Radiology Team 429

Anatomy and imaging of GI tract

Radiology Team 429

In this team we used the outlines from the:

Doctor's slides

Lecture notes

427 Radiology team

Diagnostic Imaging –PETER ARMSTRONG – 6Th Edition

Sorry we don't hold responsibility for any missing information or perhaps – perhaps -wrong material.

We tried our best to present this lecture in the best way, and we hope what we wrote is enough to cover the subjects.

Team Leaders:

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Team Members:

Abdullah aleisa

Best Wishes :)

Objectives:

- Discuss imaging modalities utilized in the evaluation of the gastrointestinal tract.
- Discuss the indication, contraindication, preparation of
- various techniques utilized in the evaluation of thegastrointestinal tract.
- Discuss the radiological anatomic features related to gastrointestinal strcutures.

IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

PLAIN FILM

FLUROSCOPY

COMPUTED TOMOGRAPHY

MAGNETIC RESONANCE IMAGING

ULTRASOUND

ANGIOGRAPHY **ERCP & PTC**

It is dynamic type of study :

- *Barium swallow*
- *Barium meal*
- *Barium follow-through*
- *Small bowel enema*
- *Barium enema*

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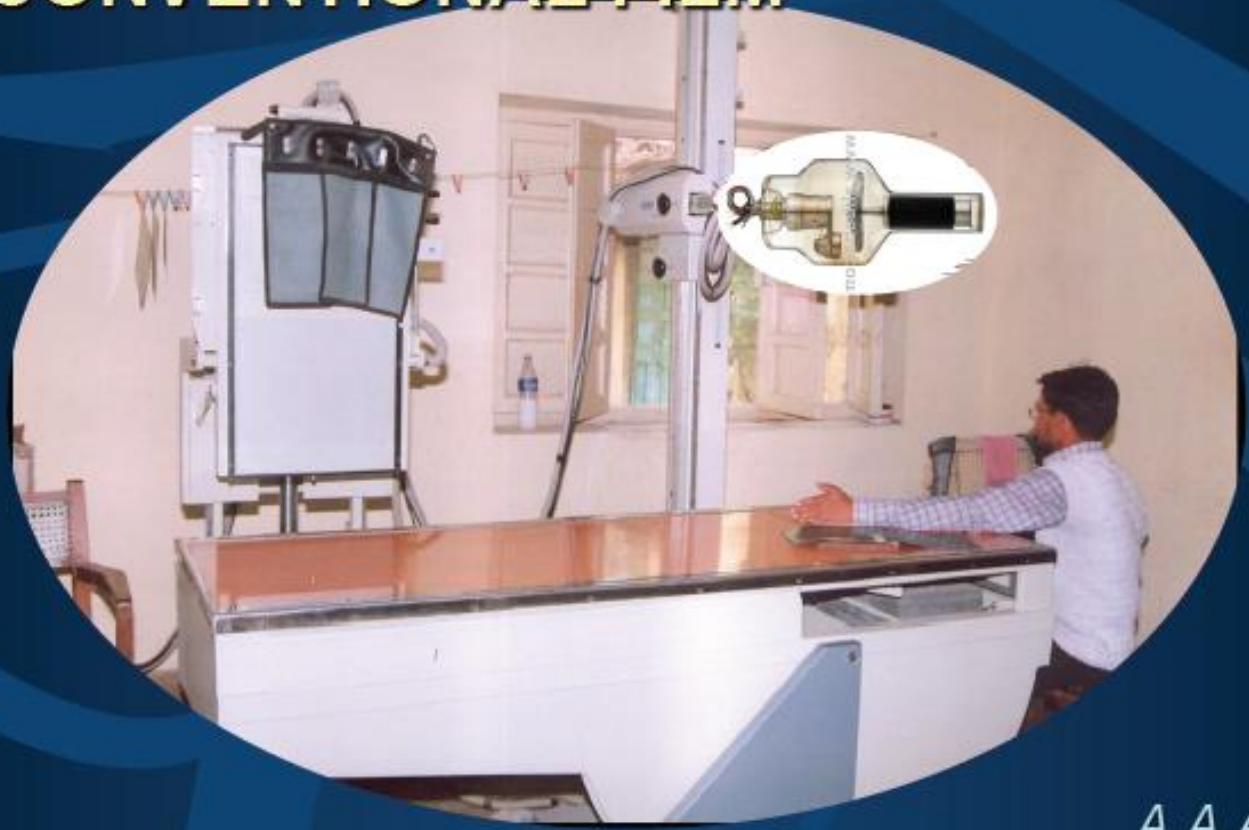
IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

PLAIN CONVENTIONAL FILM



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- The plain film is usually done supine, but sometimes is done while the patient is erect to check for air-fluid level that may indicate intestinal obstruction

- lateral decubitus is done when the patient can’t stand so we ask him to lay on his side , and take the image from front not from above

IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

PLAIN CONVENTIONAL FILM

- Normal

  - The routine projection is **supine film**; however erect film is taken in certain cases in particular patients with suspicious of intestinal obstruction to check for air-fluid levels.
  - Lateral decubitus film may be taken in very ill patients instead of erect one.

IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

PLAIN CONVENTIONAL FILM

- Normal
- Acute Abdomen
- Masses
- Inflammatory Processes

Intestinal Obstruction
Pneumoperitonium
Calculi /stones
Masses

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IMAGING MODALITIES

PLAIN FILM - NORMAL

Image key = shades

White ----- bone and calcification

Black ----- air

Grey ------ soft tissue

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IMAGING MODALITIES

PLAIN FILM - NORMAL

"What to look for?"

- ✓ Soft Tissues
- ✓ Stomach & Bowel gas distribution
- ✓ Bones & calcifications

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what to look for in GI imaging ?

