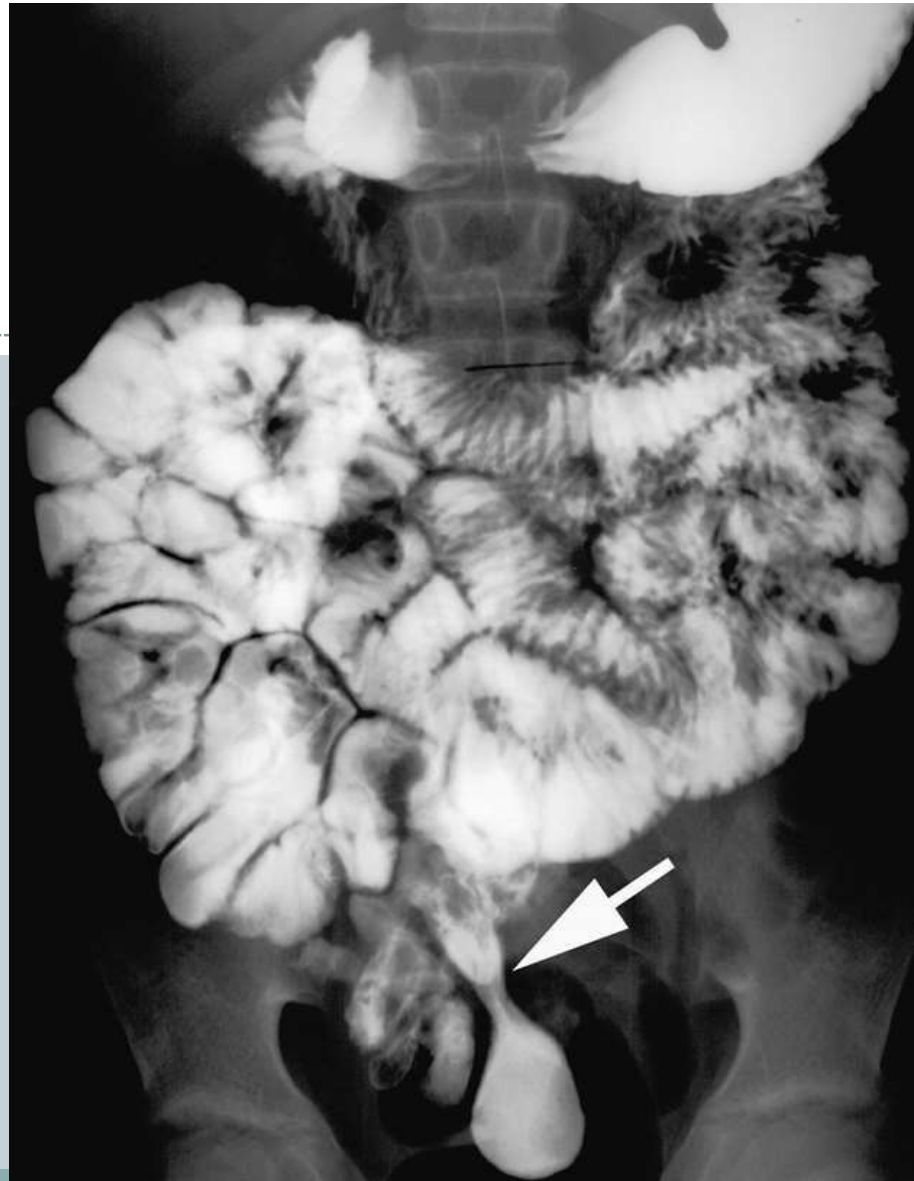
Ileo- vesical Fistula

A linear fistulous tract showing communication between ilial loop and bladder



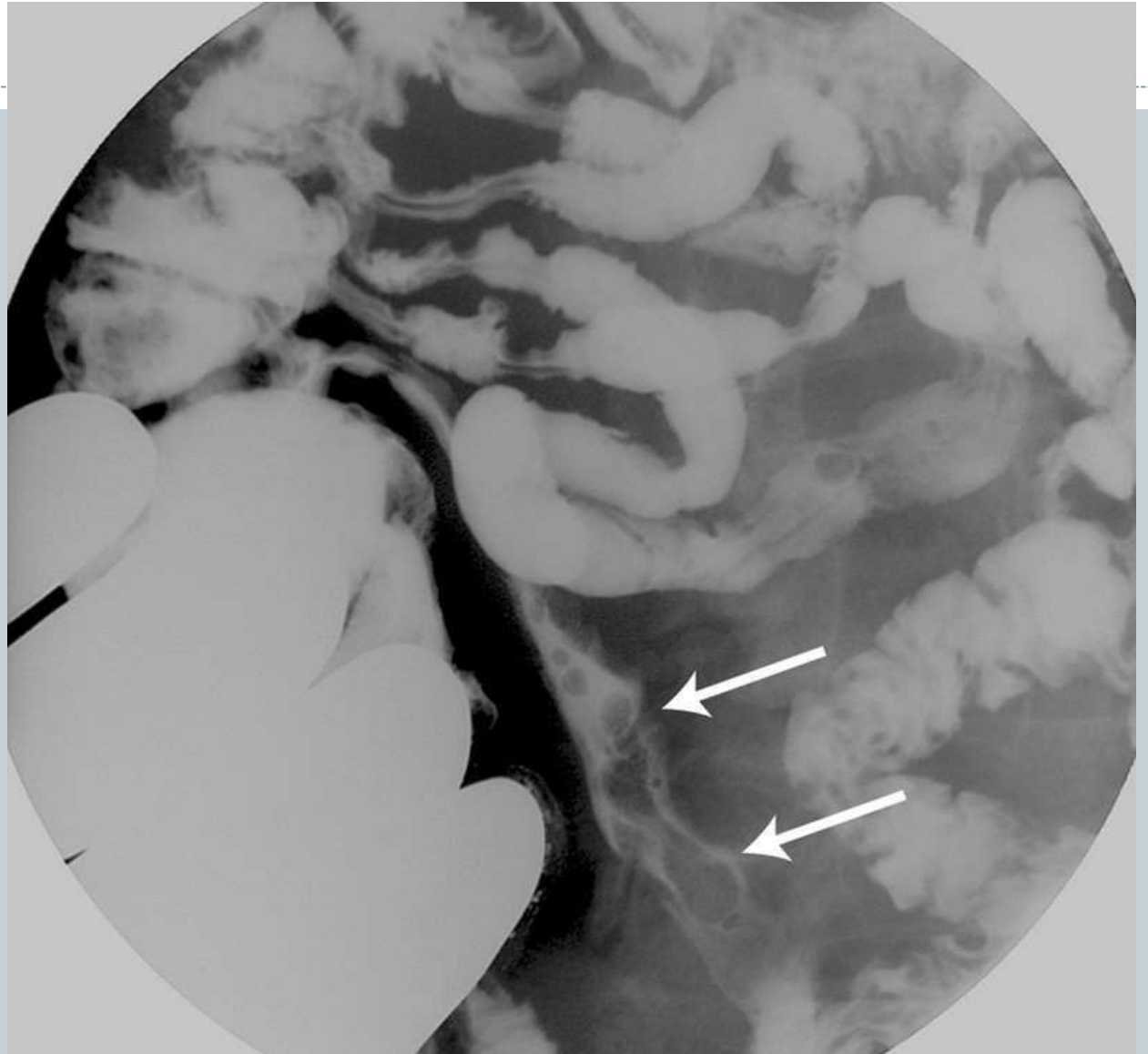
Meckel's diverticulum

A large out pouching
from antimesenteric
border of ileum



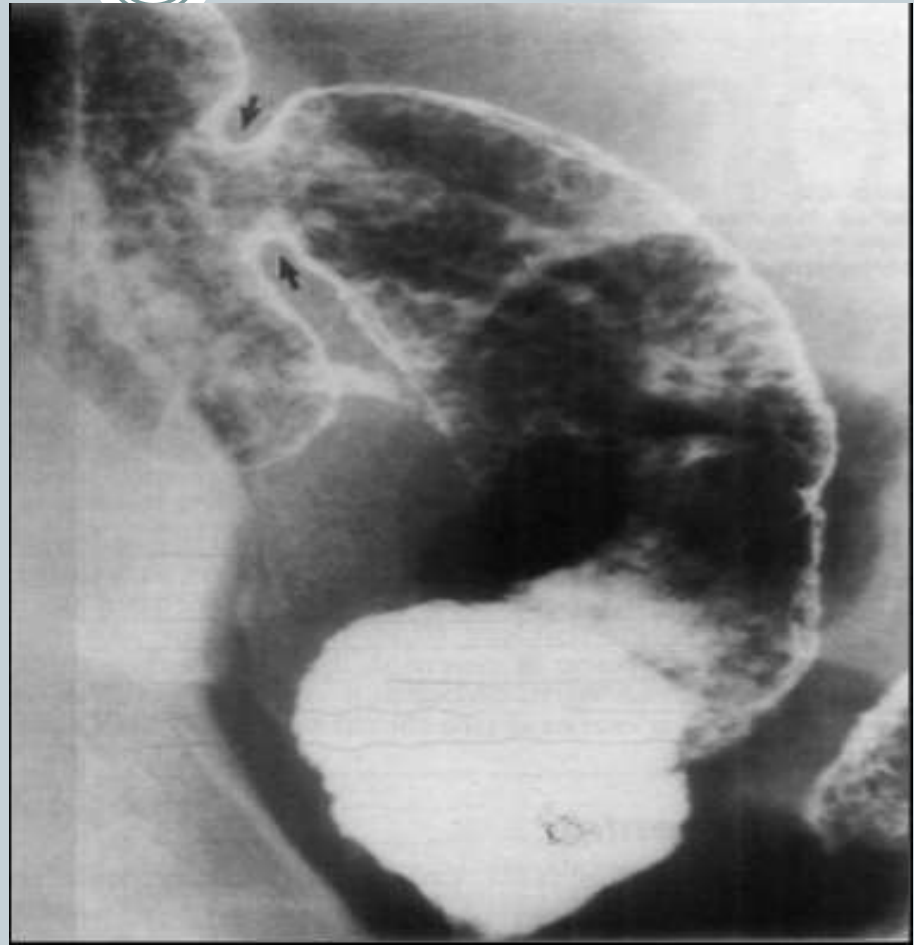
