




RADIOLOGY OF THE ABDOMEN

(LECTURE 1)

Radiology

OBJECTIVES

- To know radiology modalities used in abdomen imaging mainly GI tract.
- To know advantages and disadvantages of each modality.
- To know indications and contraindications of each modality.
- Overview on normal abdomen appearance and common pathologies including:
 - Pneumoperitomium
 - Peptic ulcer
 - Bowell obstruction
 - Inflammatory bowel disease
 - Large bowel masses/malignancies



What radiological modalities
are **GOOD** in imaging the
abdomen mainly the **GI tract**?

❖ What radiological modalities are **GOOD** in imaging the abdomen mainly the **STOMACH** and **BOWEL LOOPS**?

- ✓ **X-ray**
- ✓ **Fluoroscopy**
- ✓ **CT scan**
- ✓ **MRI**

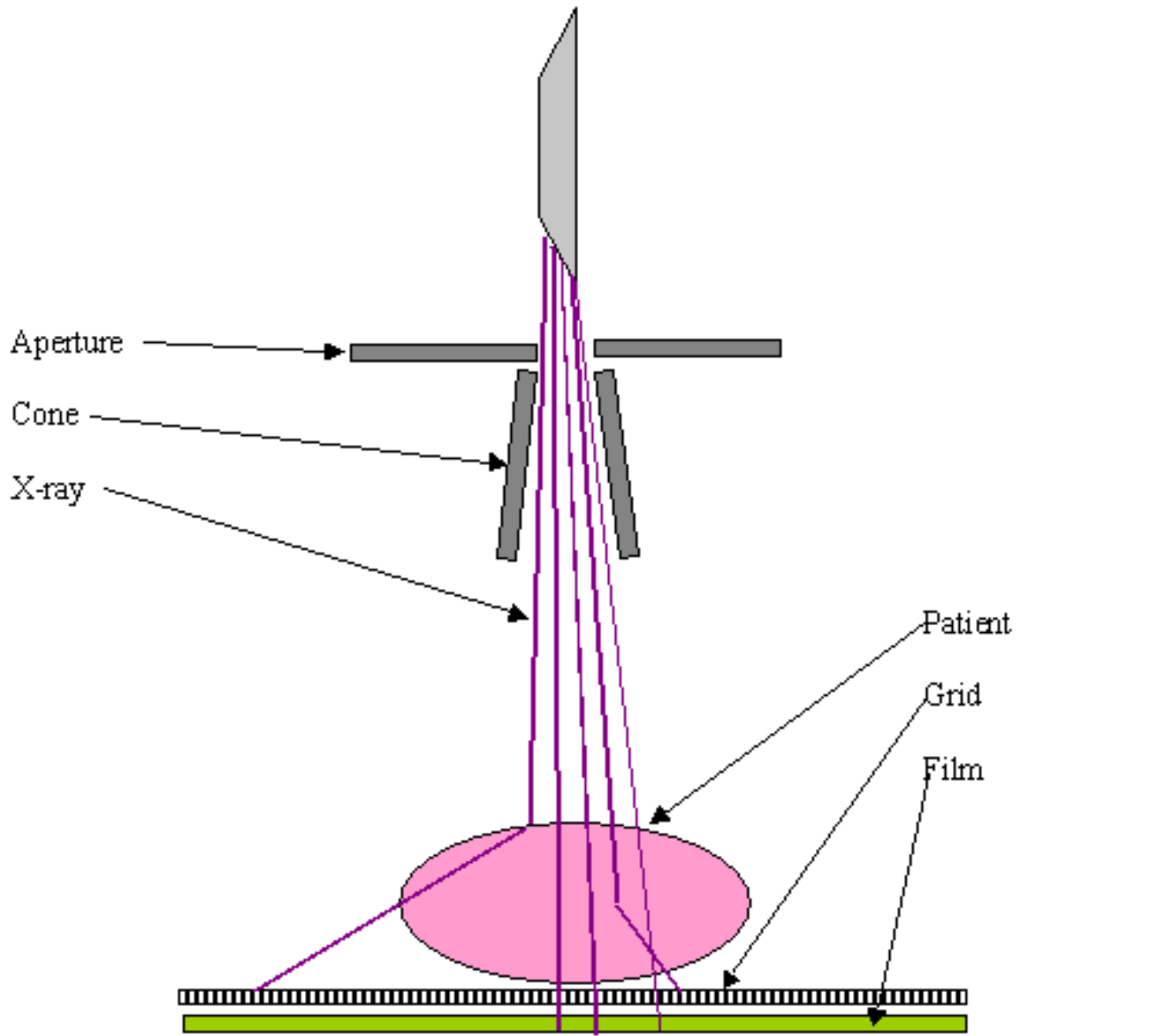
?? **US**



X-Ray

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.






ABDOMINAL X-RAY

White ----- bone and calcification

Grey ----- soft tissue

Black ----- air



❖ ADVANTAGES:

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

❖ DISADVANTAGES:

