

RADIOLOGY

GASTROINTESTINAL BLOCK

TEAM 438

Editing File

Color index:

Black: main text

Gray: Extra info

Pink: girls slides

Blue: boys slides

Red: important



RADIOLOGY OF THE ABDOMEN



Team leaders:



Nouran Arnous



Omar Aldosari

Team members:

Lina Alosaimi
Rawan Alzayed

Faisal Alqifari
Bassam Alkhuwaitir

Moh Al-Huqbani

إن الله يعطي أصعب المارك لأقوى الجنود فاستمر

Objectives

1. To know radiology modalities used in abdomen imaging mainly GI tract.
2. To know advantages and disadvantages of each modality.
3. To know indications and contraindications of each modality.
4. Overview on normal abdomen appearance and common pathologies including:
 - a. Pneumoperitoneum
 - b. Peptic ulcer
 - c. Bowel obstruction
 - d. Large bowel masses/malignancies
 - e. Inflammatory bowel disease

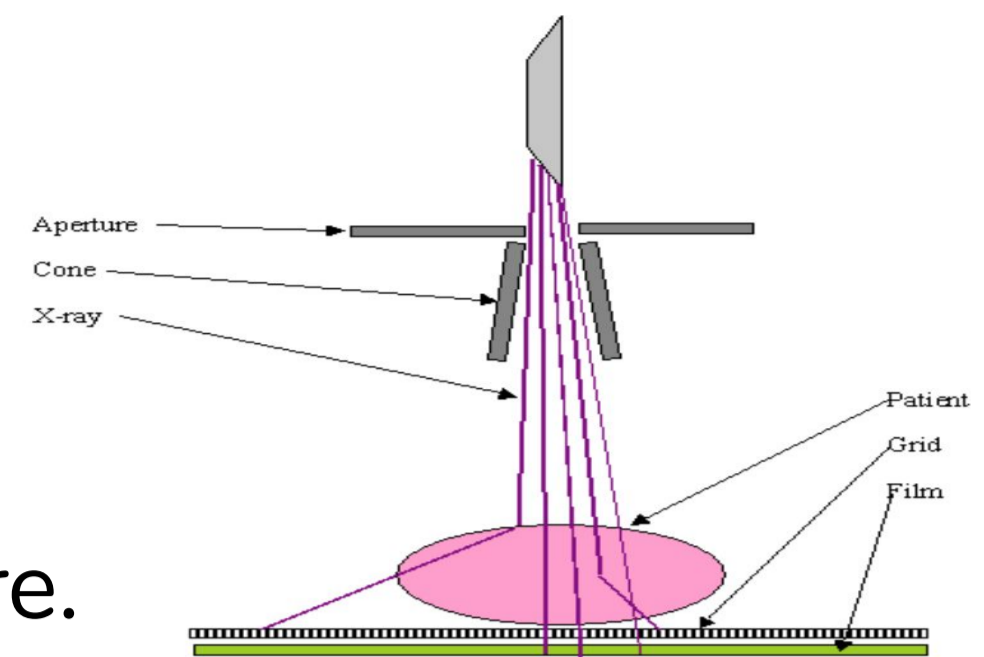
What radiological modalities are good in imaging the Abdomen mainly Stomach and Bowel loops:

CT scan MRI Fluoroscopy X-ray

Ultrasound for solids organs only (liver, spleen)

Abdominal X Ray

- ❖ X-ray is a form of radiation, that are focused into a beam
- ❖ X-ray can pass through most objects including the human body.
- ❖ When X-rays strike a piece of photographic film, they make a picture.



Advantages:

- Widely available
- Cheap
- Excellent in diagnosing **free air in the abdomen**
- Good in diagnosing **bowel obstruction**
- Good in diagnosing stones & calcifications

Disadvantages:

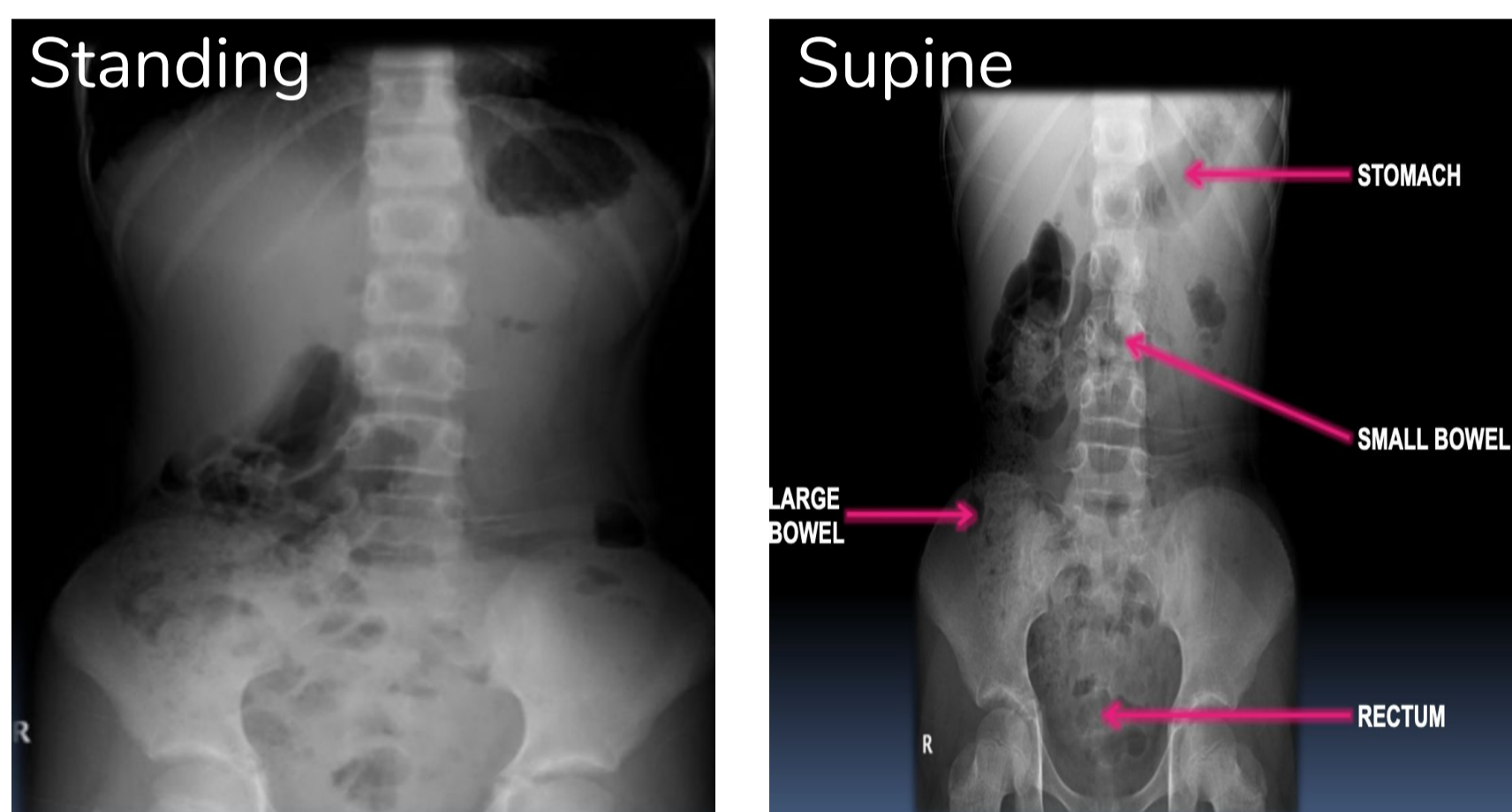
- Radiation
- Poor soft tissue details

Interpretation	
White	Bone and calcification
Grey	Soft tissue
Black	Air

Contraindications
Pregnancy

Indications	
Abdominal pain	foreign body
Bowel obstruction	Trauma
Stones	Masses
supportive lines	