- soft tissues (bladder maybe seen in pelvis if it was distended) some shadow may also be seen which indicate the uterus and also, you can outline the other soft tissues (psoas major muscle, liver, kidney & spleen)
- Stomach and bowel gas distribution.
- Dense bone and calcifications.

IMAGING MODALITIES

PLAIN FILM - NORMAL

Soft Tissue

- Liver
- Spleen
- Kidneys
- Urinary bladder (filled)
- Psoas muscles

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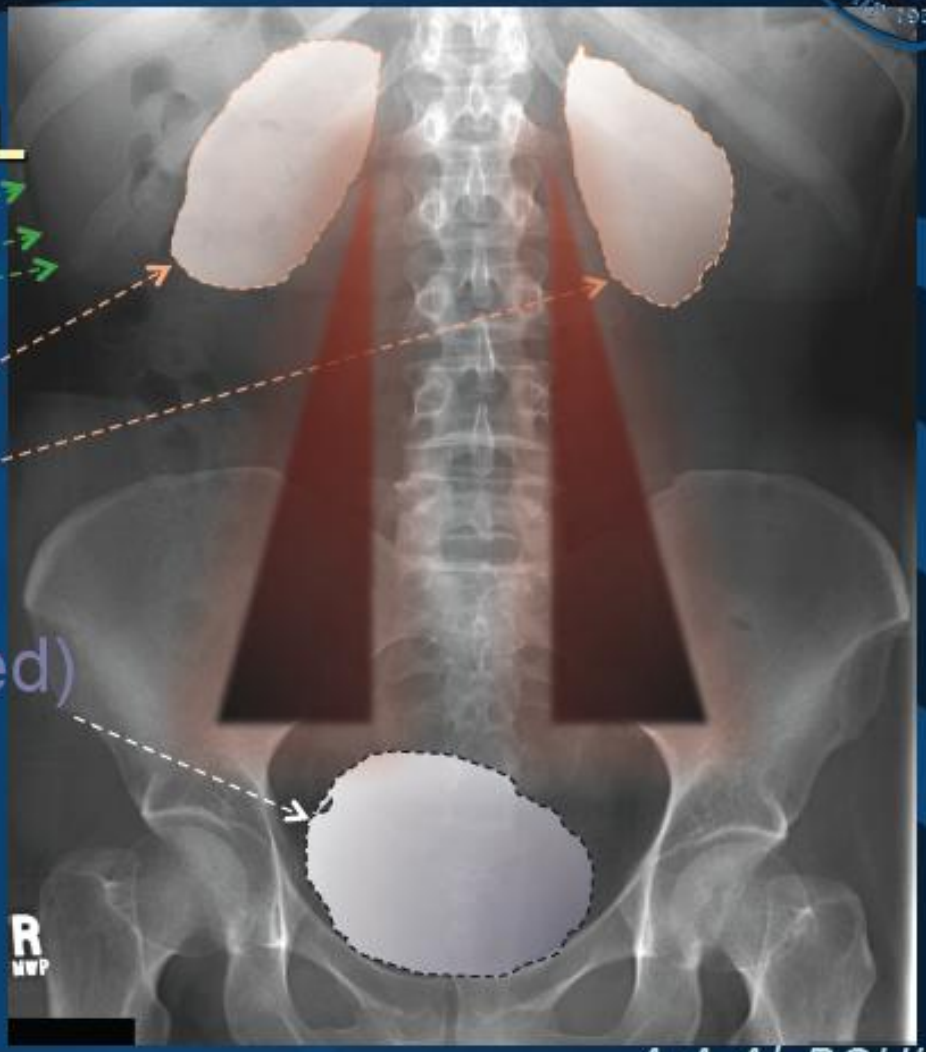
IMAGING MODALITIES

PLAIN FILM - NORMAL

- Liver
- Spleen
- Kidneys
- Urinary bladder (filled)
- Psoas muscles



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IMAGING MODALITIES

PLAIN FILM - NORMAL

Normal gas pattern

- Stomach, in the epigastric area
  Should be present unless "vomiting / NGT"
- 2-3 loops of non distended small bowel
  Less than 2.5 cm in diameter
- Always air in the rectum or sigmoid
  contain stool
- Small vs Large Bowel distribution