- Radiation
- Poor soft tissue details

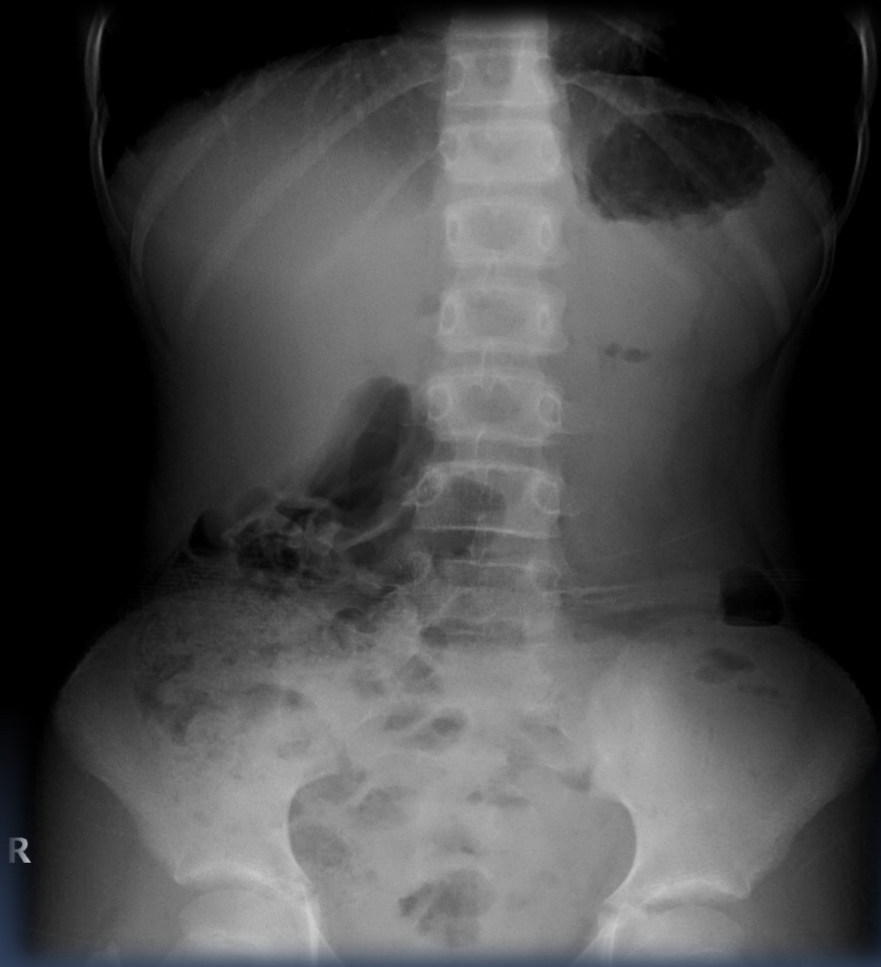
❖ INDICATIONS

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

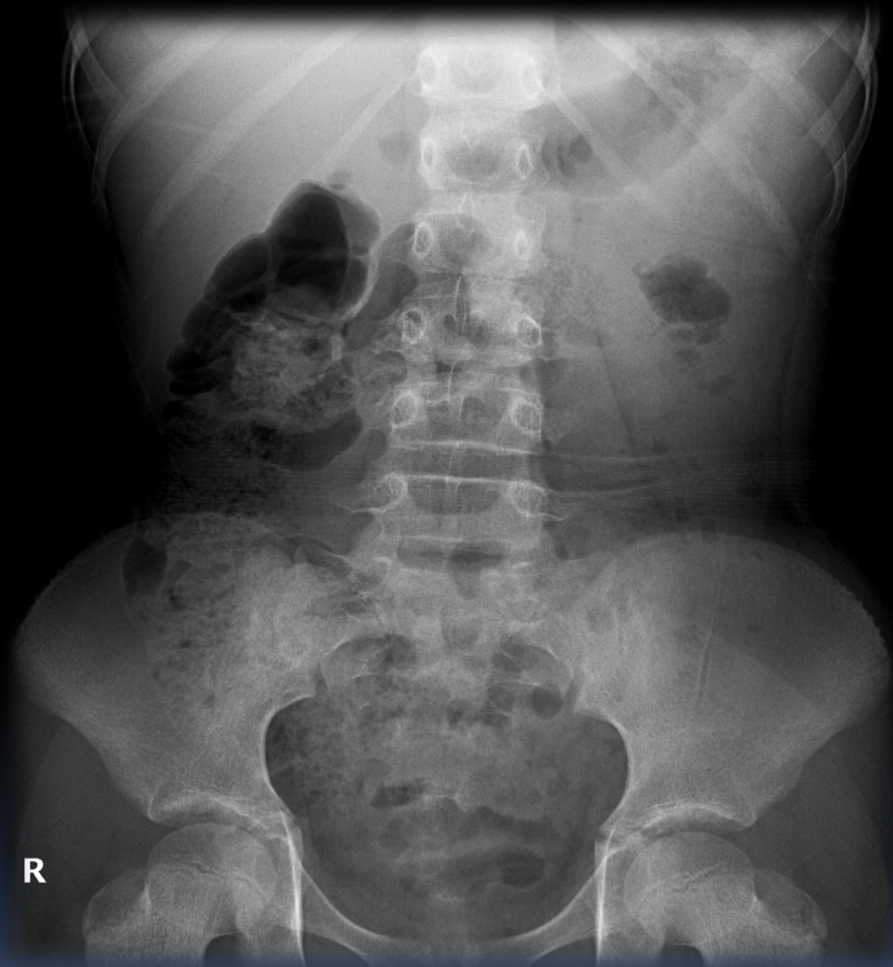
❖ CONTRAINDICATIONS:

- pregnancy

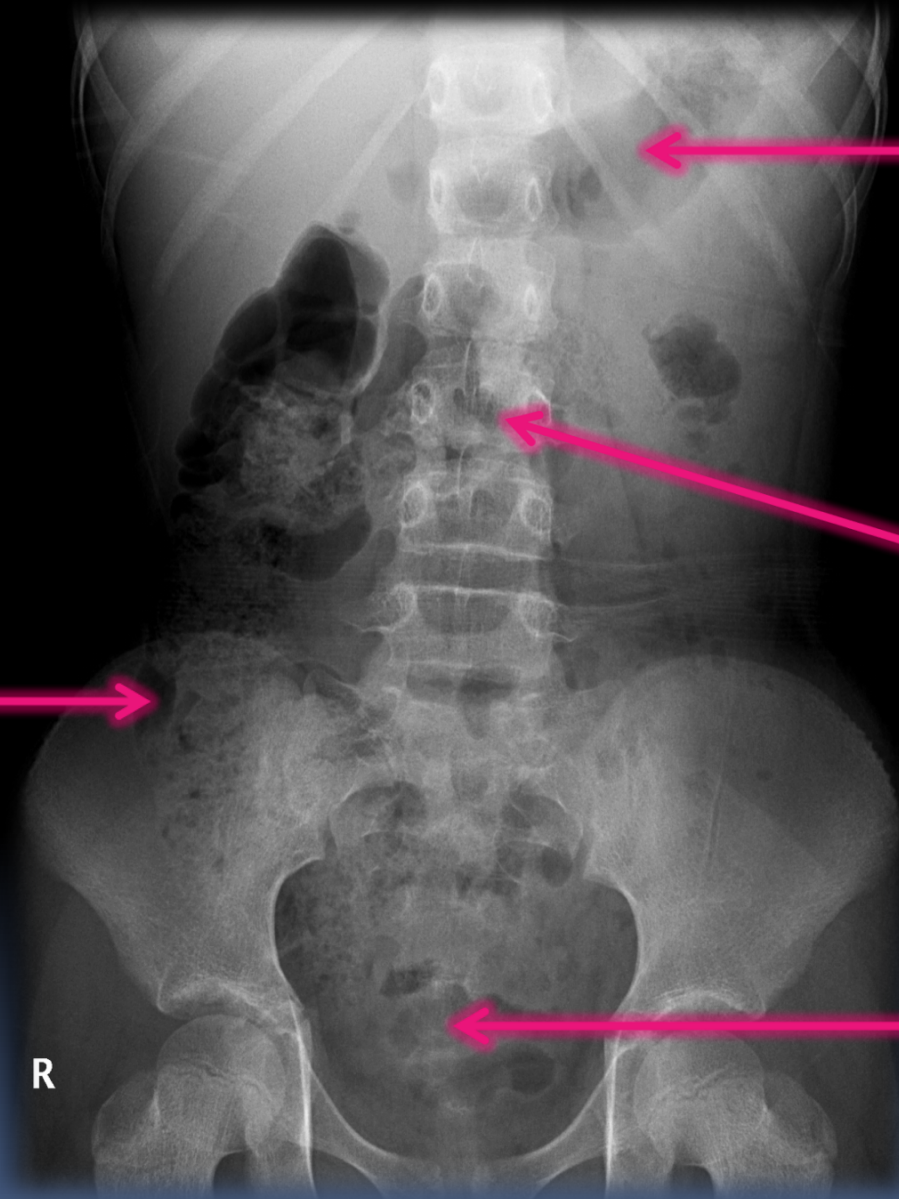
NORMAL ABDOMEN X-RAY



Standing



Supine



STOMACH

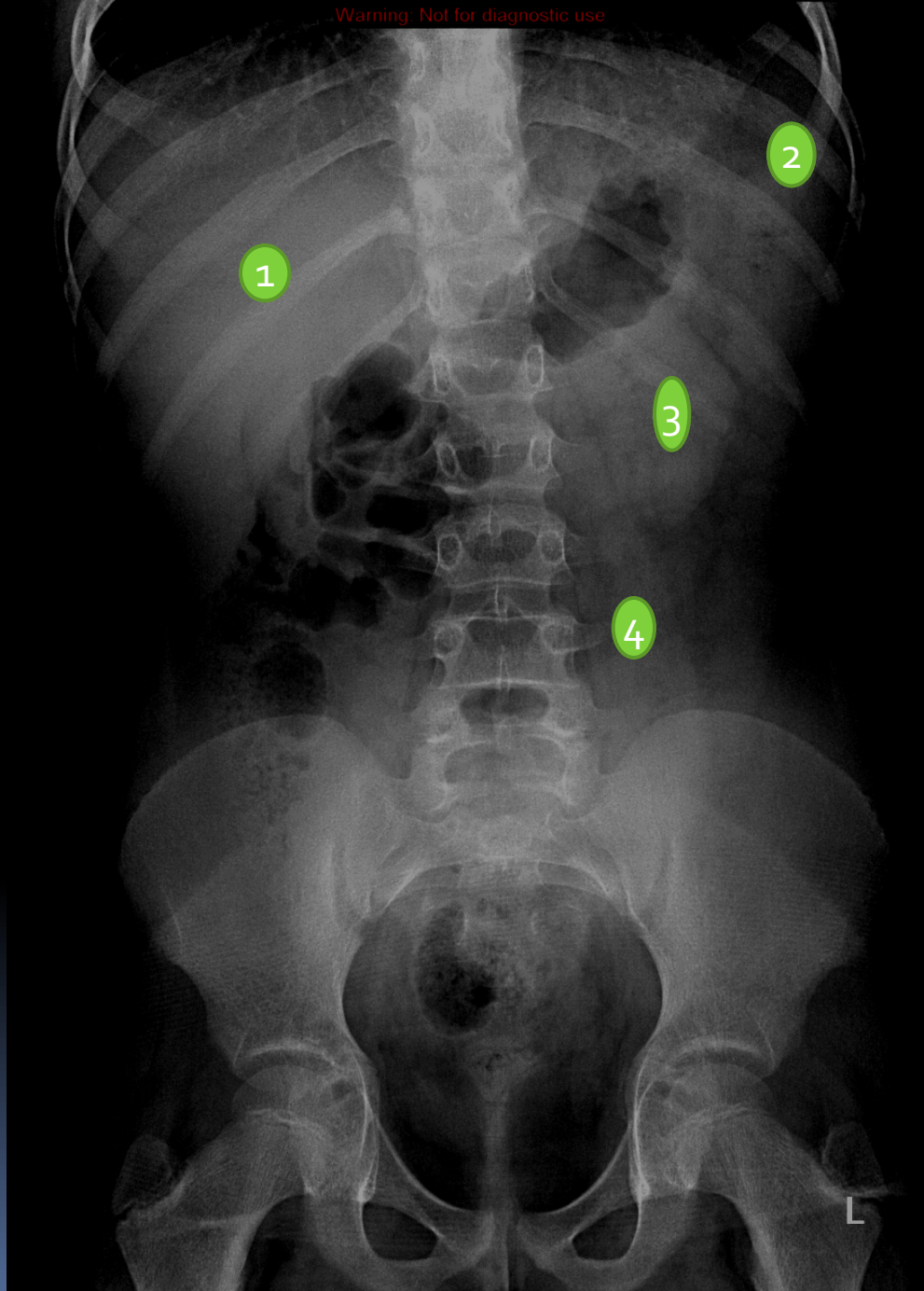
SMALL BOWEL

LARGE BOWEL

RECTUM

R

Soft tissues



Soft tissues

- Liver
- Spleen
- Kidneys
- Psoas muscles



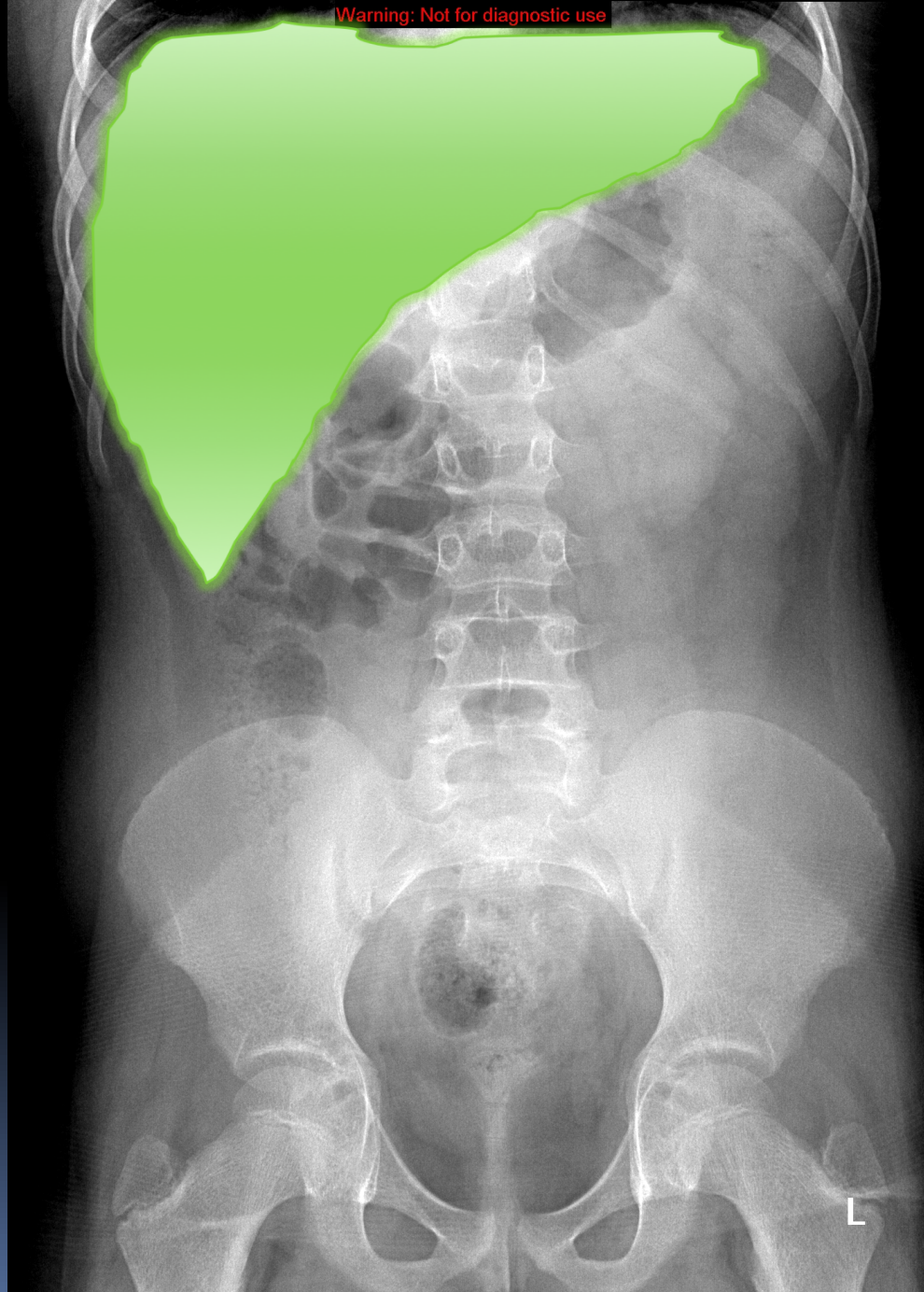
Soft tissues

Liver

Spleen

Kidneys

Psoas muscles