Crohn's Disease

- String Sign
- Cobble stone appearance



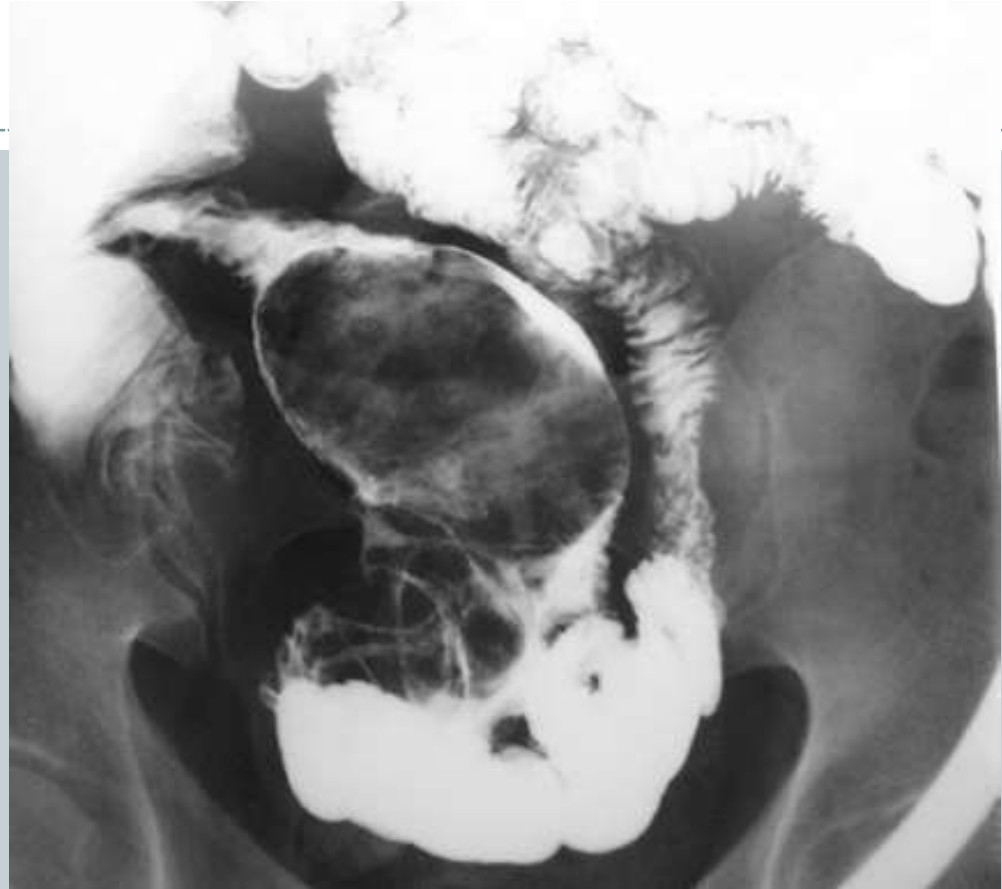
Crohn's Disease:

- Mucosal Granularity
- Stricture



Small Bowel Polyps:

A large filling
defect with in
the bowel wall



Small Bowel Tumors:

Irregular short segment
narrowing with mucosal
irregularity





BARIUM ENEMA

BARIUM ENEMA:



- A barium enema is a test used to help visualize the colon (large bowel).
- A barium enema is used to look for problems in the colon, such as polyps, inflammation (colitis), narrowing of the colon, tumors, diverticulitis.