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IMAGING MODALITIES

PLAIN FILM - NORMAL

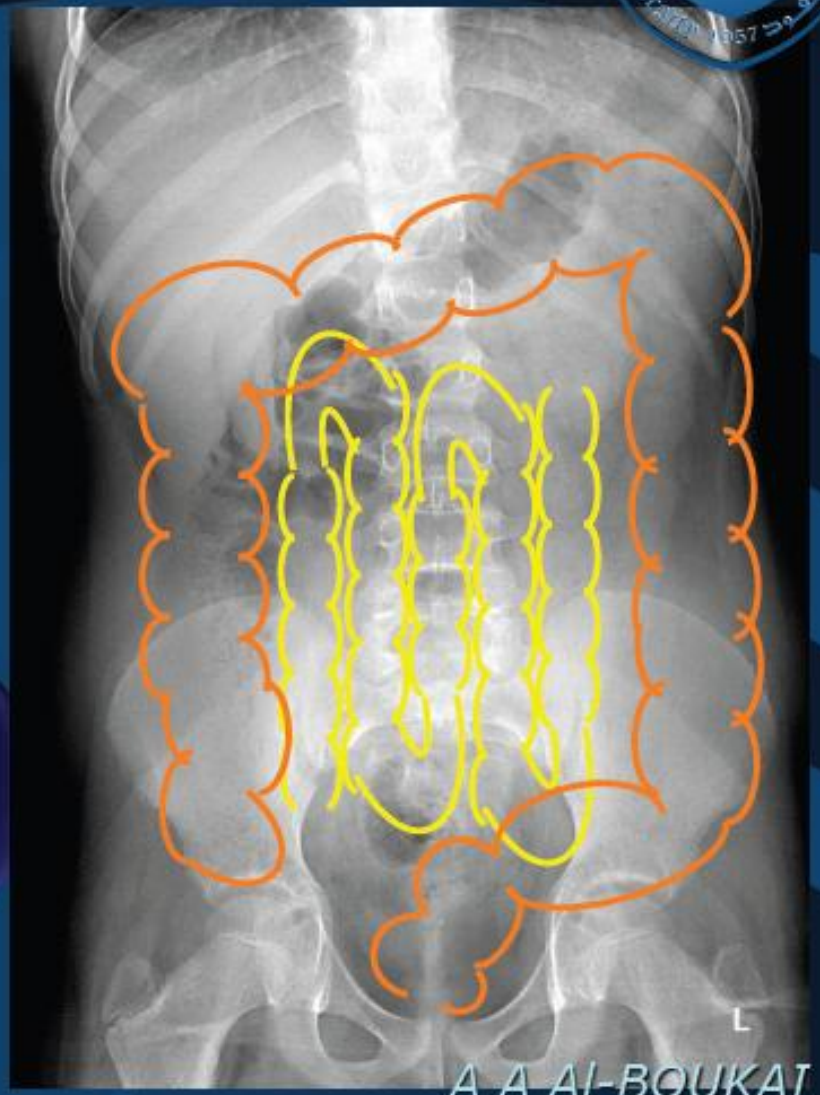
Normal gas pattern

Small bowel

- Central
- Valvulae markings extend across lumen
- Maximum dilated diameter is 3 cm

Large bowel

- Periphral
- Haustral markings
- Contain feces



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How to differentiate between large and small bowel?

IMAGING MODALITIES

PLAIN FILM - NORMAL

Bowel mucosal folds

Haustral pattern in large bowel

Valvulae conniventes in small bowel

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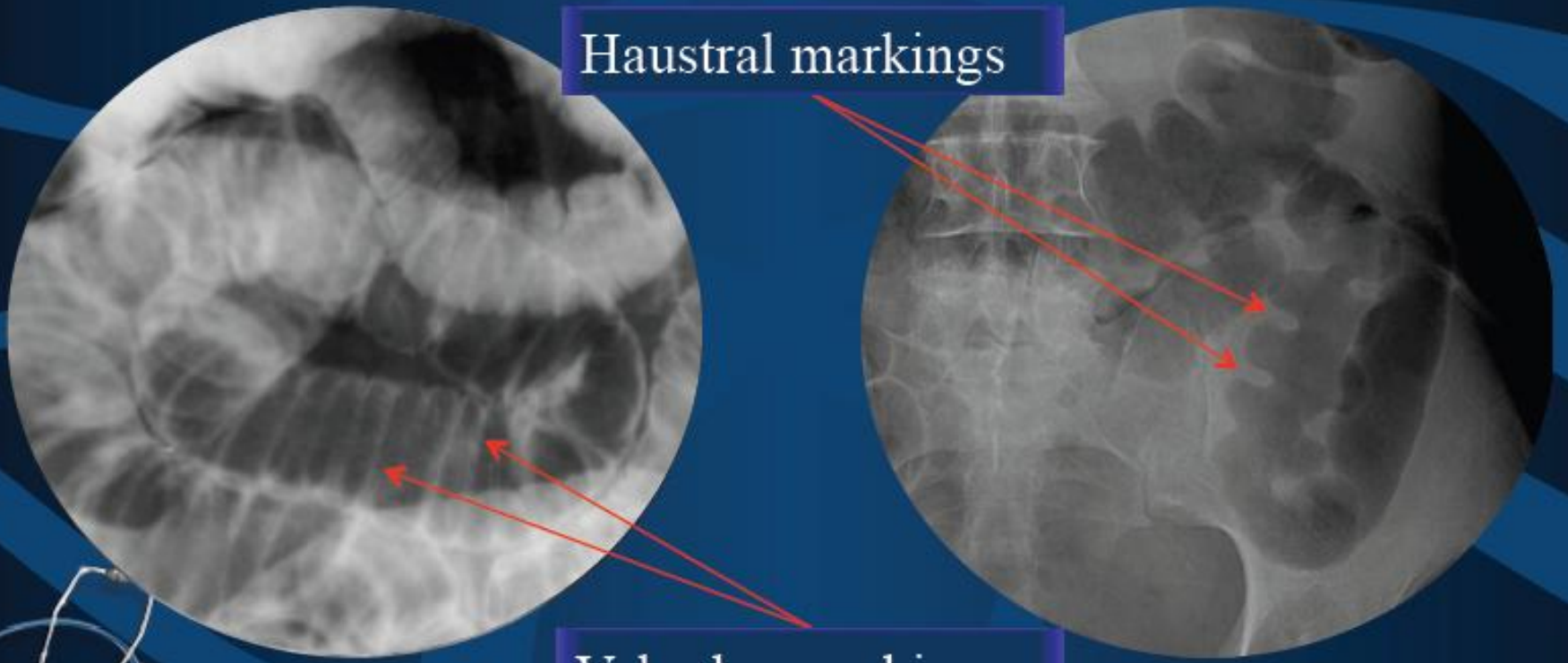
- Large bowel: located on the periphery when imaging , have haustration which is short and thick, only few millimeter in diameter
- Small bowel: Thin and extended in the whole diameter

IMAGING MODALITIES

PLAIN FILM - NORMAL

Bowel mucosal folds



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IMAGING MODALITIES

PLAIN FILM - NORMAL

Gas Bowel

IMAGING MODALITIES

PLAIN FILM – NORMAL / Bowel Preparation

Well Prepared

Not Prepared

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IMAGING MODALITIES

PLAIN FILM – ABNORMAL

IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

FLUROSCOPY – Dynamic Contrast Studies

Natural contrast in the body

- Air
- Fat

Added contrast in the body

- Barium sulfate
- Iodine (Water Soluble)

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IMAGING MODALITIES

Imaging modalities utilized in evaluation of Gastrointestinal Tract:

FLUROSCOPY – Dynamic Contrast Studies

- Barium sulfate
- Iodine (Water Soluble)

- Fluroscopy: we add contrast (Iodine& barium) which can be used as an IV because there is no powder to precipitate.