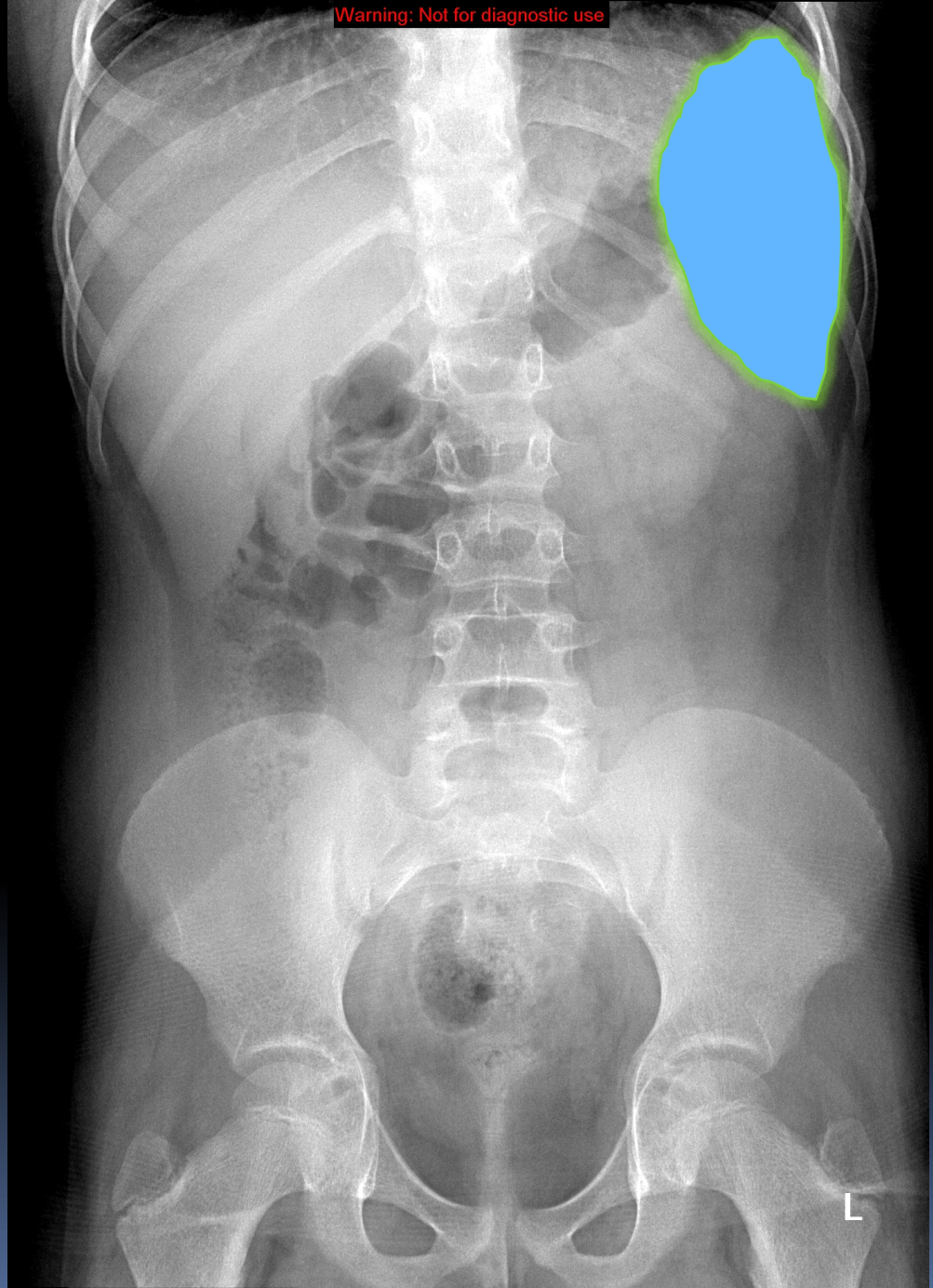


Liver

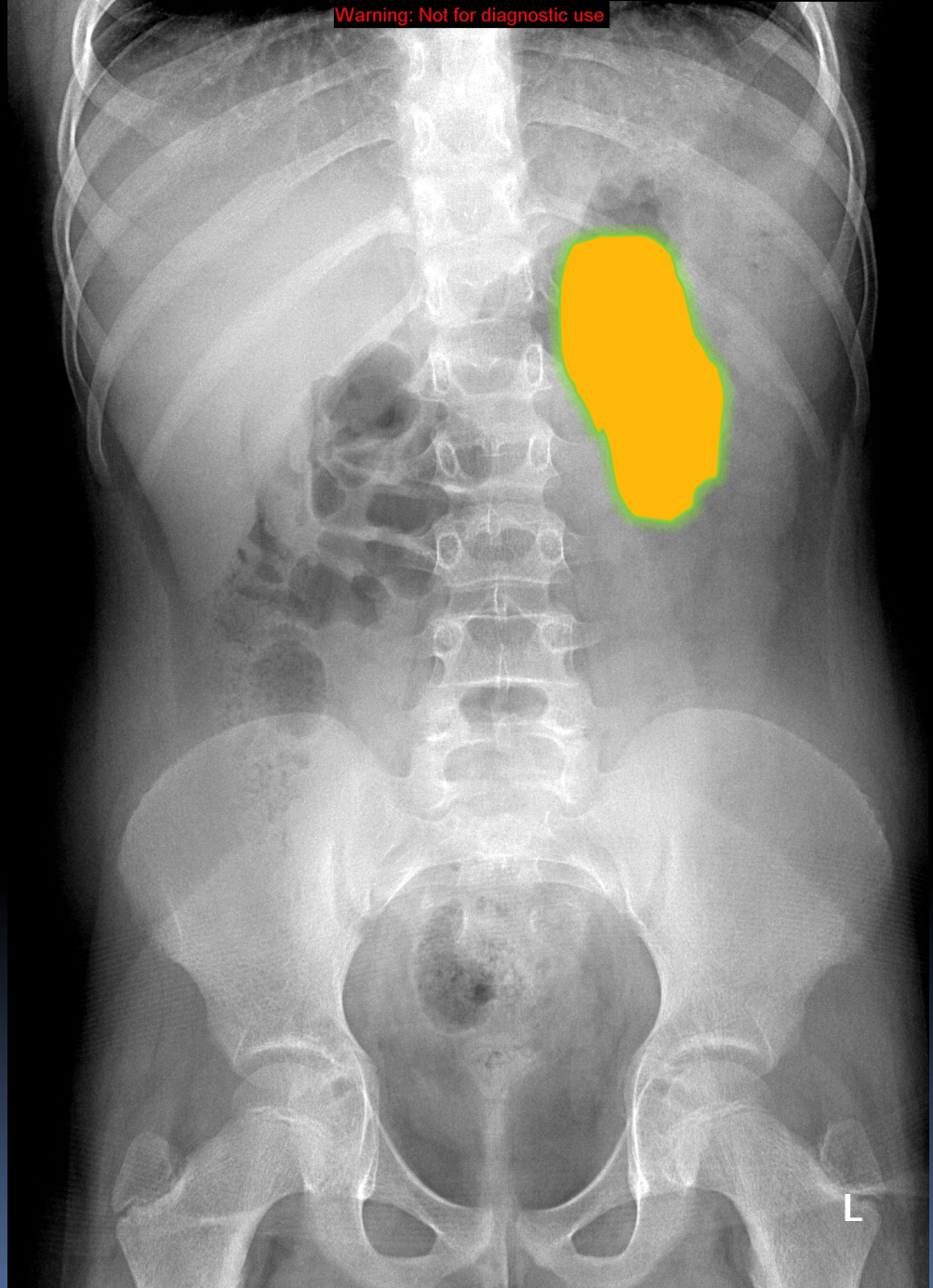
Spleen

Kidneys

Psoas muscles

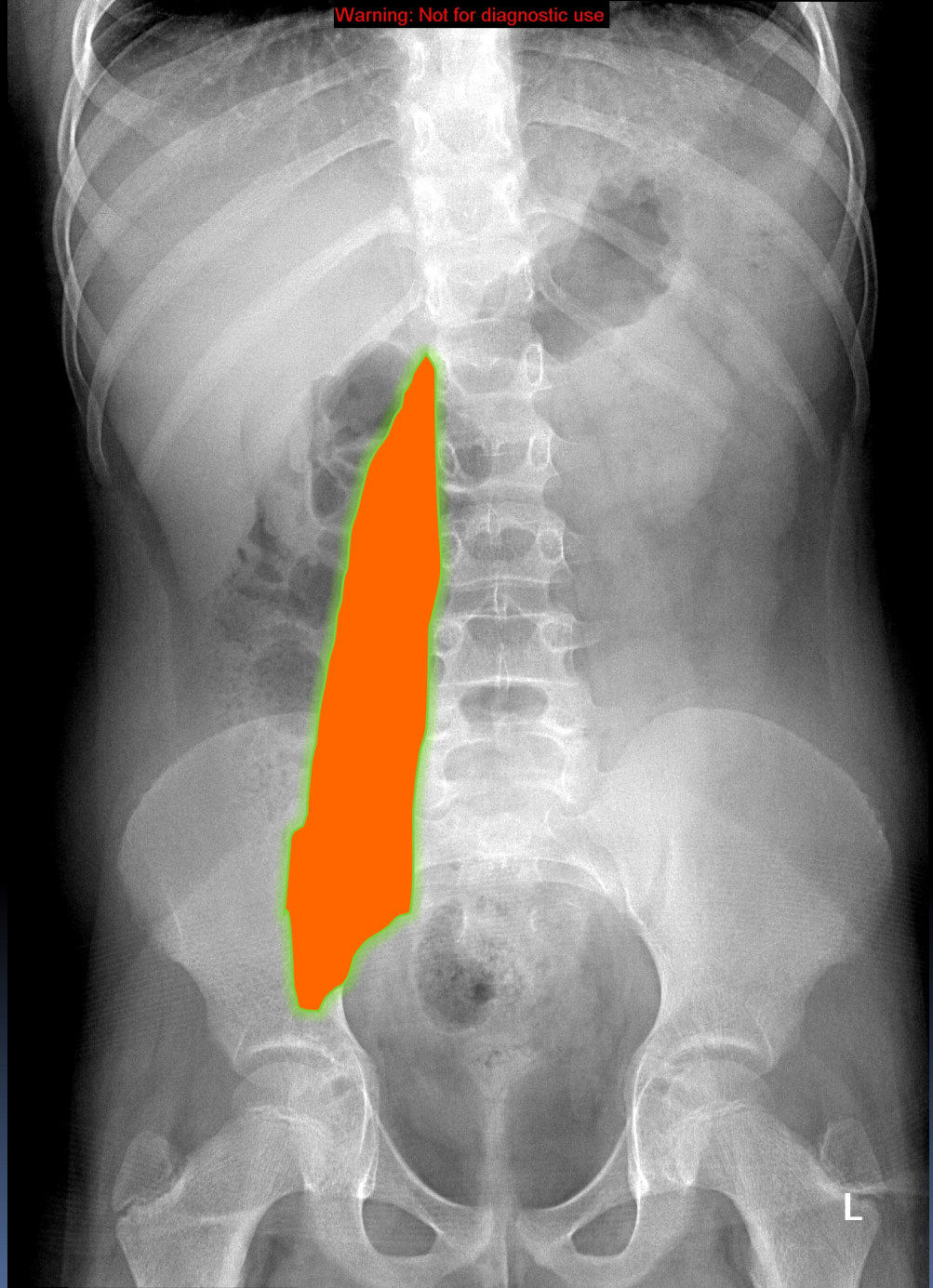


Liver
Spleen
Kidney
Psoas muscles

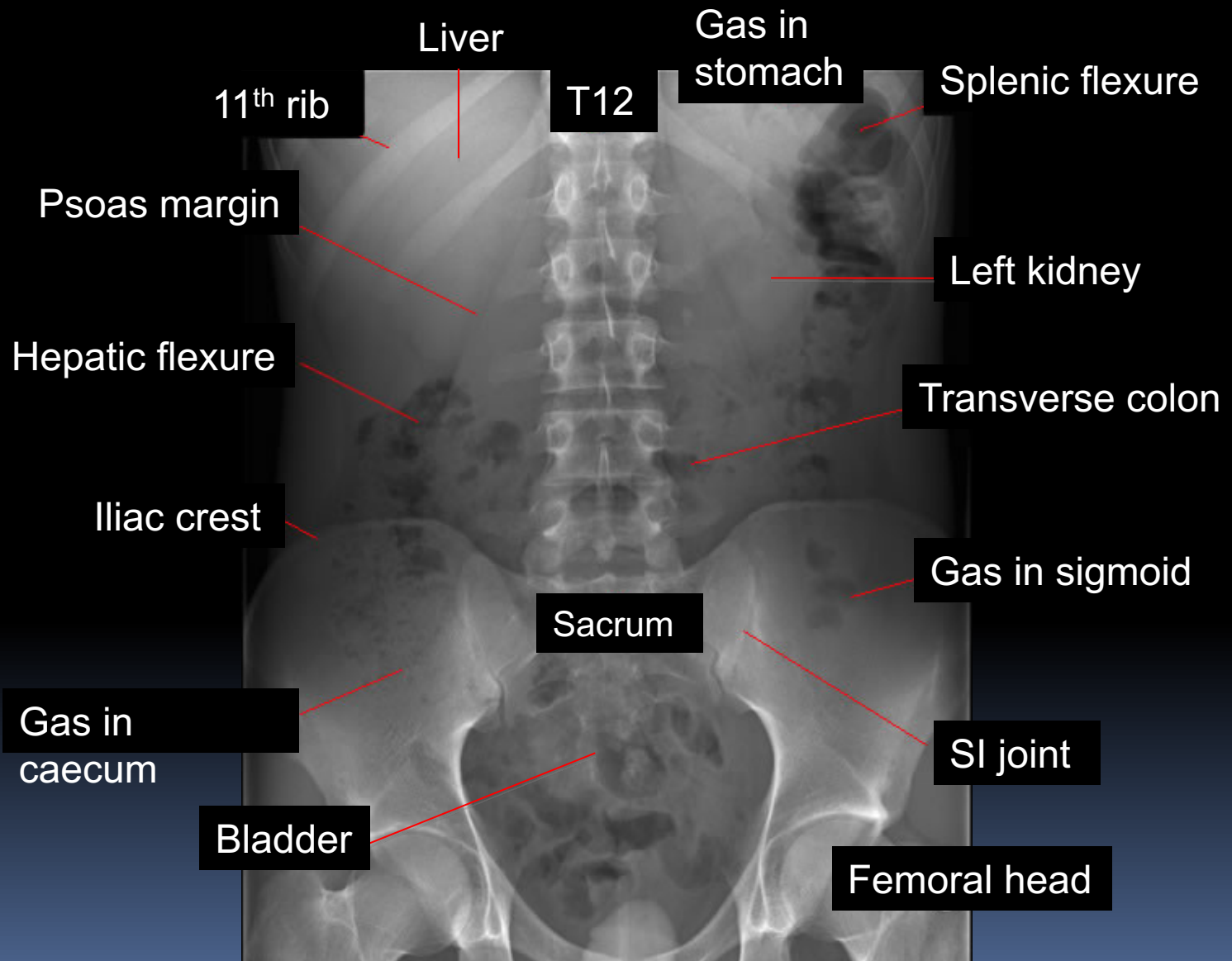


Liver
Spleen
Kidneys

Psoas muscles



Normal AXR

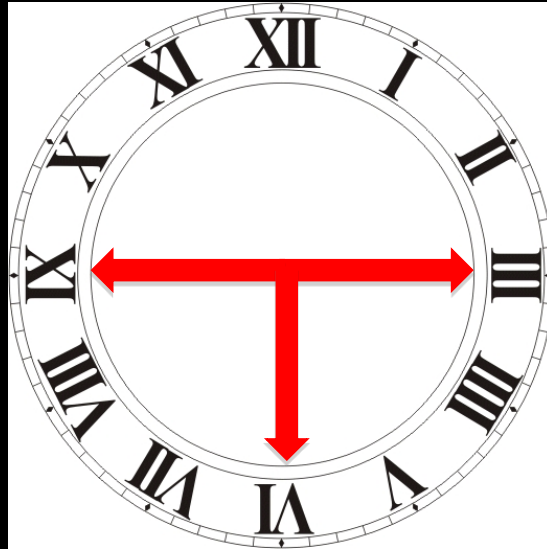


What is normal?