Normal Abdominal X Ray

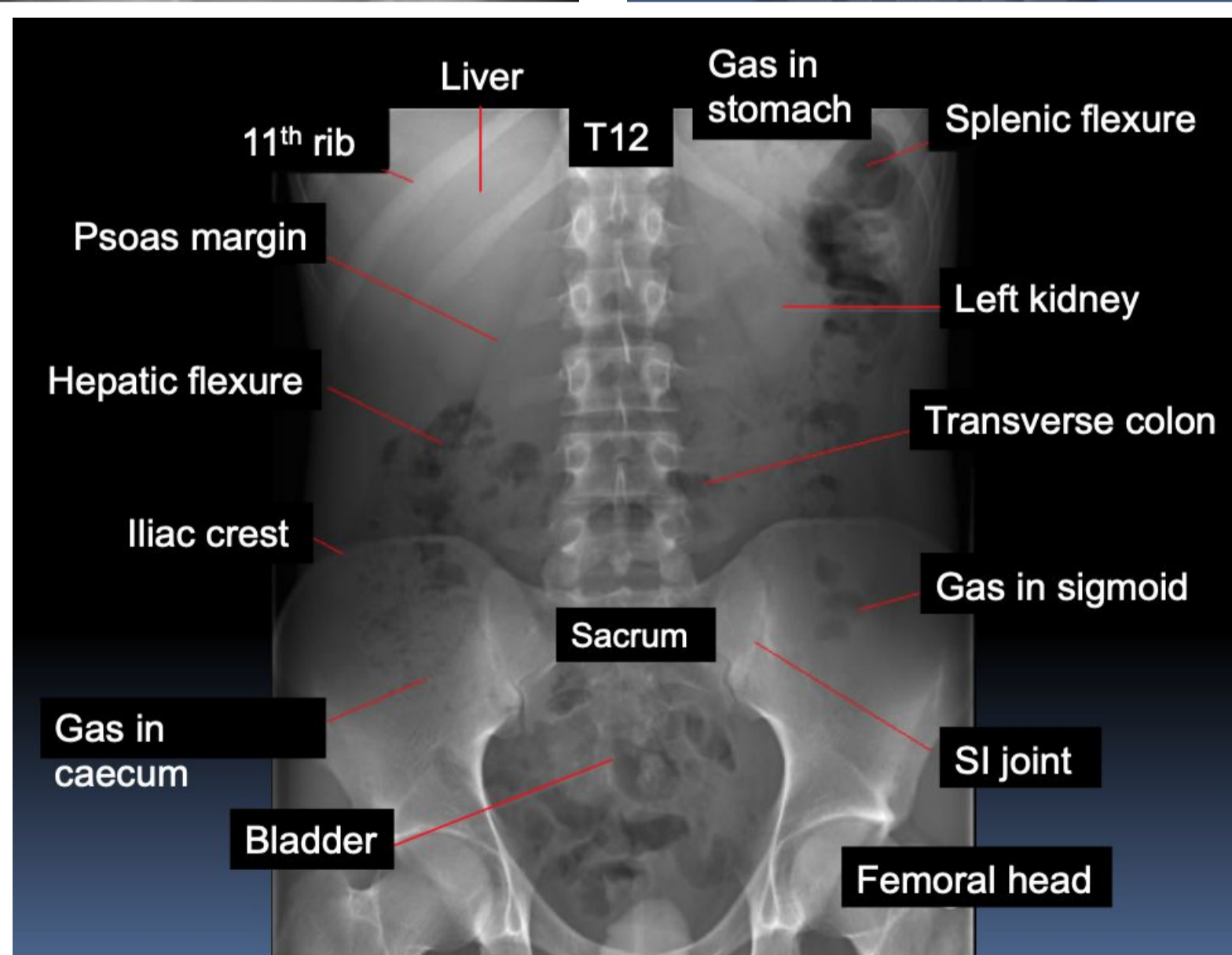


- What are the normal X-ray findings:
- Stomach:
 - Almost always air in stomach
 - Small bowel:
 - Usually small amount of air in 2 or 3 loops
 - Large bowel:
 - Almost always air in rectum and sigmoid
 - Varying amount of gas in rest of large bowel