When to use Iodine (Water Soluble) ? MCQ !!!

- 1- perforation
- 2- bowel obstruction
- Vistula in the esophagus

IMAGING MODALITIES

FLUROSCOPY – Barium Swallow

Ba Swallow Indications:

- Dysphagia
- Pain
- Tracheo-esophageal Fistula
- Esophageal perforation
- Pre-operative assessment of bronchial Ca

- Barium swallow indications: dysphagia and pain. (In trachea-esophageal fistula & esophageal perforation we give **Iodine** to avoid barium powder to precipitate in the lungs.

IMAGING MODALITIES

FLUROSCOPY – Barium Meal

Indications:

- Dysphagia
- Weight Loss
- Upper Abdominal Mass
- Assessment of site of Perforation
- Pre-operative assessment of bronchial Ca

Contra-indications:

- Complete Large Bowel Obstruction

Patient Preparation:

- Nill orally for 6 hours perior to exam
- Stop Smoking

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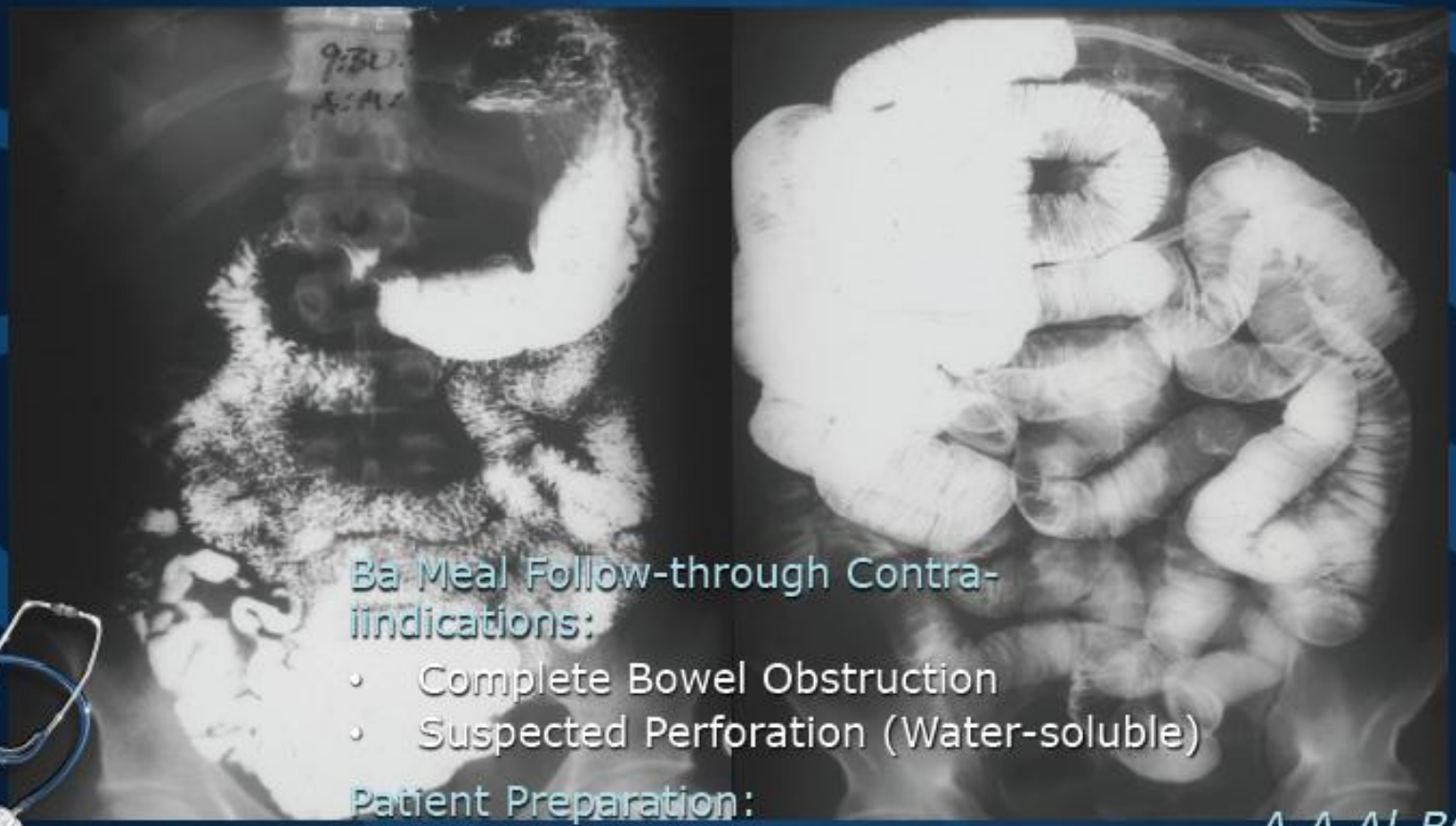
IMAGING MODALITIES

FLUROSCOPY

Barium Meal Follow-through

Small Bowel enema



Ba Meal Follow-through Contra-indications:

- Complete Bowel Obstruction
- Suspected Perforation (Water-soluble)

Patient Preparation:

- Laxative

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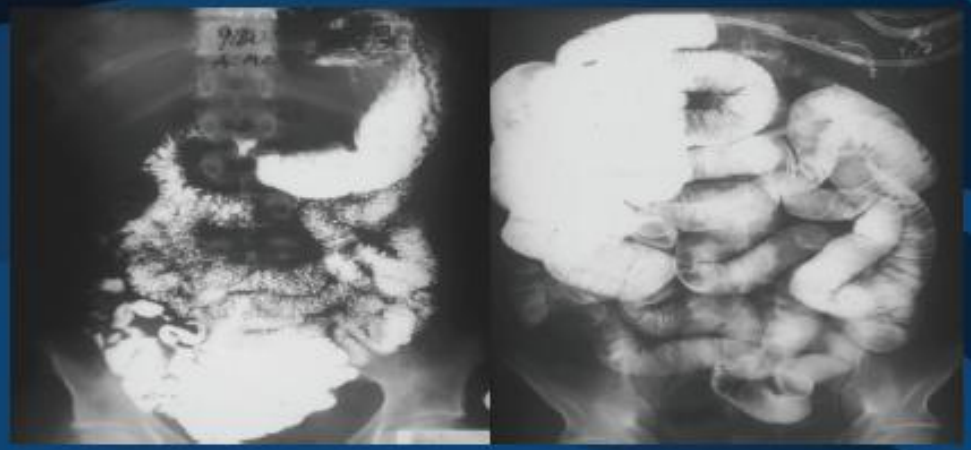
IMAGING MODALITIES

FLUROSCOPY



Ba Meal Follow-through Indications:

- Pain
- Diarrhea
- Bleeding
- Partial Obstruction

Ba Meal Follow-through Contra-iindications:

- Complete Bowel Obstruction
- Suspected Perforation (Water-soluble)

Patient Preparation:

- Laxative

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IMAGING MODALITIES

FLUROSCOPY – Barium Enema

Ba Enema Indications:

- Pain
- Change in bowel habit
- Bleeding / Melaena
- Obstruction

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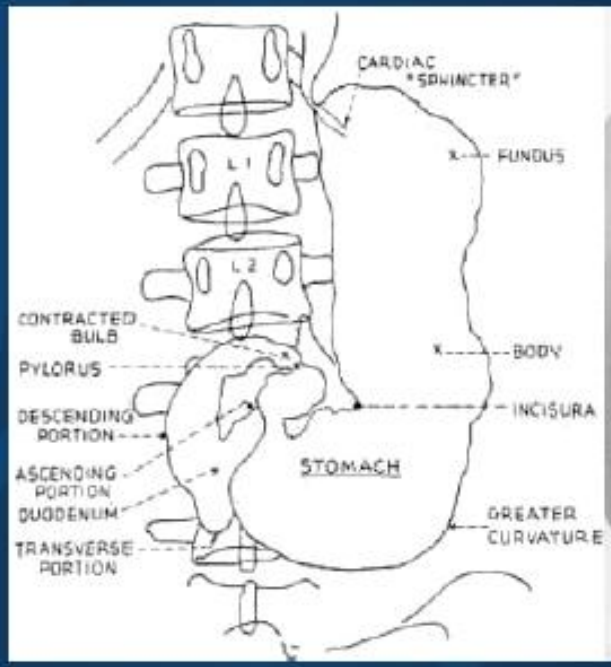
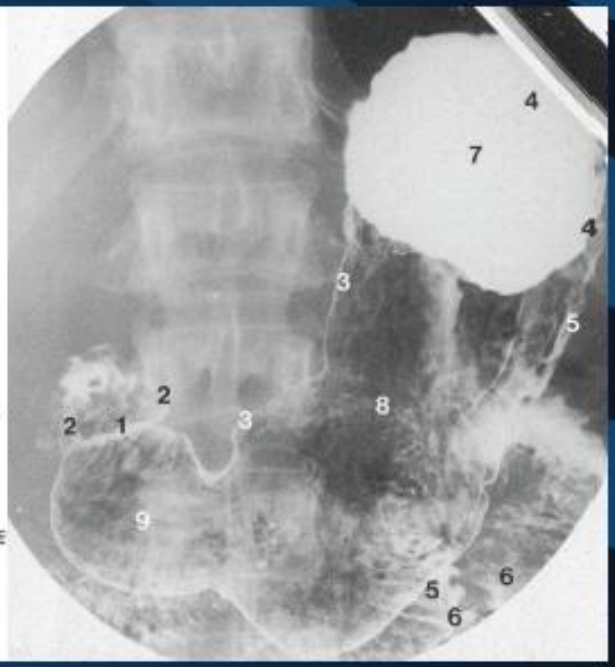
IMAGING MODALITIES

FLUROSCOPY – Dynamic Contrast Studies

Anatomy:
1- Pylorus
2- Duodenal cap "1st part ofduodenum"
3- Lesser curvature of stomach
4- Barium in the fundus of stomach
5- Greater curvature of stomach
6- Jujenal loops
7- Fundus of Stomach
8- Body of stomach
9- Antrum of stomach





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IMAGING MODALITIES

FLUROSCOPY

Anatomy:

1- Jujenal loops
2- Ileal loops
3- Duodenal loop
4- Stomach
5- Nasogastric tube

Barium Meal Follow-through

Small Bowel enema

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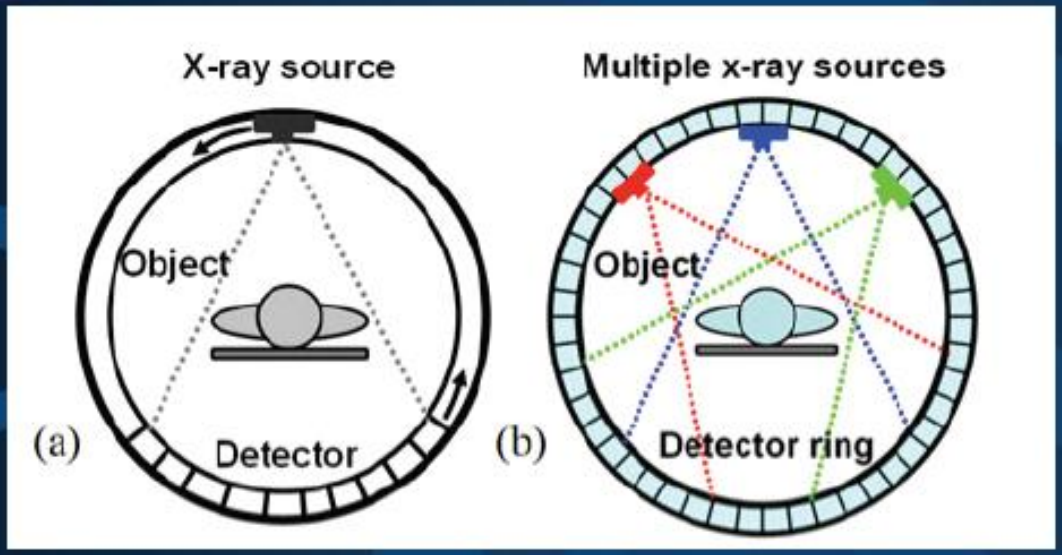
- In small bowel enema , enema is injected into the small bowel.
- In small bowel collapse → Feathery appearance

IMAGING MODALITIES

COMPUTED TOMOGRAPHY

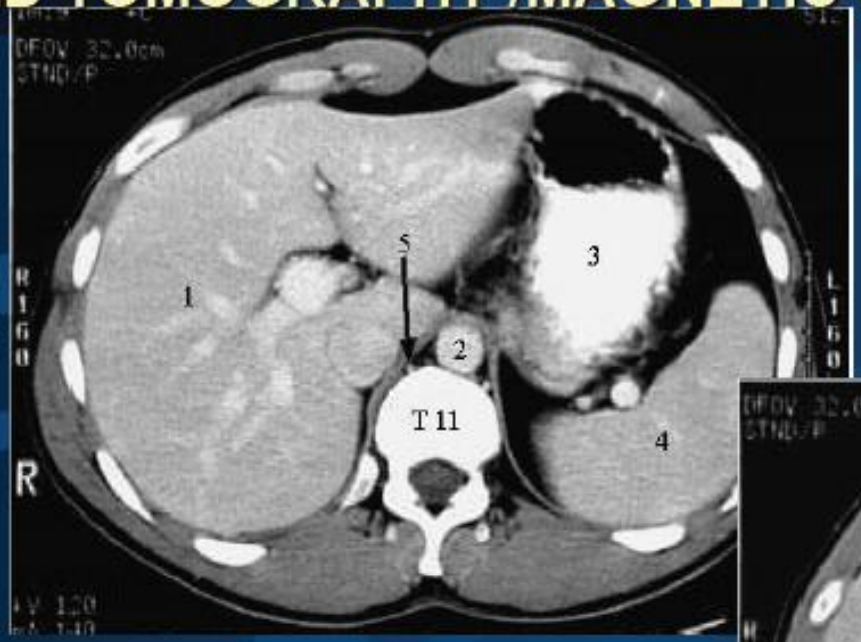


IMAGING MODALITIES

COMPUTED TOMOGRAPHY /MAGNETIC RESONANCE IMAGING

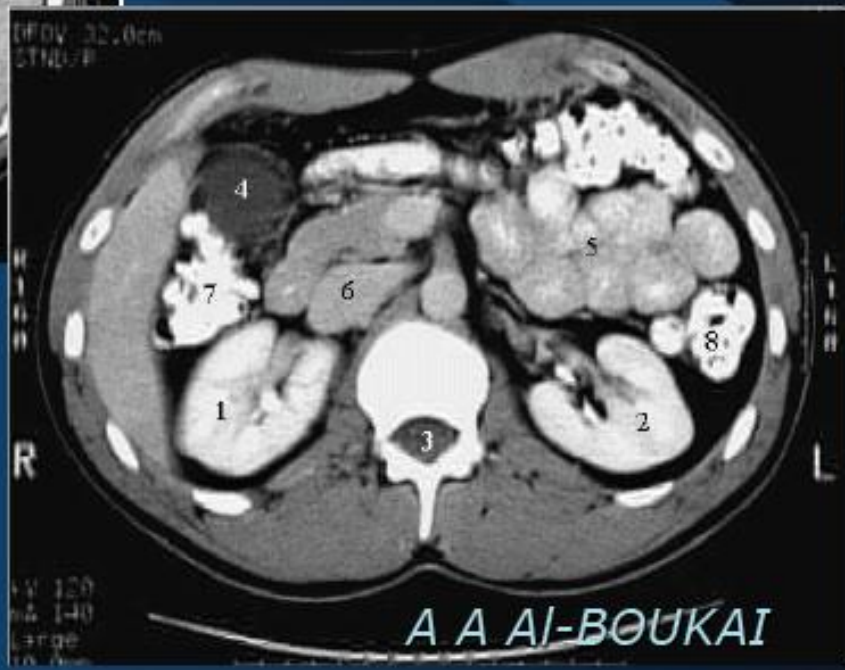
Anatomy:

1- Liver
2- Aorta
3- Stomach
4- Spleen



Anatomy:

1- Right Kidney
2- Left Kidney
3- Spinal Canal
4- Gall Bladder
5- Jujenal loops
6- IVC
7- Right Colon
8- Left Colon