Indications:



- benign tumors (such as polyps).
- Colorectal carcinoma
- ulcerative colitis (inflammatory bowel disease).
- Hirsch sprung disease in children.

Contraindications:

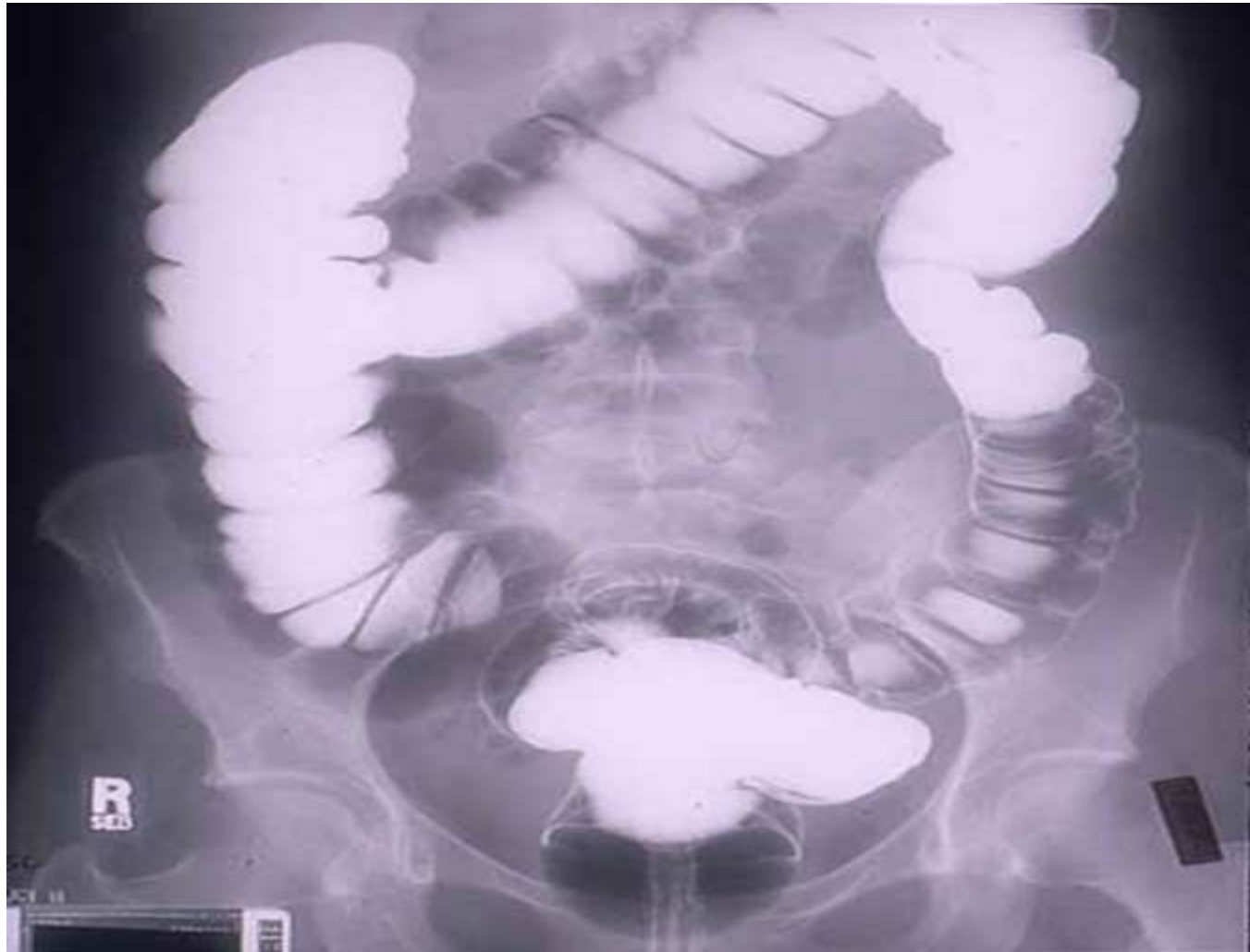


- Toxic Mega colon
- Pseudomembranous colitis
- Recent biopsy
- Recent barium meal