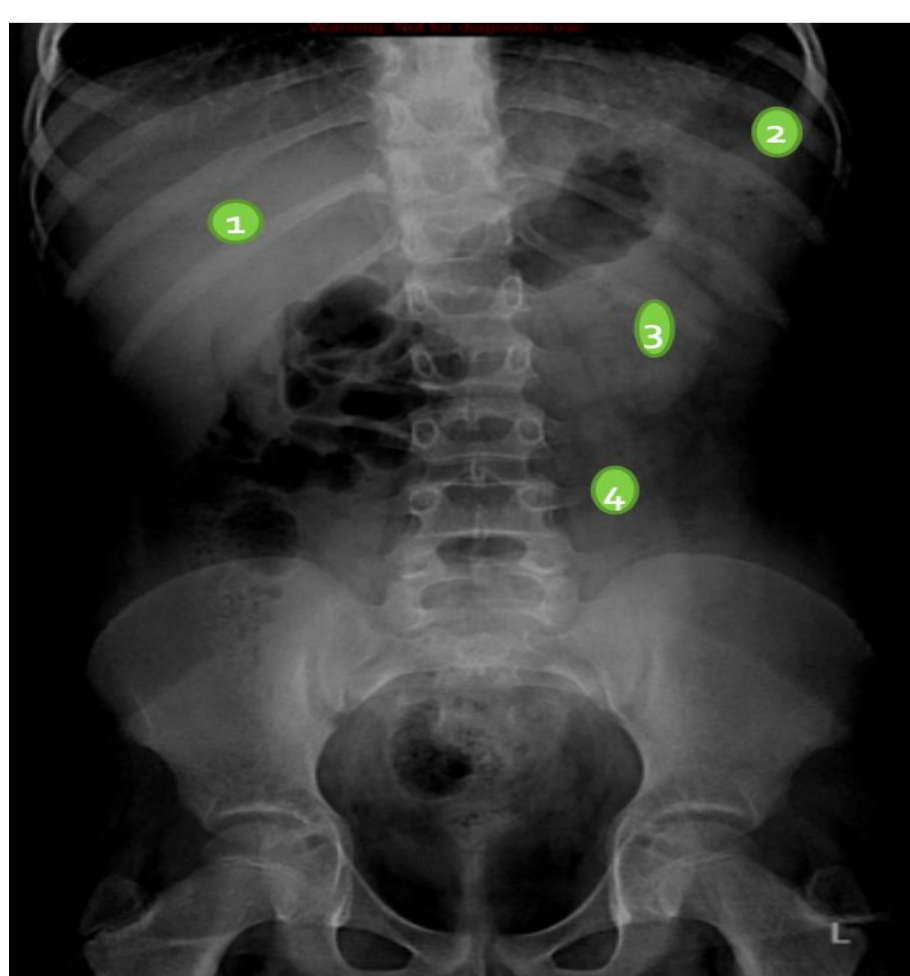
3,6,9 RULE

Maximum Normal Diameter of bowel

Small bowel	3cm
Large bowel	6cm
Caecum	9cm

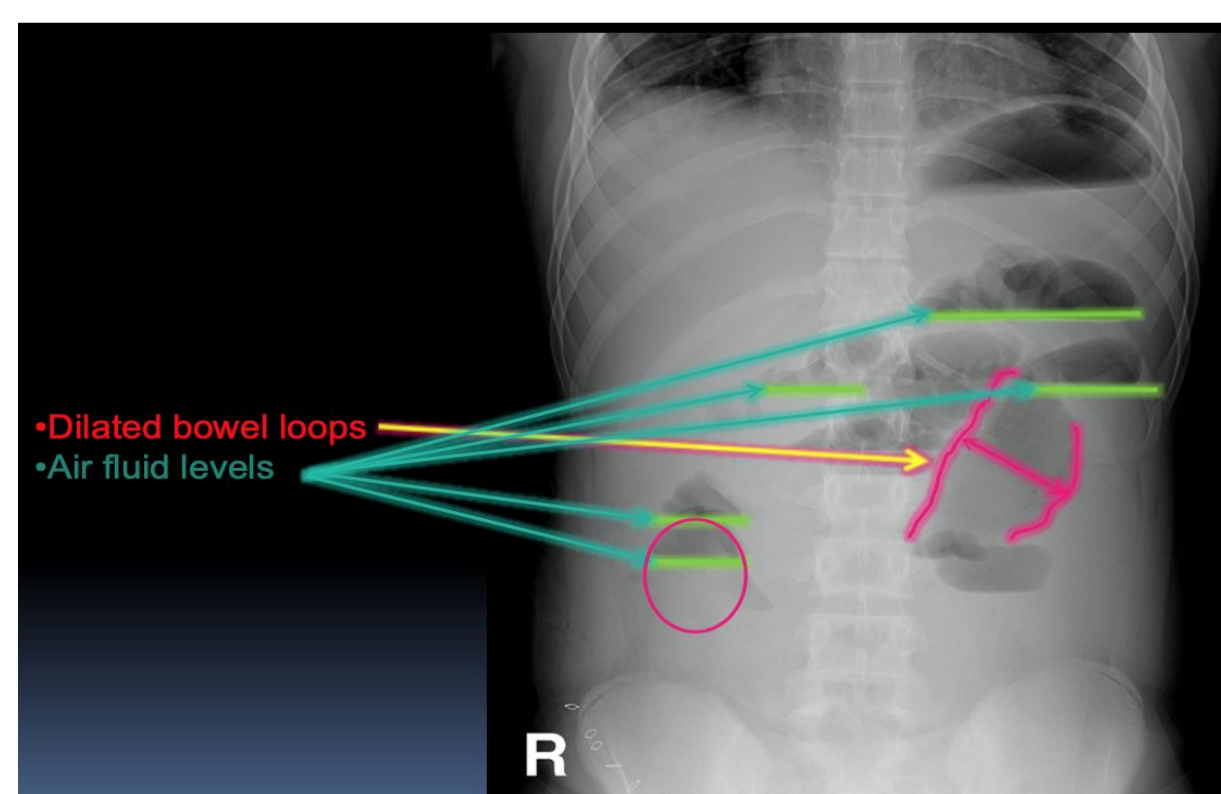


Soft Tissue



- Liver
- Spleen
- Kidneys
- Psoas muscles

Abnormal Abdominal X Ray



Dilated bowel loops

Air fluid levels

Air outside the bowel loops

1) Bowel Obstruction 2) pneumoperitoneum

Fluoroscopy (X Ray + contrast)

Advantages:

- Available
- Relatively Cheap
- Excellent in evaluation the **bowel lumen and mucosa**

Disadvantages:

- Radiation
- Poor in evaluating extra luminal pathologies

Types	
Barium swallow	Esophagus
Barium meal	Stomach
Barium follow through	Small bowel
Barium enema	Large bowel

Contraindications of barium

Pregnancy
Bowel obstruction
Bowel perforation (with barium type of contrast)

Indications

Assessing the mucosal outline	Abdominal pain
Gastroesophageal reflux	Masses
Inflammatory bowel diseases	Post surgical, leak