IMAGING MODALITIES

COMPUTED TOMOGRAPHY

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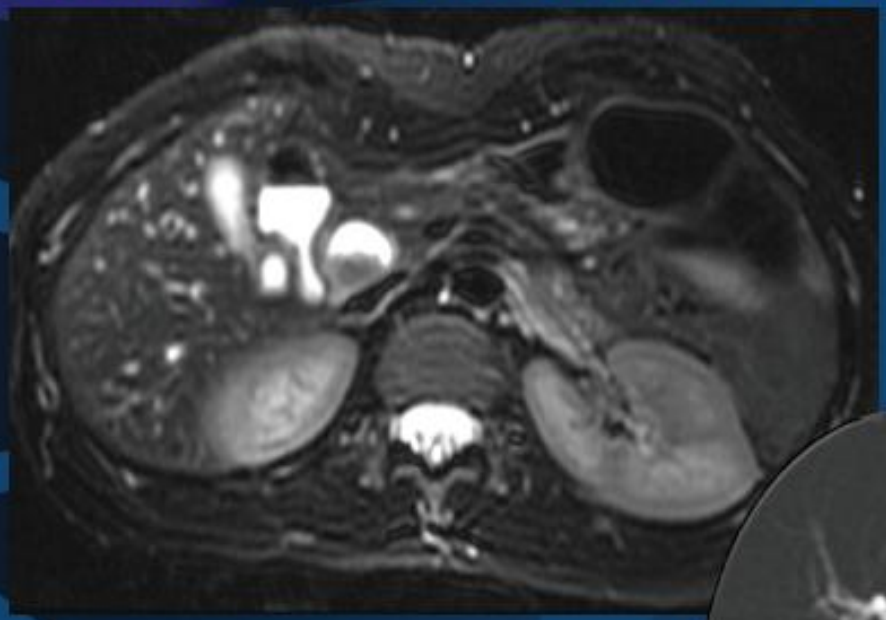
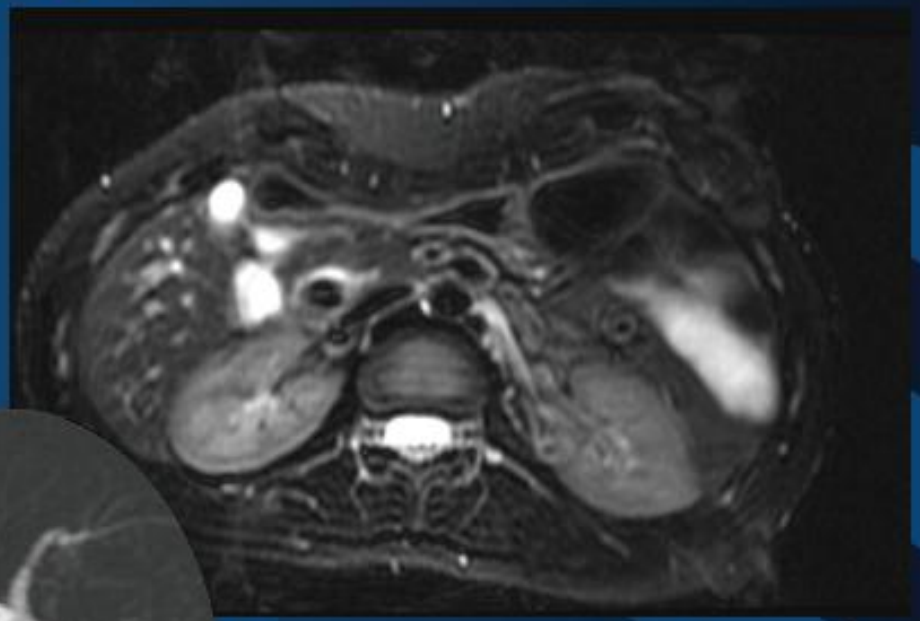
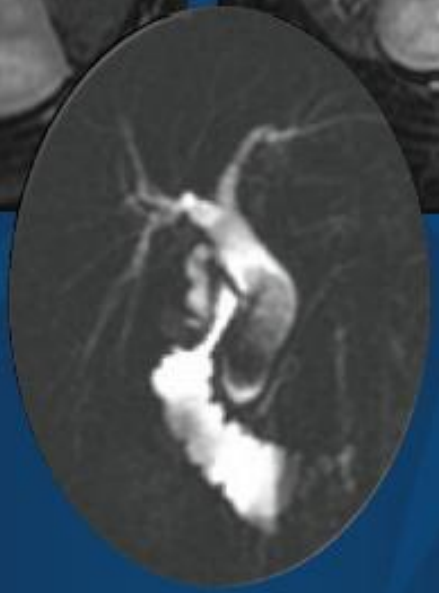
IMAGING MODALITIES