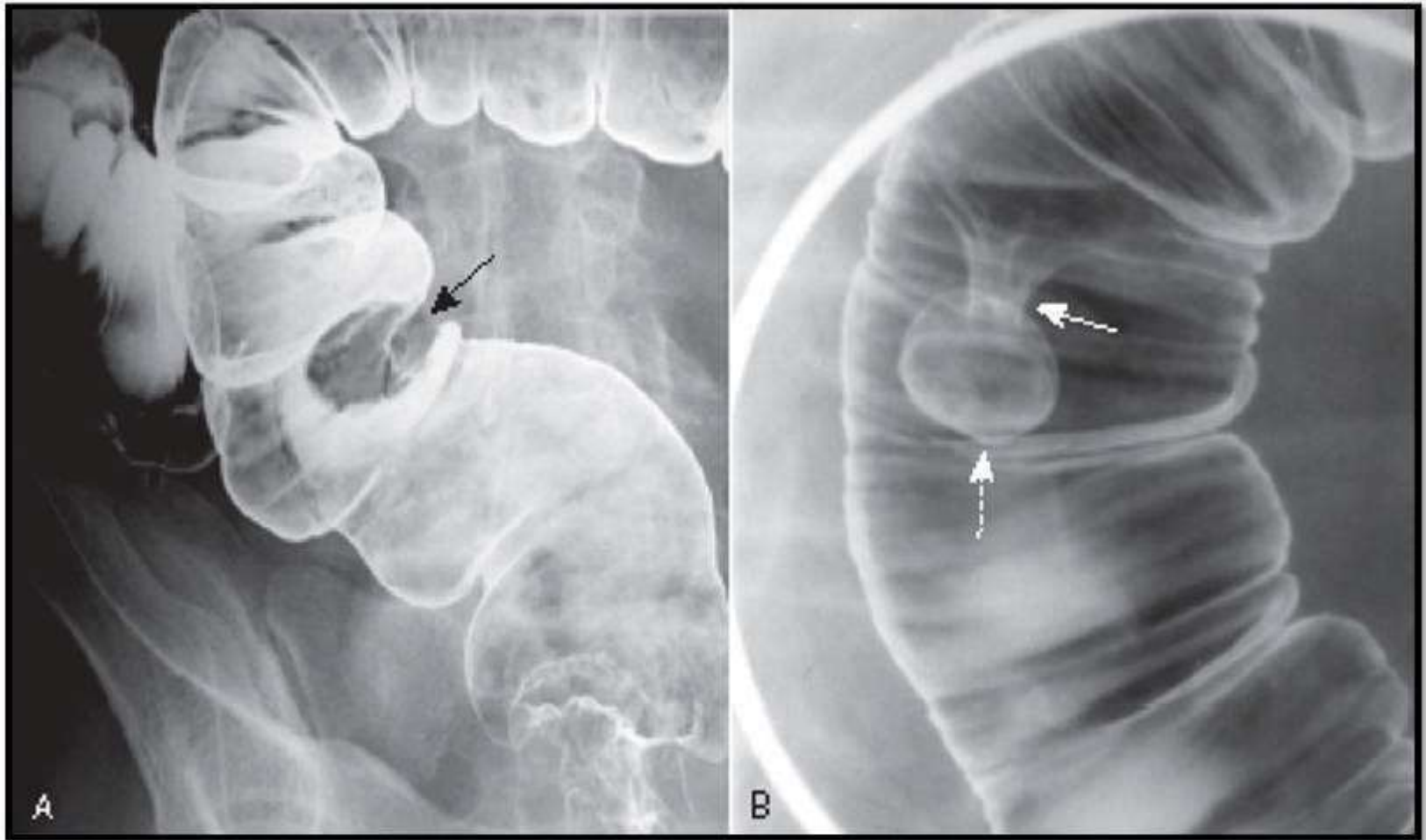
CONTRAST:



- 500 ml barium suspension used
- 1. SINGLE CONTRAST STUDY (20% W/V)
The colon is filled with barium, which outlines the intestine and reveals large abnormalities.
- 2. DOUBLE CONTRAST (100% W/V)
 - the colon is first filled with barium
 - then the barium is drained out, leaving only a thin layer of barium on the wall of the colon.
 - The colon is then filled with air. This provides a detailed view of the inner surface of the colon, making it easier to see narrowed areas (strictures), diverticula, or inflammation.



Large Bowel Polyps



Ulcerative Colitis:



- Lead pipe colon : tubular
ahaustral featureless colon



Colorectal CA:



- Apple Core Lesion



Hirschsprung's Disease:

- Abrupt transition zone at recto sigmoid junction; inversion of recto sigmoid index



Diverticular Diseases:

- Multiple small rounded out pouching from the bowel wall



Thank You!