BARIUM SWALLOW



BARIUM MEAL



BARIUM FOLLOW THROUGH

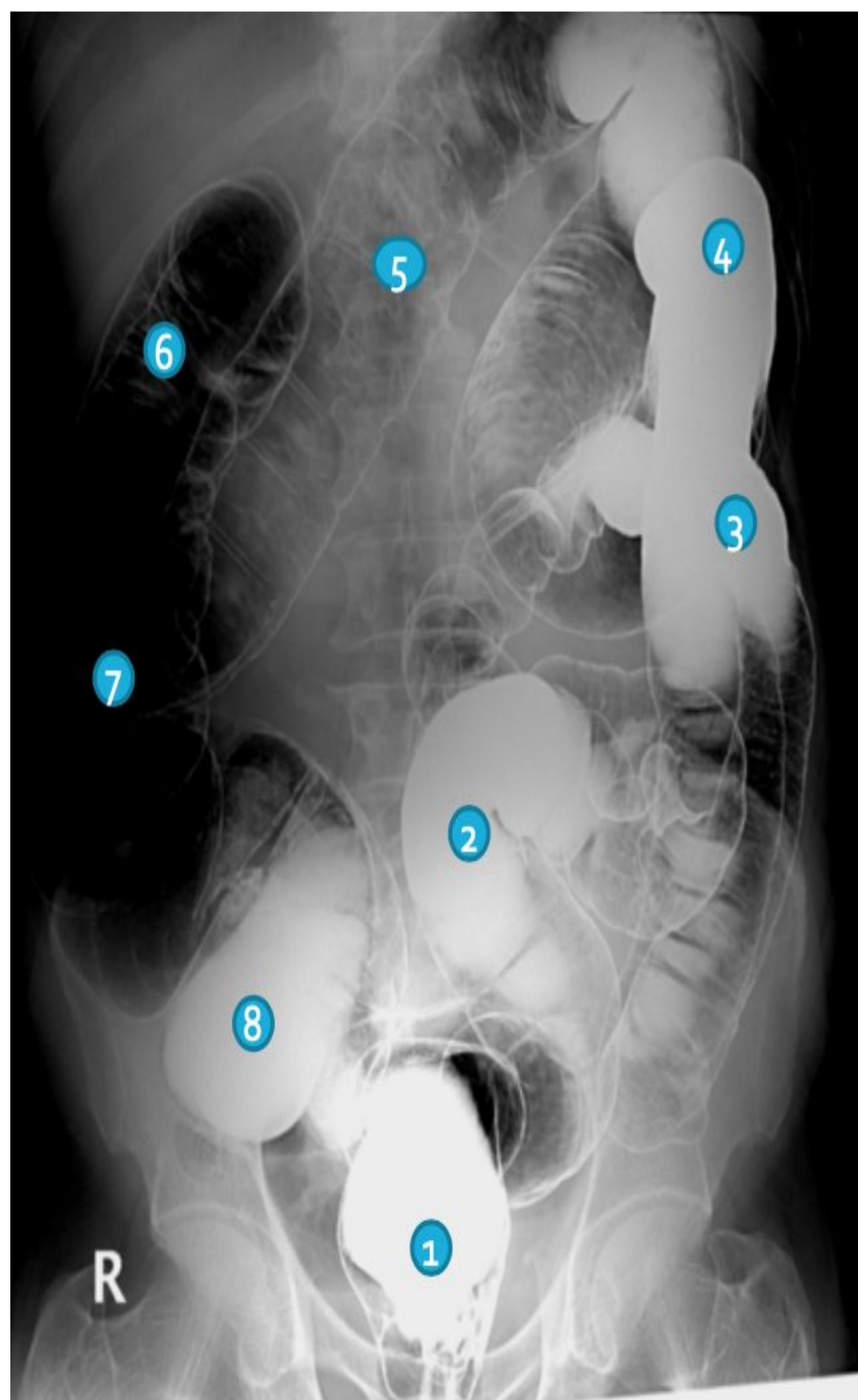


BARIUM ENEMA



BARIUM ENEMA

“rectum is really clear”



- 1 Rectum
- 2 Sigmoid colon
- 3 Descending colon
- 4 Splenic flexure
- 5 Transverse colon
- 6 Hepatic flexure
- 7 Ascending colon
- 8 Cecum

Abnormality



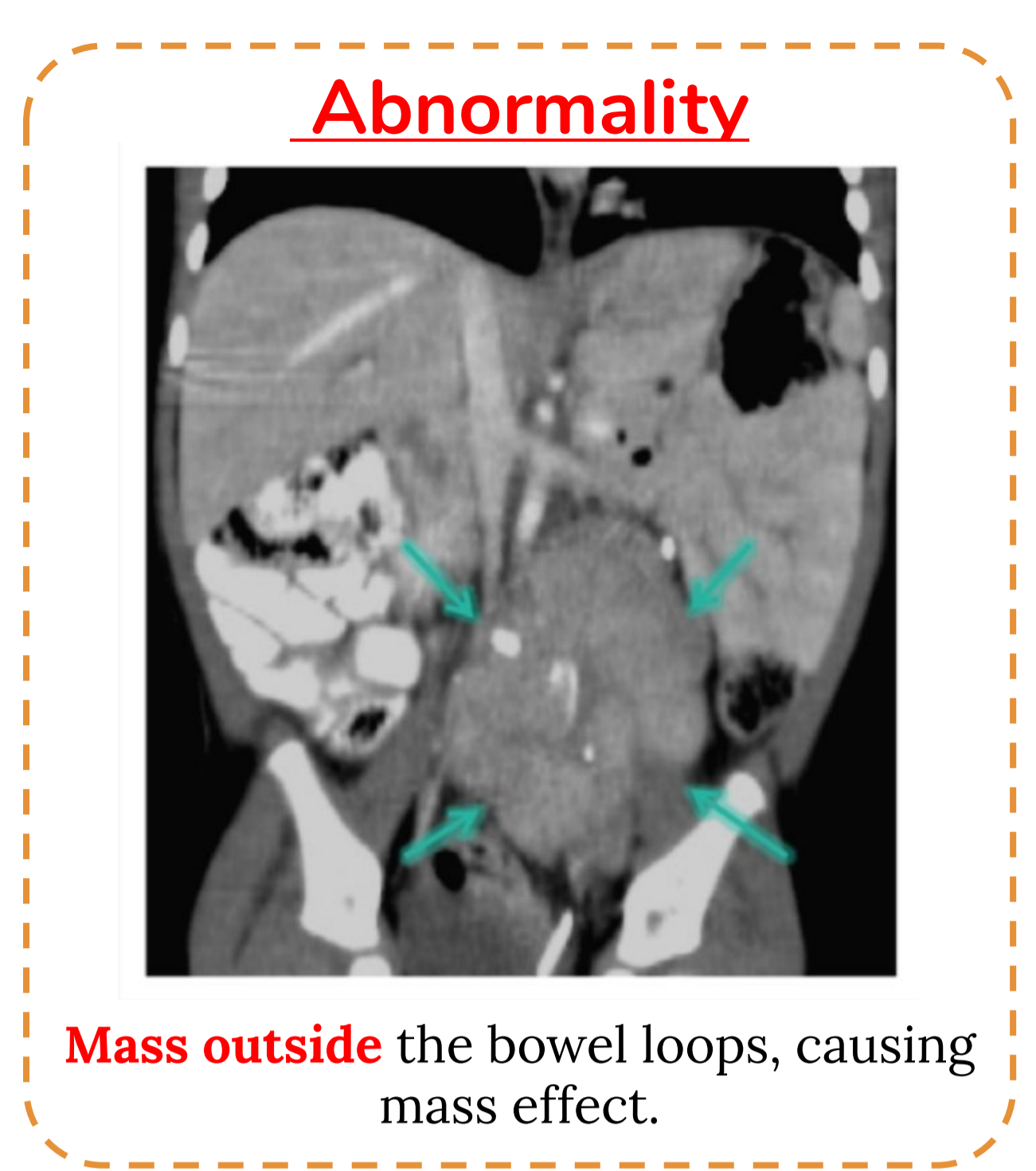
Peptic ulcer disease



Colon mass/malignancy
(Apple core appearance)

CT scan

- ❑ 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 intravenous contrast (renal disease)
 - Relatively expensive



Contraindications
Pregnancy
No IV contrast in renal failure
Unstable patients (severe trauma/ICU)