- **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



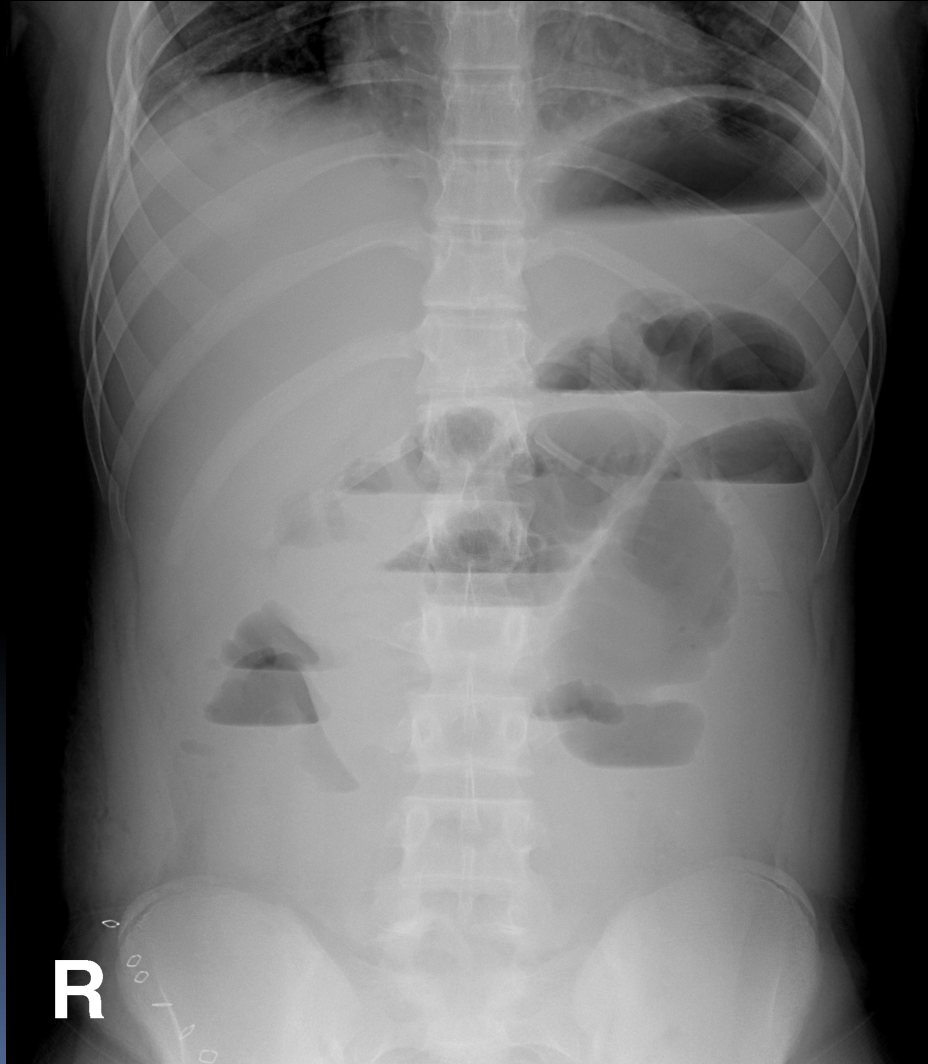
Maximum Normal Diameter of bowel

Small bowel 3cm

Large bowel 6cm

Caecum 9cm

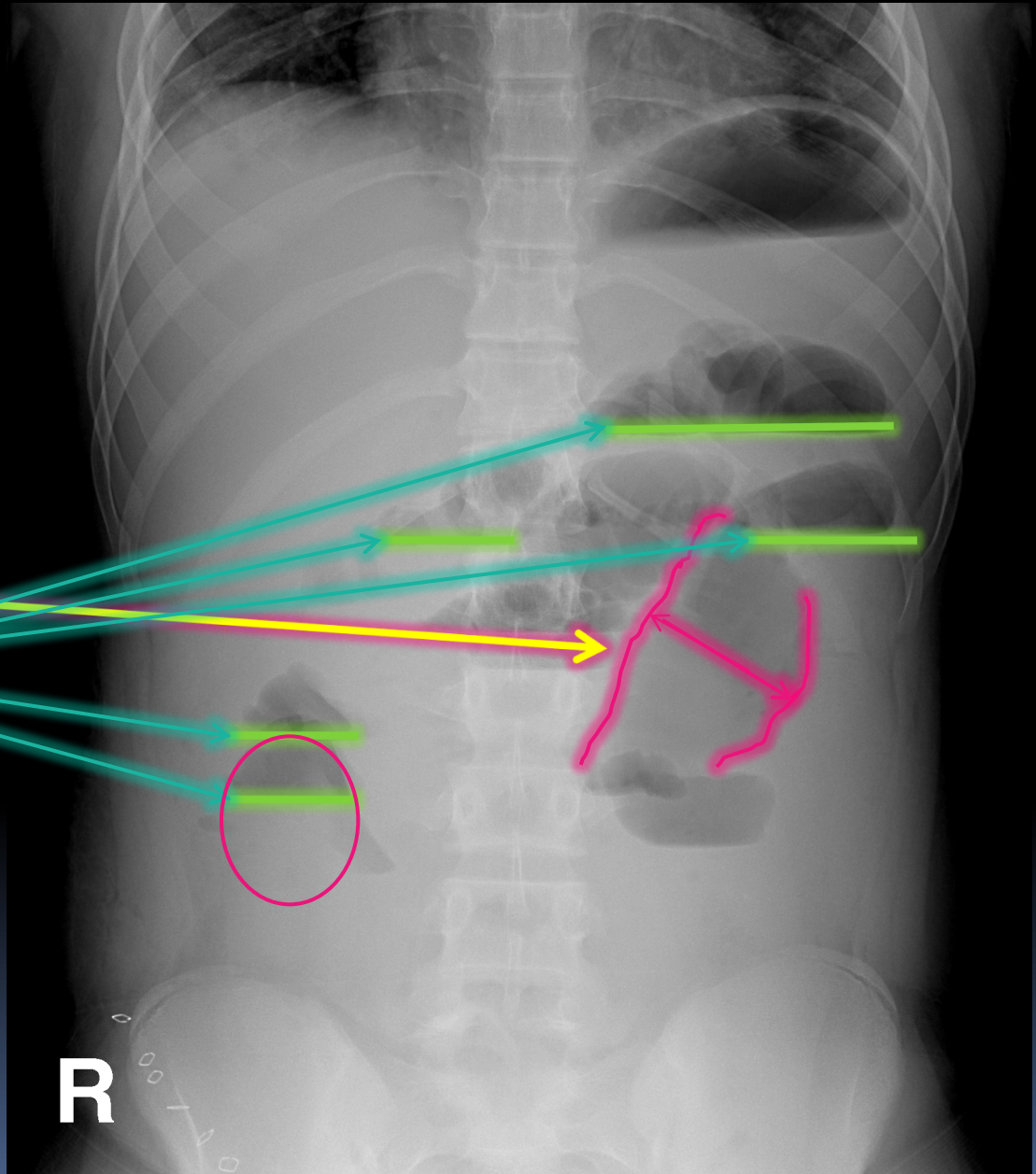
Is this X ray normal or abnormal ? and Why?



is **ABNORMAL**

BOWEL OBSTRUCTION

- Dilated bowel loops
- Air fluid levels



Is the air inside or outside the bowel loops?