MAGNETIC RESONANCE IMAGING







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IMAGING MODALITIES

ULTRASOUND

Hepatic vein color doppler

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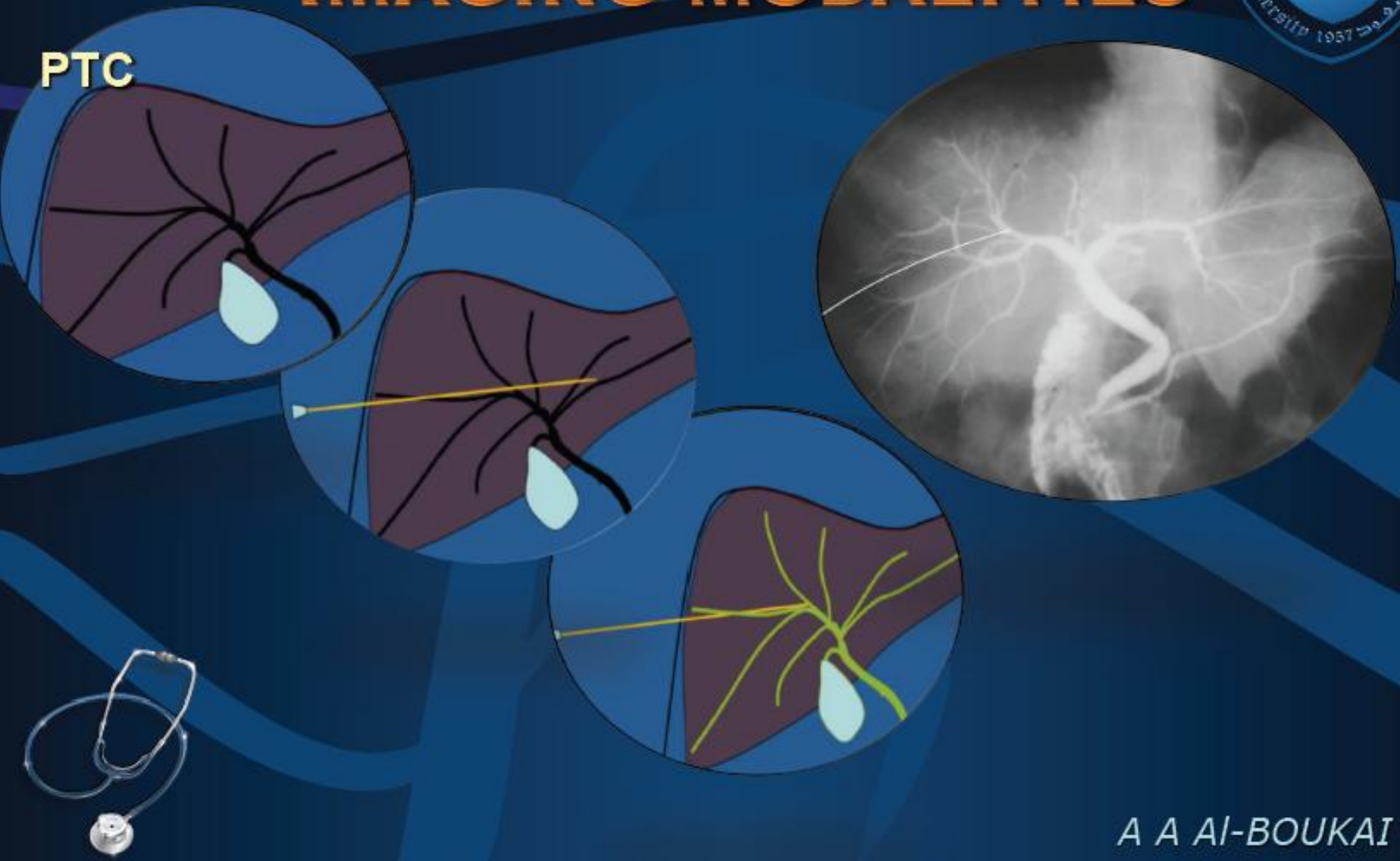
- In ultrasound the Doppler is used to outline the blood flow in the vessels.

IMAGING MODALITIES



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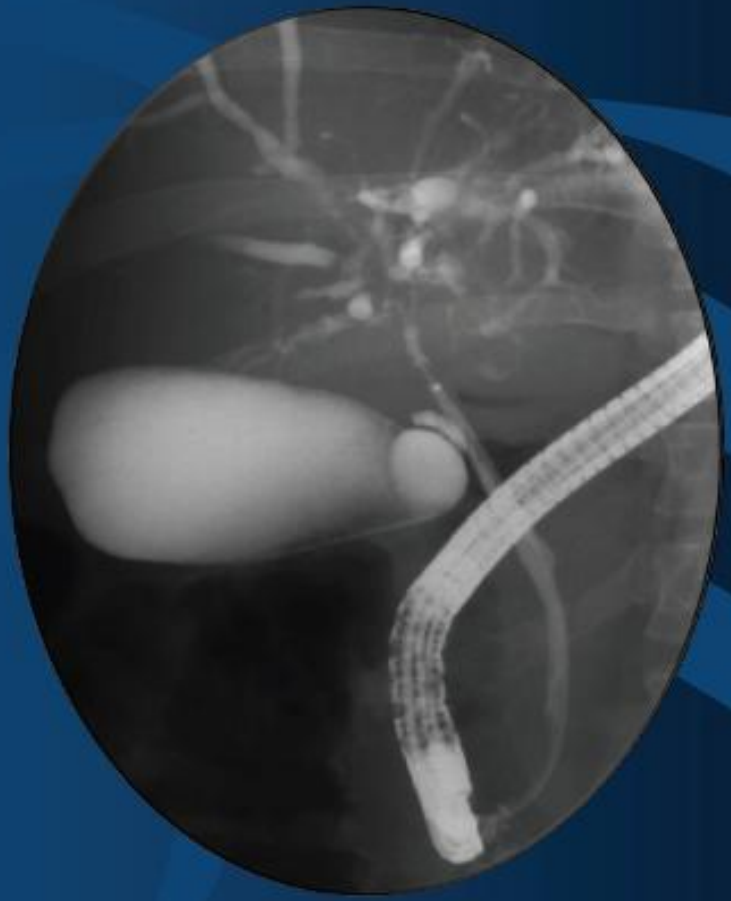
IMAGING MODALITIES

ERCP



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IMAGING MODALITIES

ERCP & PTC

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ERCP & PTC are used to evaluate the biliary system

- ERCP : contrast is injected through the ampulla of vater by endoscopy.
- PTC: contrast is injected in the liver and the a catheter is applied