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

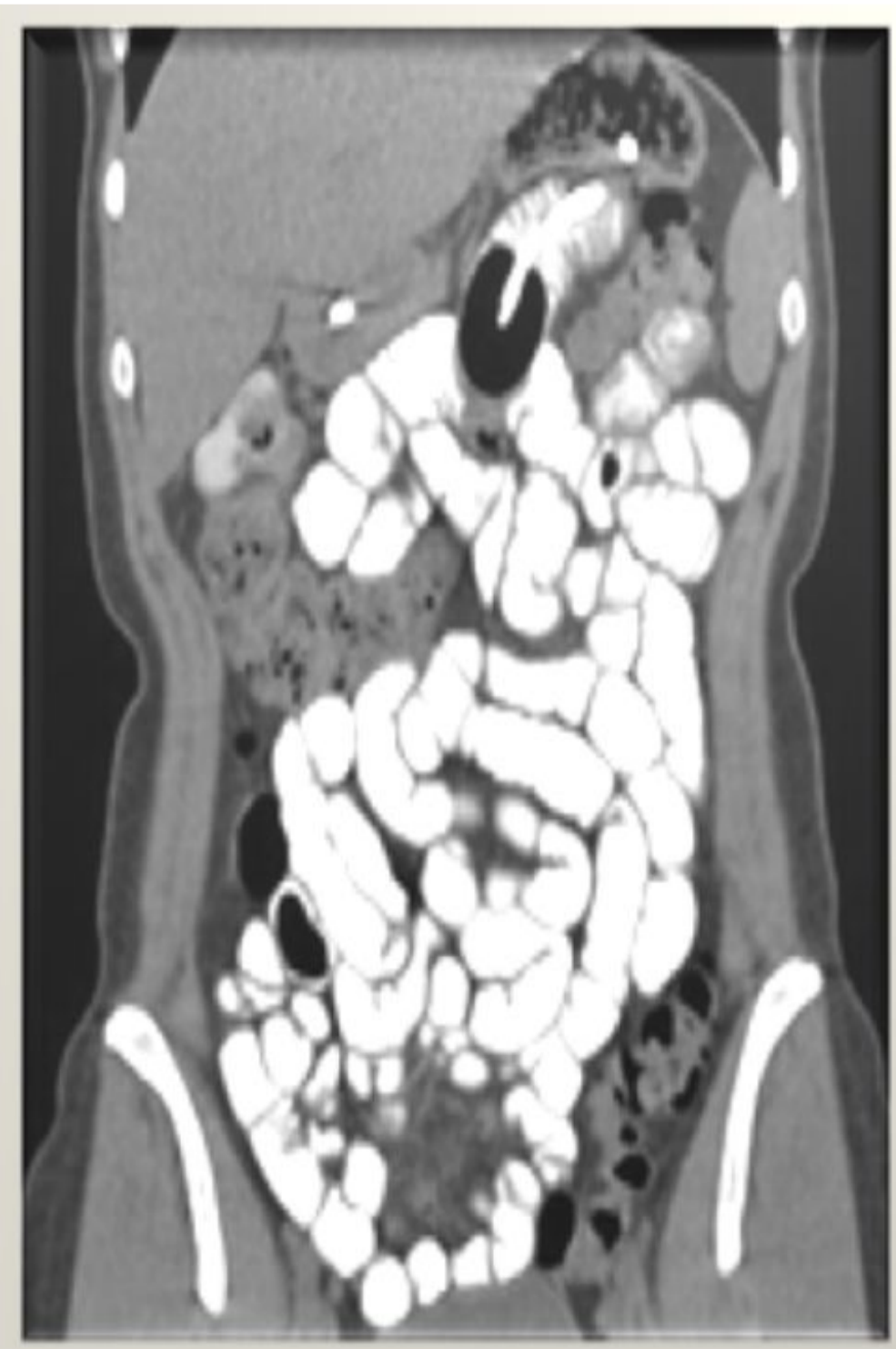
MRI

- ❑ Advantages:
 - Relatively safe in pregnancy (no radiation)
 - Give much more soft tissue details.
 - Excellent in diagnosing **abdominal solid organ lesion**: liver, spleen, kidneys.
 - **But best modality to examine solid structures in the abdomen is Ultrasound**
- ❑ Disadvantages:
 - Expensive
 - Long scanning time
 - Sensitive to motion