**It is outside
(pneumoperitonium)**



Fluoroscopy



X-RAY

+



**ORAL
CONTRAST**



Barium swallow -----> Esophagus

Barium meal -----> Stomach

Barium follow through -----> Small bowel

Barium enema -----> Large bowel



❖ ADVANTAGES:

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

❖ DISADVANTAGES:

- Radiation
 - Poor in evaluating extra luminal pathologies
- 

❖ INDICATIONS

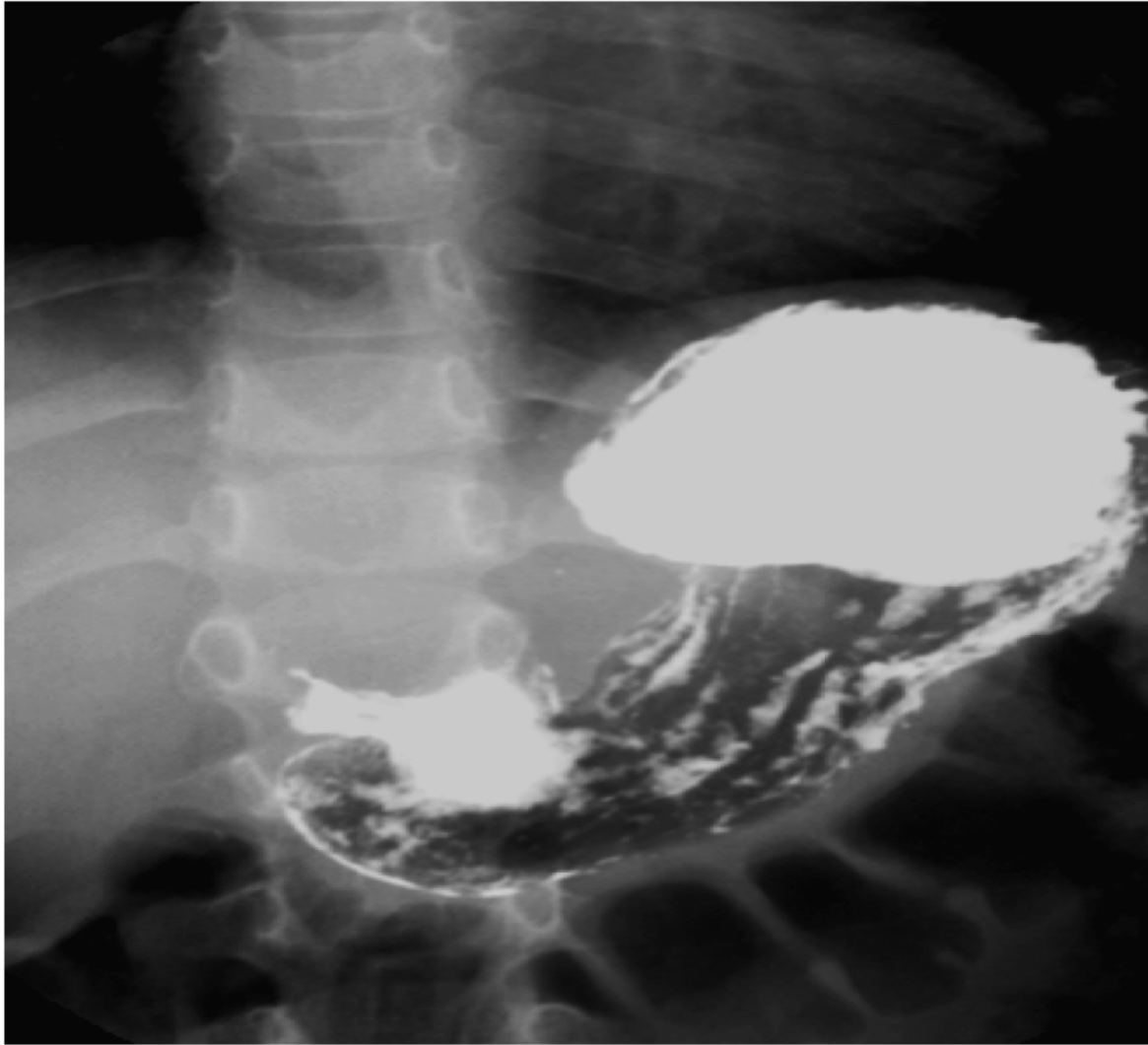
- Assessing the mucosal outline
- Abdominal pain
- Gastro esophageal reflux
- Masses
- Inflammatory bowel diseases
- Post surgical, leak

❖ CONTRAINDICATIONS:

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



BARIUM SWALLOW



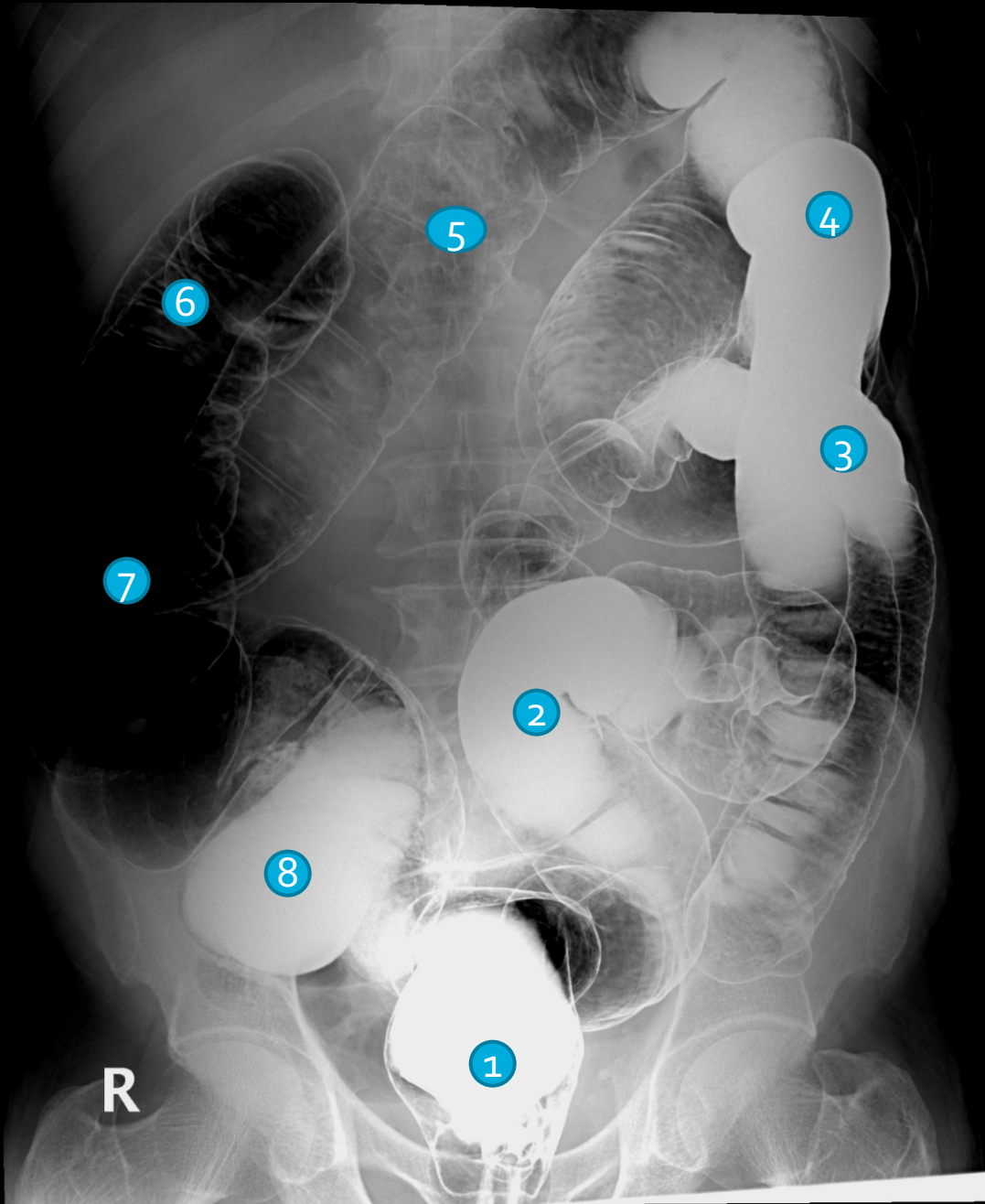
BARIUM MEAL



BARIUM FOLLOW THROUGH

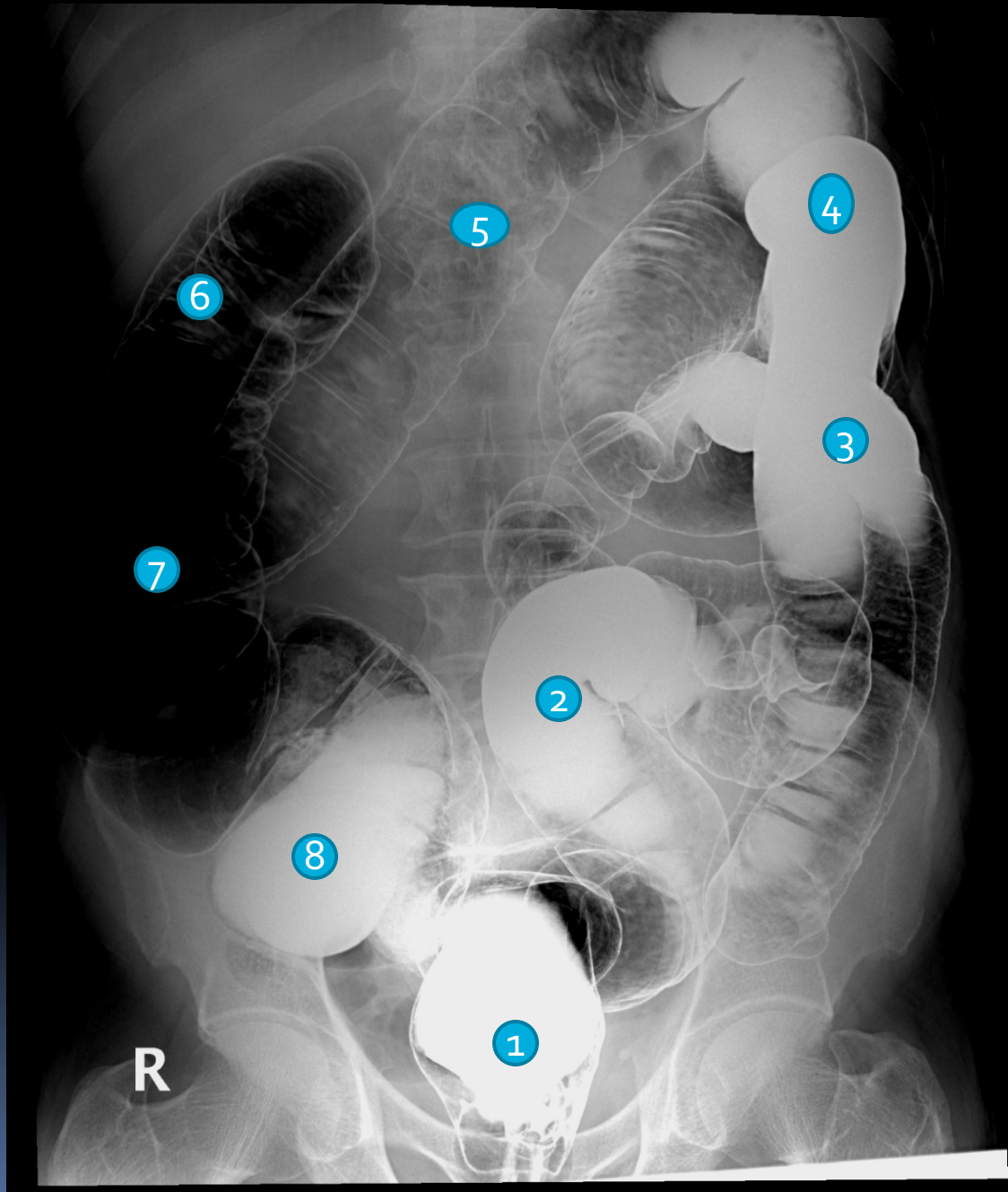


BARIUM ENEMA



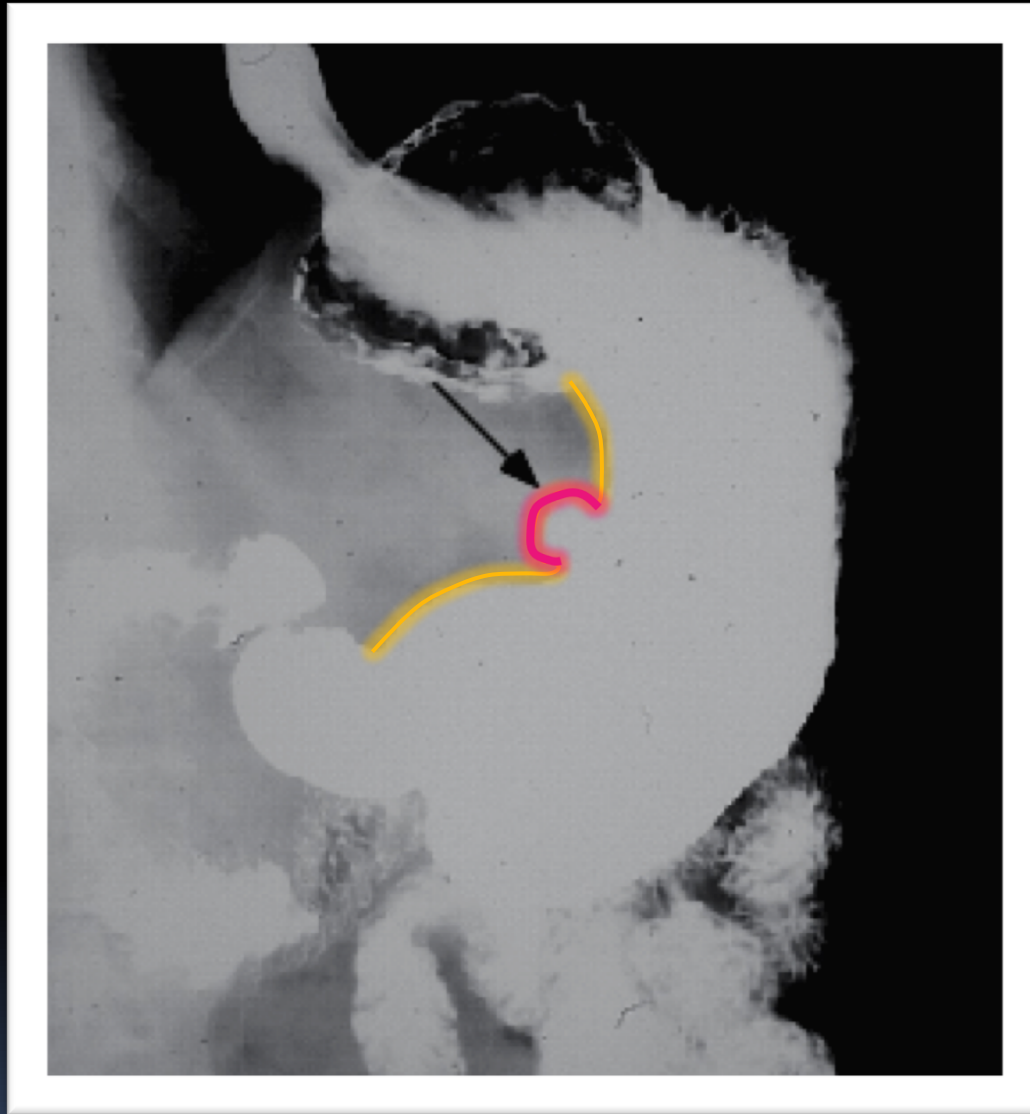
What type of this study?

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



What is abnormal here?





Peptic ulcer disease

What is abnormal in this barium enema?