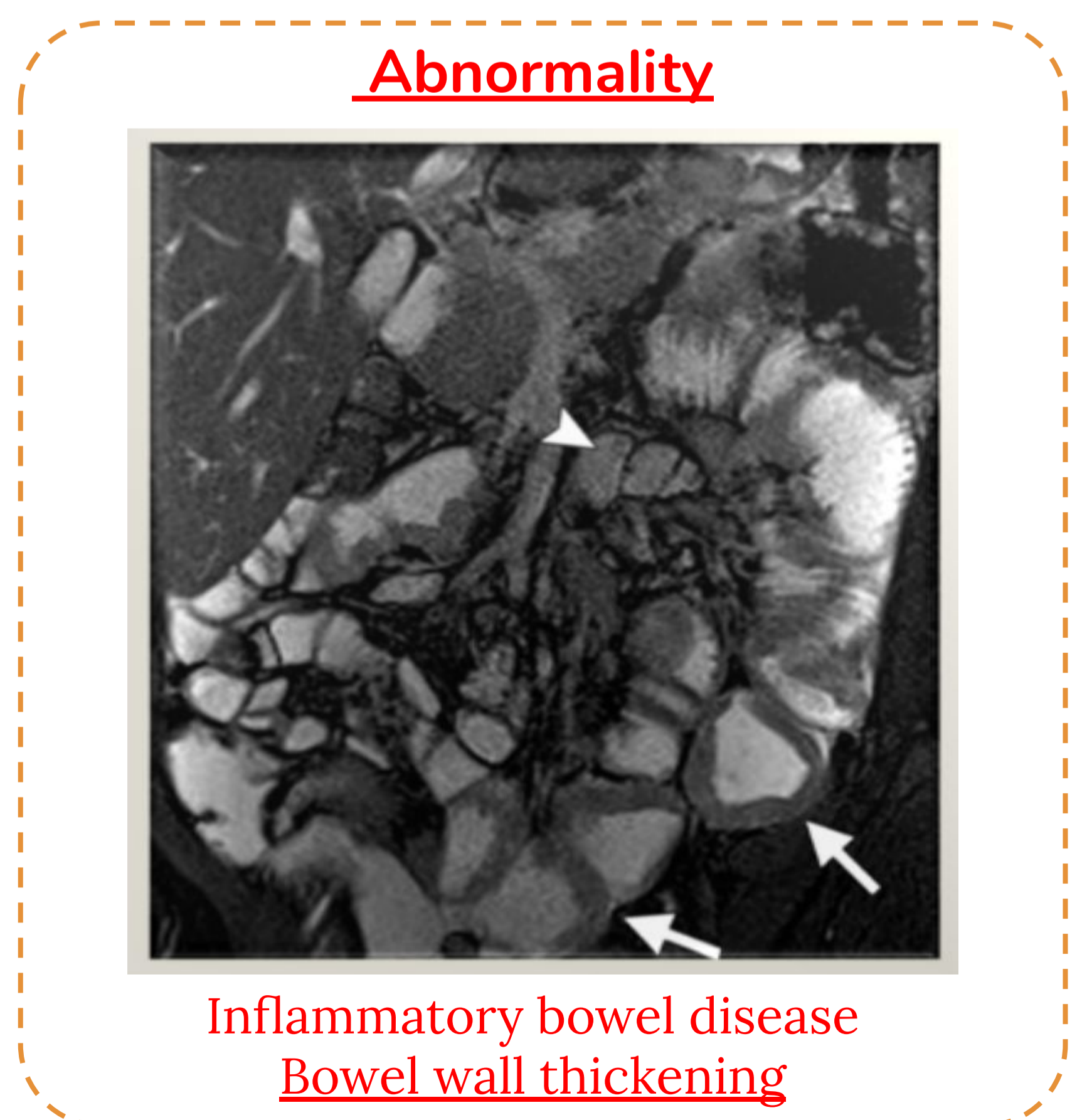
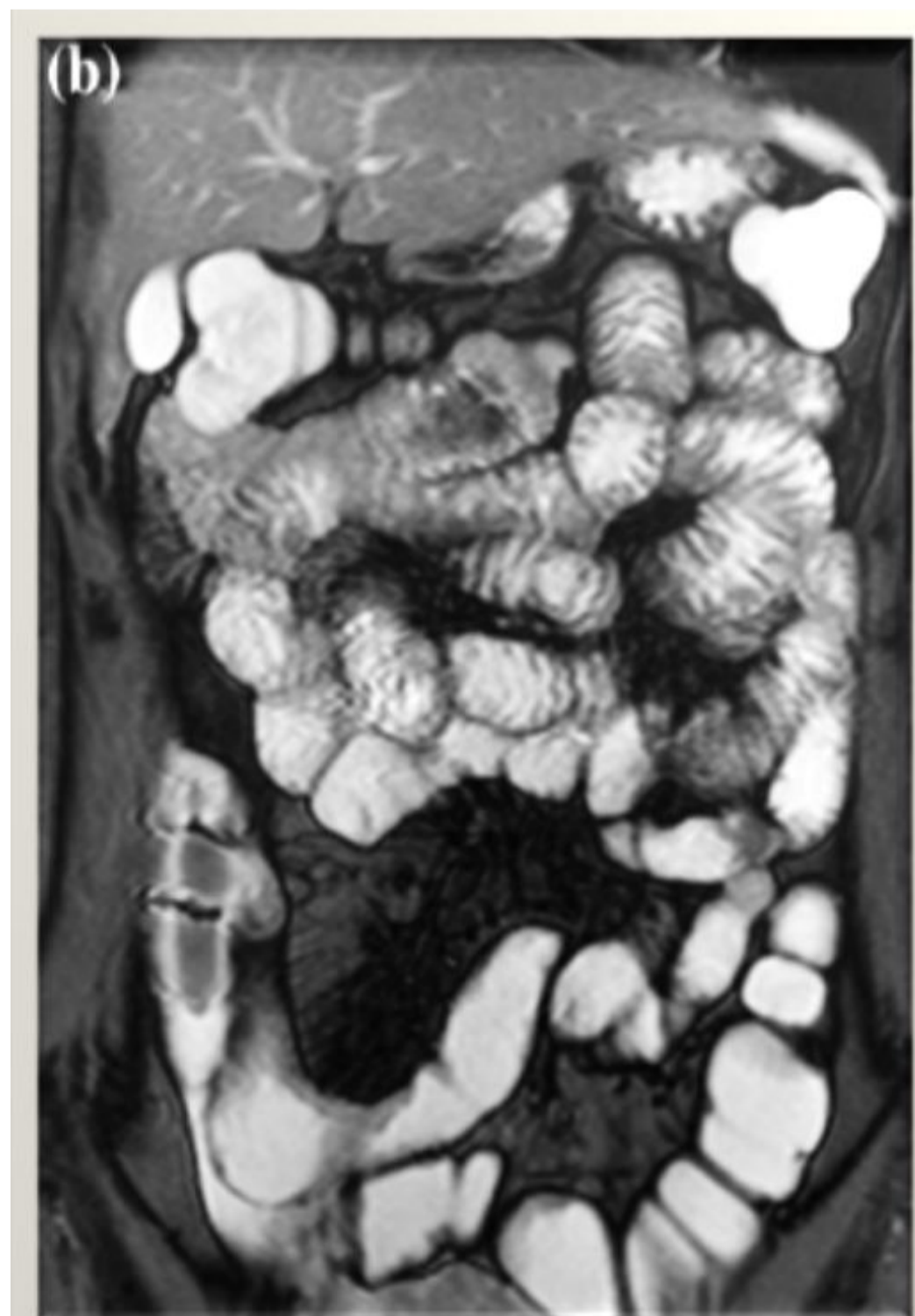
Contraindications
uncooperative patients
Early pregnancy (relative contraindication)
No IV contrast renal failure (relative contraindication)