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
- Some times need intra venous contrast (renal disease)
- Relatively expensive

❖ 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)

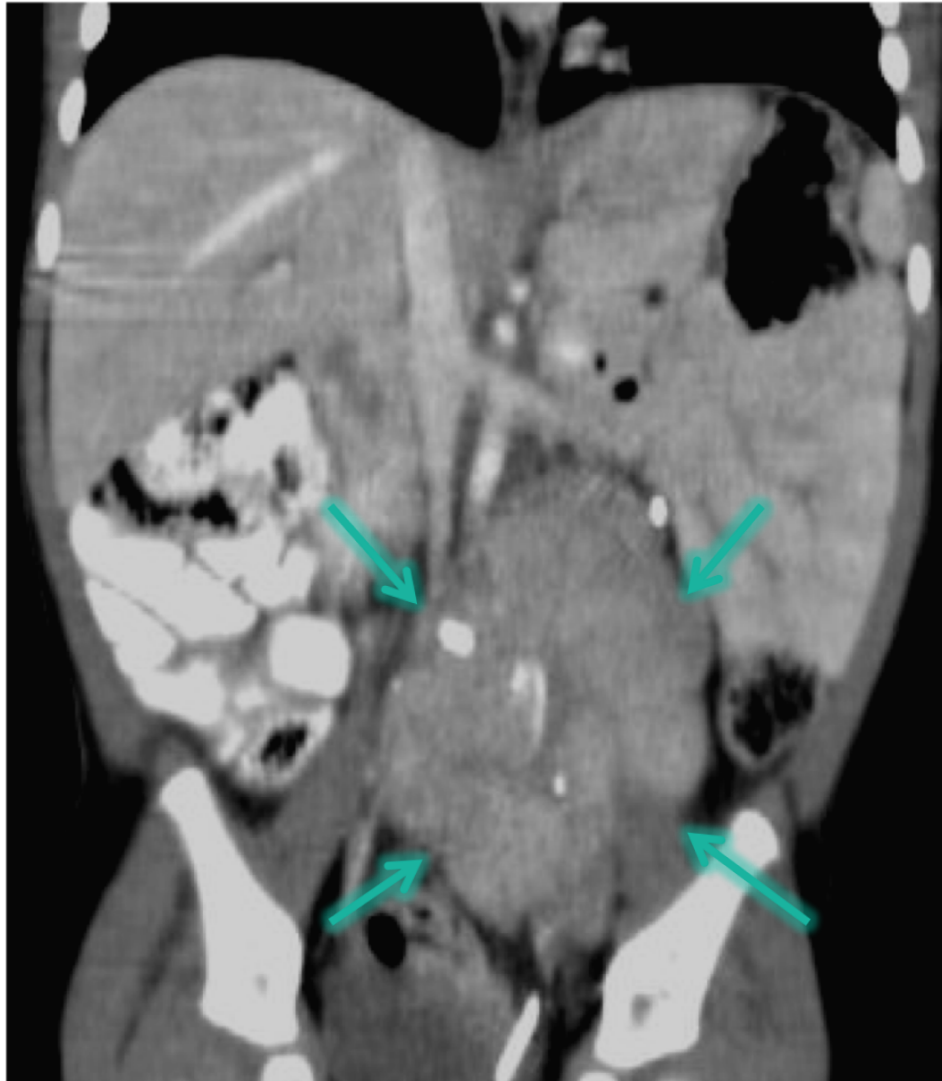




Where is this mass ? Inside or outside the bowel loops?



It is **OUTSIDE**
the bowel and
causing mass
effect.



MRI





❖ 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

❖ INDICATIONS

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

❖ CONTRAINDICATIONS:

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

(b)





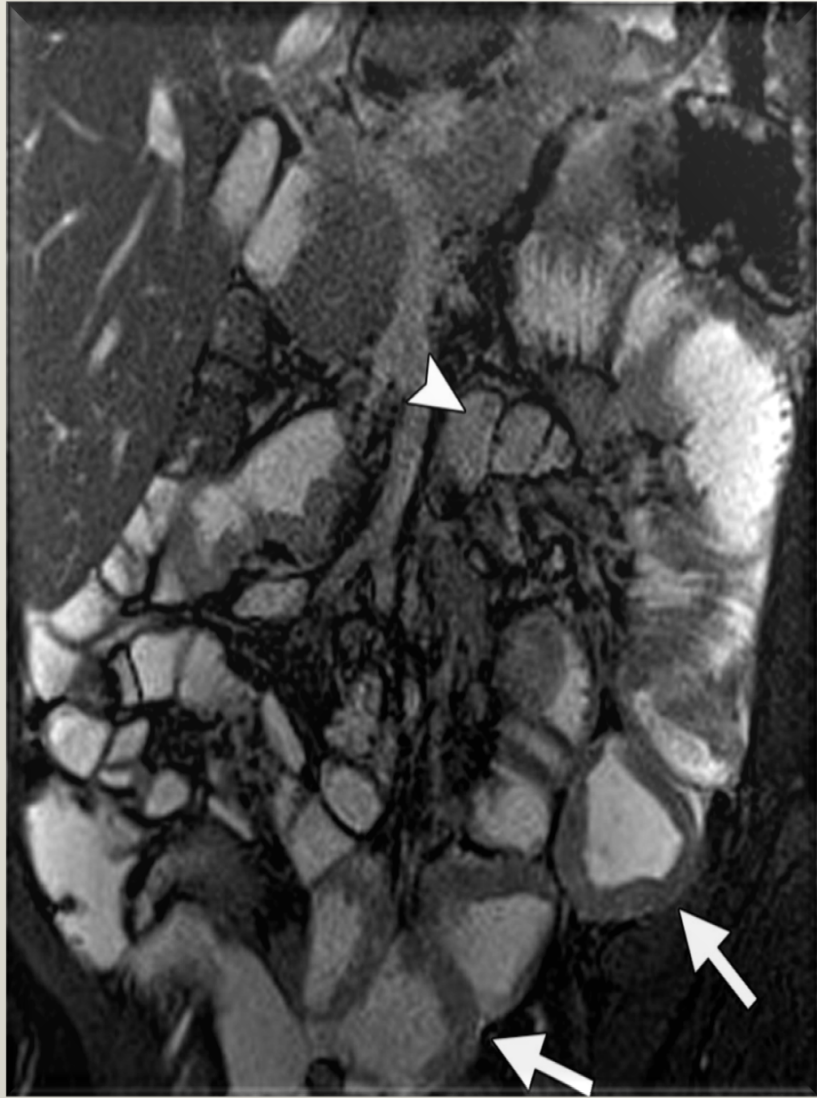
CT scan



MRI

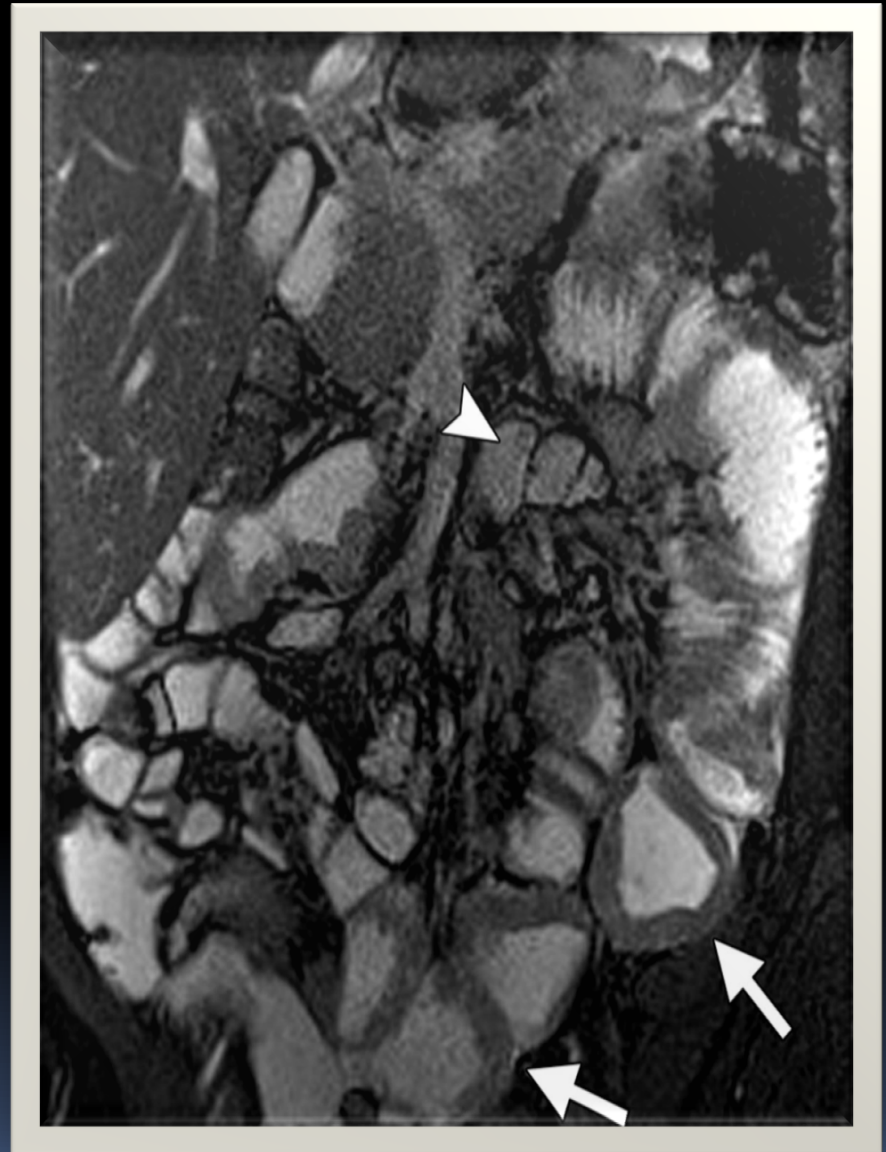
Can you identify what is abnormal ?





Inflammatory bowel disease

- Bowel wall thickening





THANK YOU