Indications	
Abdominal solid organ masses	Inflammatory bowel disease

Normal
CT



Normal
MRI

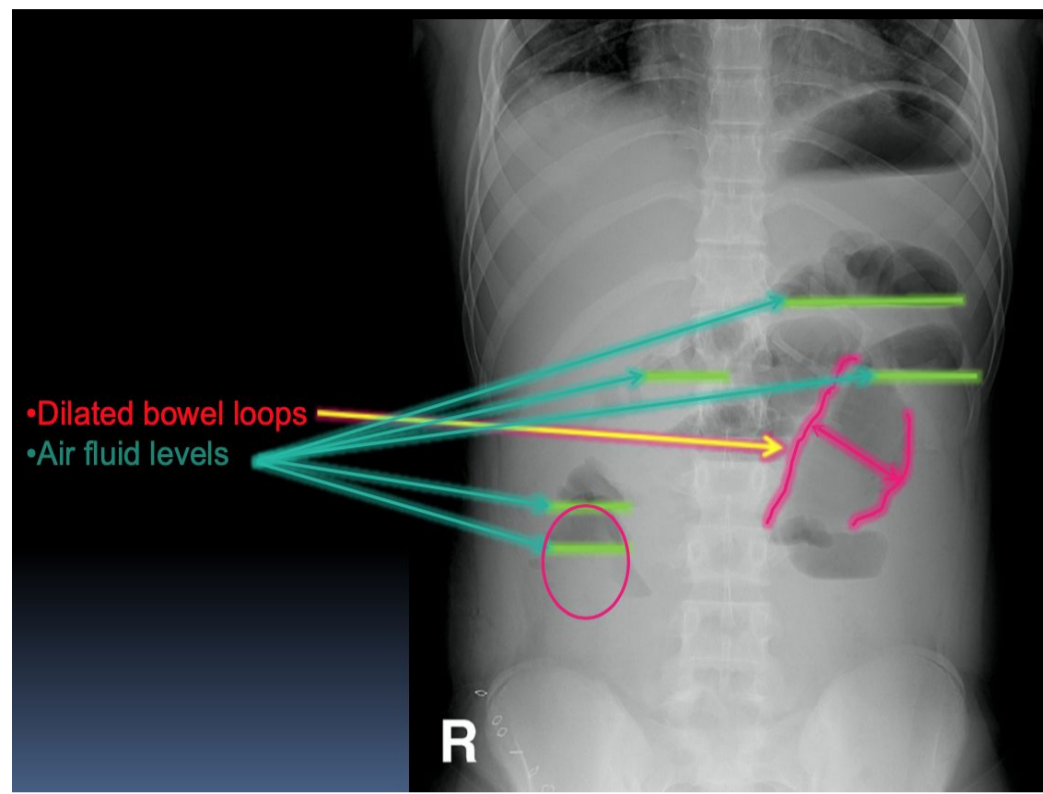


Summary

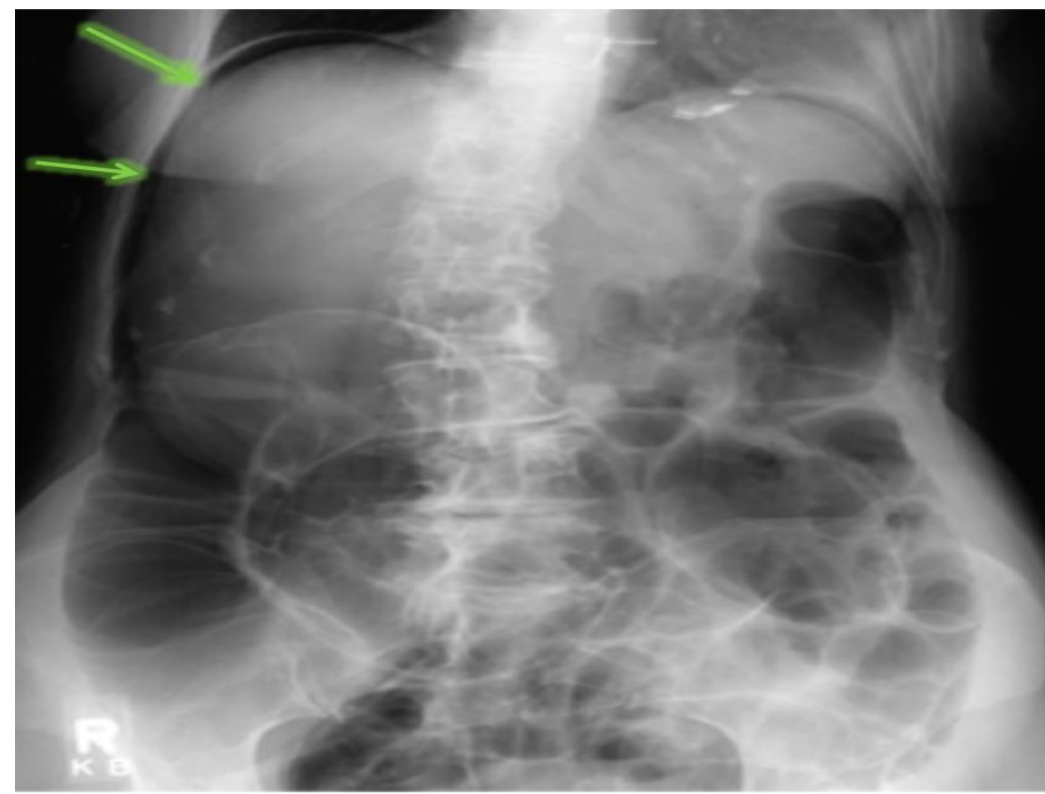
Abdominal X Ray

- Advantages:
 - Excellent in diagnosing **free air in the abdomen**
 - Good in diagnosing **bowel obstruction**

Abnormal Abdominal X Ray



Dilated bowel loops
Air fluid levels



Air outside the bowel loops

- Bowel Obstruction**
- pneumoperitoneum**

3,6,9 RULE

Maximum Normal Diameter of bowel

Small bowel 3cm

Large bowel 6cm

Caecum 9cm

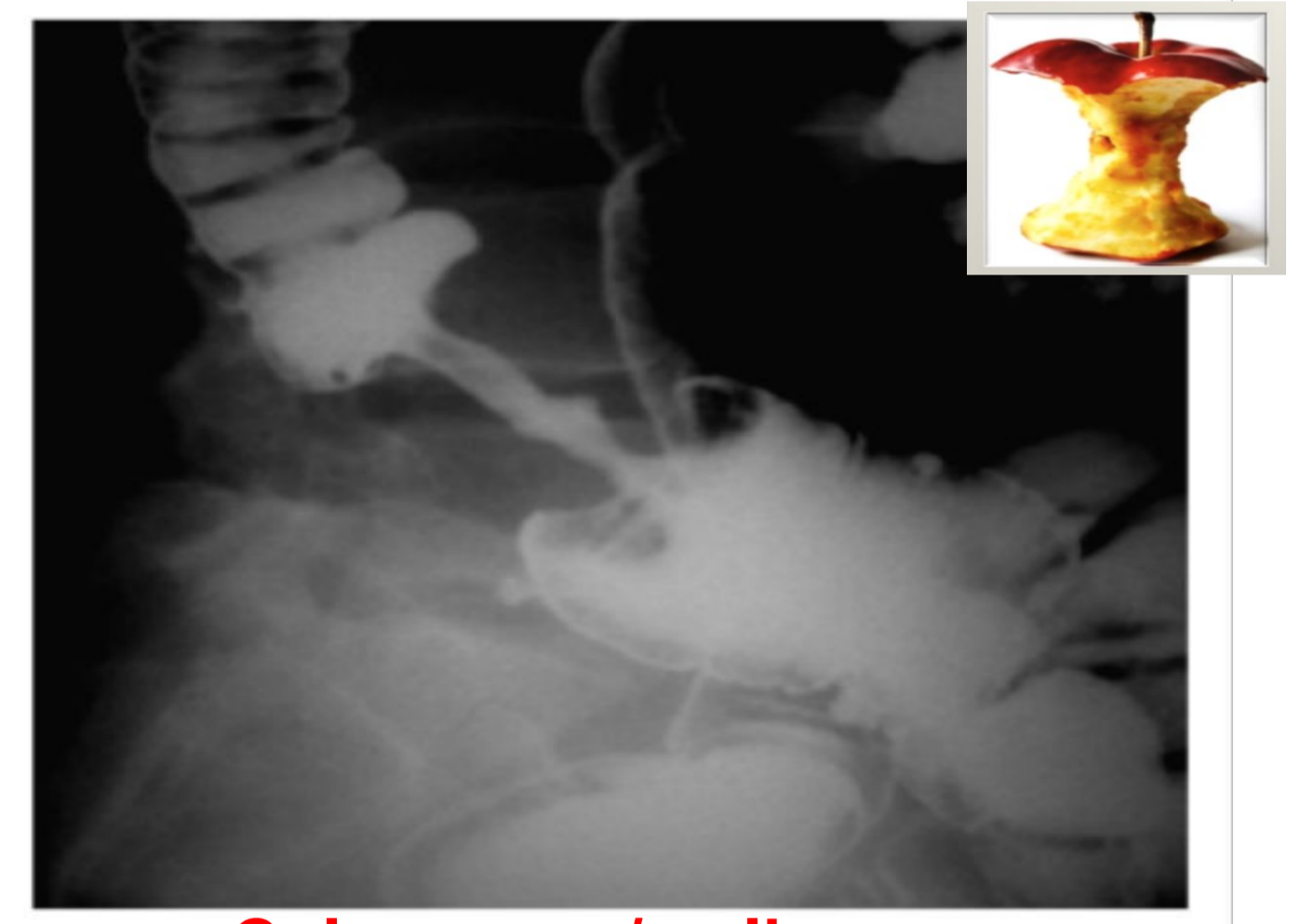
Note: that any value **above** these would be abnormal

Fluoroscopy (X Ray + contrast)

- Advantages:
 - Excellent in evaluation the **bowel lumen and mucosa**

Types	
Barium swallow	Esophagus
Barium meal	Stomach
Barium follow through	Small bowel
Barium enema	Large bowel

Abnormality



Colon mass/malignancy

(Apple core appearance)

CT scan

- Advantages:
 - Excellent in diagnosing **extra-luminal lesions**
 - Excellent in diagnosing the **Cause** of bowel obstruction

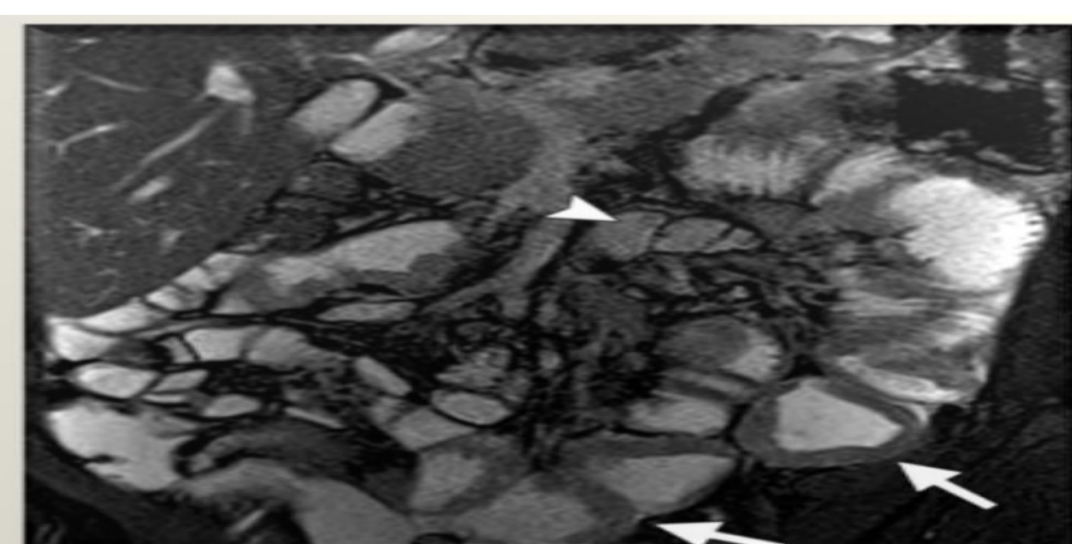
Abnormality



Mass outside the bowel loops, causing mass effect.

MRI

- Advantages:
 - Excellent in diagnosing **abdominal solid organ lesion**: liver, spleen, kidneys.
 - The modality of choice to examine solid structures in the abdomen is **Ultrasound**



Abnormality

Inflammatory bowel disease
Bowel wall thickening

Cases

CASE 1 :

A patient complains from severe abdominal pain. The doctor suspected bowel obstruction, what is the best modality that can be used to confirm that?

X-RAY

Note: Initially, first is X-ray. To know the cause and the site of obstruction CT with WATER soluble contrast. **Barium is non water soluble and it's contraindicated.**

CASE 2 :

An abdominal X-ray was taken for a patient showed free air under the diaphragm "extra Luminal Gas", what is the most likely diagnosis?

Pneumoperitoneum

CASE 3 :

A patient complains from constipation, what shall we use first to evaluate his bowel?

X-RAY

CASE 4 :

An abdominal X-ray was taken for a patient showed Dilated bowel loops with Air and fluid levels, what is probably the diagnosis?

Bowel Obstruction

CASE 5 :

A patient complains from diarrhea for the last week so that doctor wanted to evaluate the bowel lumen and mucosa, what is the suitable modality to be used?

Fluoroscopy

CASE 6 :

Ahmed complains from chronic constipation, X-Ray showed A mass in the colon so the doctor requested Barium enema (Fluoroscopy) which showed Apple core appearance of that segment of the colon, what is the most likely diagnosis?

Colon Malignancy

CASE 7 :

A patient came to the ER with Abdominal cramps, pain, bloody diarrhea, and Fever. The MRI showed Bowel wall Thickening, what is the most likely diagnosis?

Inflammatory bowel disease

CASE 8 :

A patient came to the ER complaining from Diarrhea that was bloody, Rectal pain and Inability to defecate despite urgency. After the Fluoroscopy was taken it showed featureless colon with lead pipe Appearance. What is the most likely diagnosis?

Ulcerative Colitis



Quiz :

1 -Which of the following will be first “initial” modality used for diagnosing pneumoperitoneum?

- A - X-ray
- B - CT scan
- C - MRI
- D - Barium swallow

2 - Which ONE of the following may appear as a sign in small bowel obstruction?

- A - Rigler’s sign
- B - Bowel wall thickening
- C - Air fluid level
- D - Apple core appearance

3 - Which of the following is the best diagnostic procedure to evaluate the lumen and mucosa of the Small bowel ?

- A - CT scan
- B - Barium follow through
- C - MRI
- D - Ultrasound

4 - A 66 year old man presented to GIT clinic with intermittent per rectum bleeding. Barium enema revealed irregular narrowed descending colon with apple core appearance. What is the most likely diagnosis?

- A - Bowel Obstruction
- B - pneumoperitoneum
- C - Colon malignancy
- D - Inflammatory bowel

5 -A 66 year old man presented to GIT clinic. Abdominal X-ray was taken for that patient. which of the following is considered abnormal Diameter of the Caecum?

- A - 10 cm
- B - 9 cm
- C - 8 cm
- D -7 cm

6 -Which of the following is the best to diagnose the Cause of bowel obstruction?

- A - Fluoroscopy
- B - MRI
- C - X-Ray
- D - CT scan

7 - Which of the following is the best diagnostic procedure to evaluate the lumen and mucosa of the Stomach?

- A - Barium follow through
- B - Barium swallow
- C - Barium meal
- D - Barium enema

8 - Which of the following will be first modality of choice to examine the Liver?

- A - X-Ray
- B - Ultrasound
- C - MRI
- D - CT scan

9 - A patient came to the ER with Abdominal cramps, pain, bloody diarrhea, and Fever. The MRI showed Bowel wall Thickening, what is the most likely diagnosis?

- A - Bowel Obstruction
- B - Colon malignancy
- C - pneumoperitoneum
- D - Inflammatory bowel

10 - A 34 year old man presented to GIT clinic with Abdominal pain. X-Ray revealed Dilated bowel loops with Air fluid levels. What is the most likely diagnosis?

- A - Bowel Obstruction
- B - Pneumoperitoneum
- C - Colon malignancy
- D - Inflammatory bowel

