

✦ Quick tips:

- X-Ray shows
 - shadows.
 - Gas.
 - Calcifications.

- 3, 6, 9 cm rule
 - small bowel
 - colon
 - cecum

Abdominal x ray

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AXRay
• 4 views :

- ① • AP Supine abdominal X-ray Standard.
- ② • Erect AXR suspicion of intestinal obstruction to show air-fluid levels.
- ③ • Left lateral decubitus AXR Neonates or elderly that cannot stand up
- ④ • Erect chest X-ray to check if there's air under diaphragm.
* in 10% of perforation cases there's no AFD ∴ we do CT scan.

∴ any patient with acute abdomen gets abdominal X-Ray and chest X-Ray.

hemi-diaphragms to the symphysis pubis.

Radiograph quality

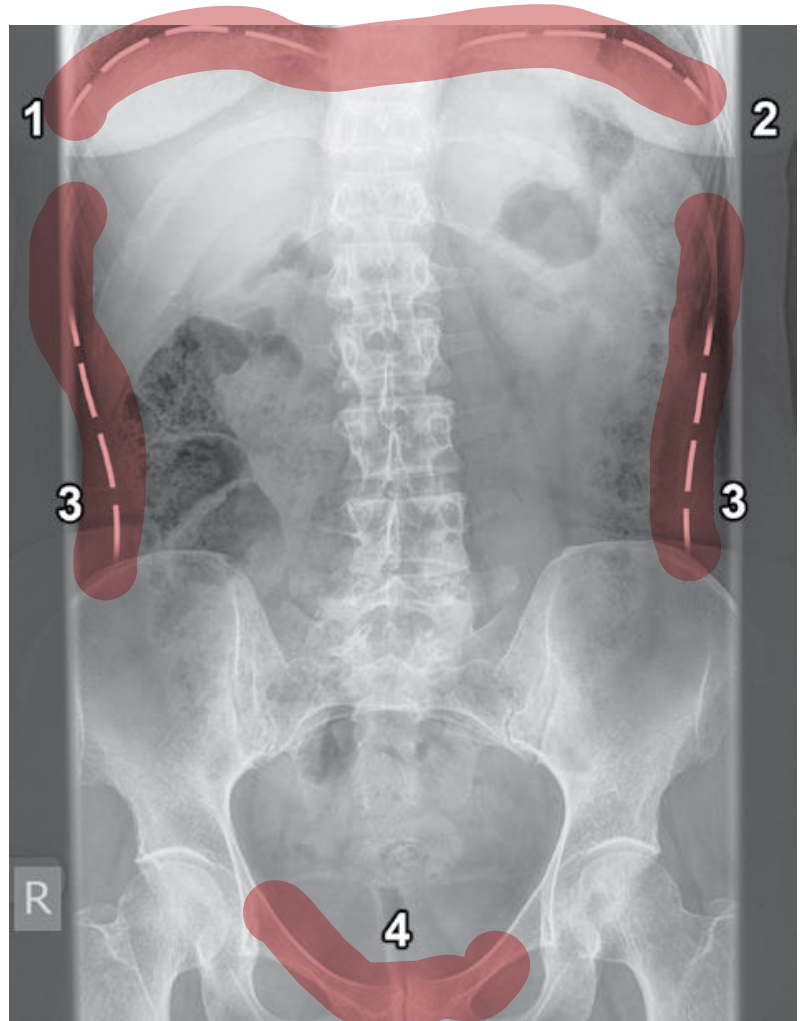
→ full exposure to the abdomen.

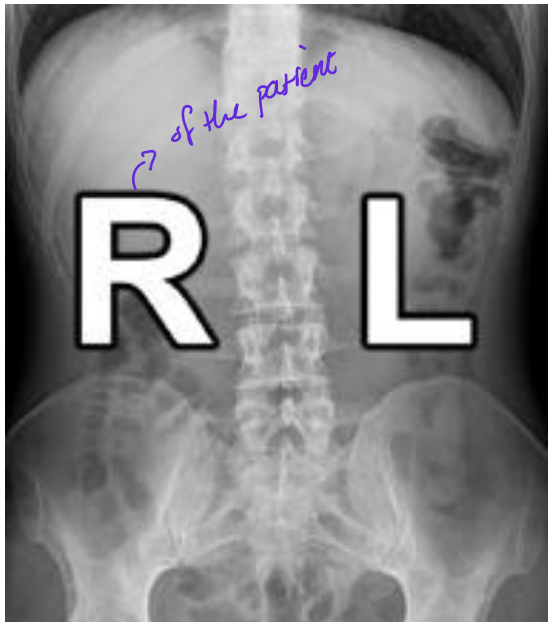
We should have levels:

1 - Both hemidiaphragms.

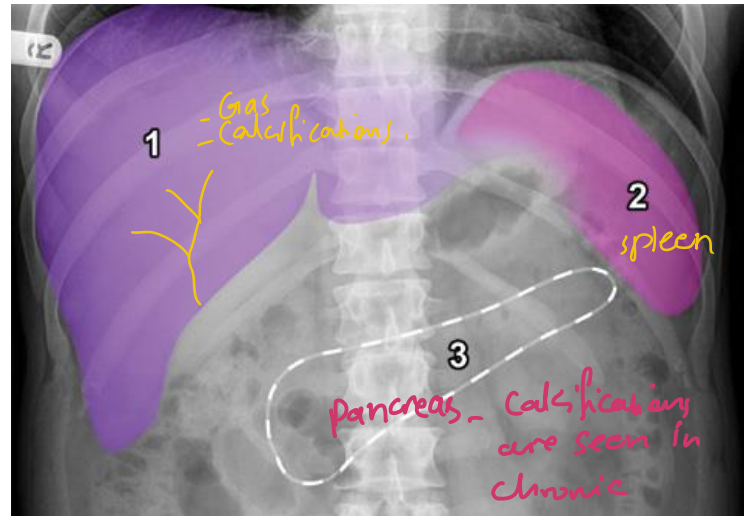
2 - Symphysis pubis.

3 - lateral abdominal walls



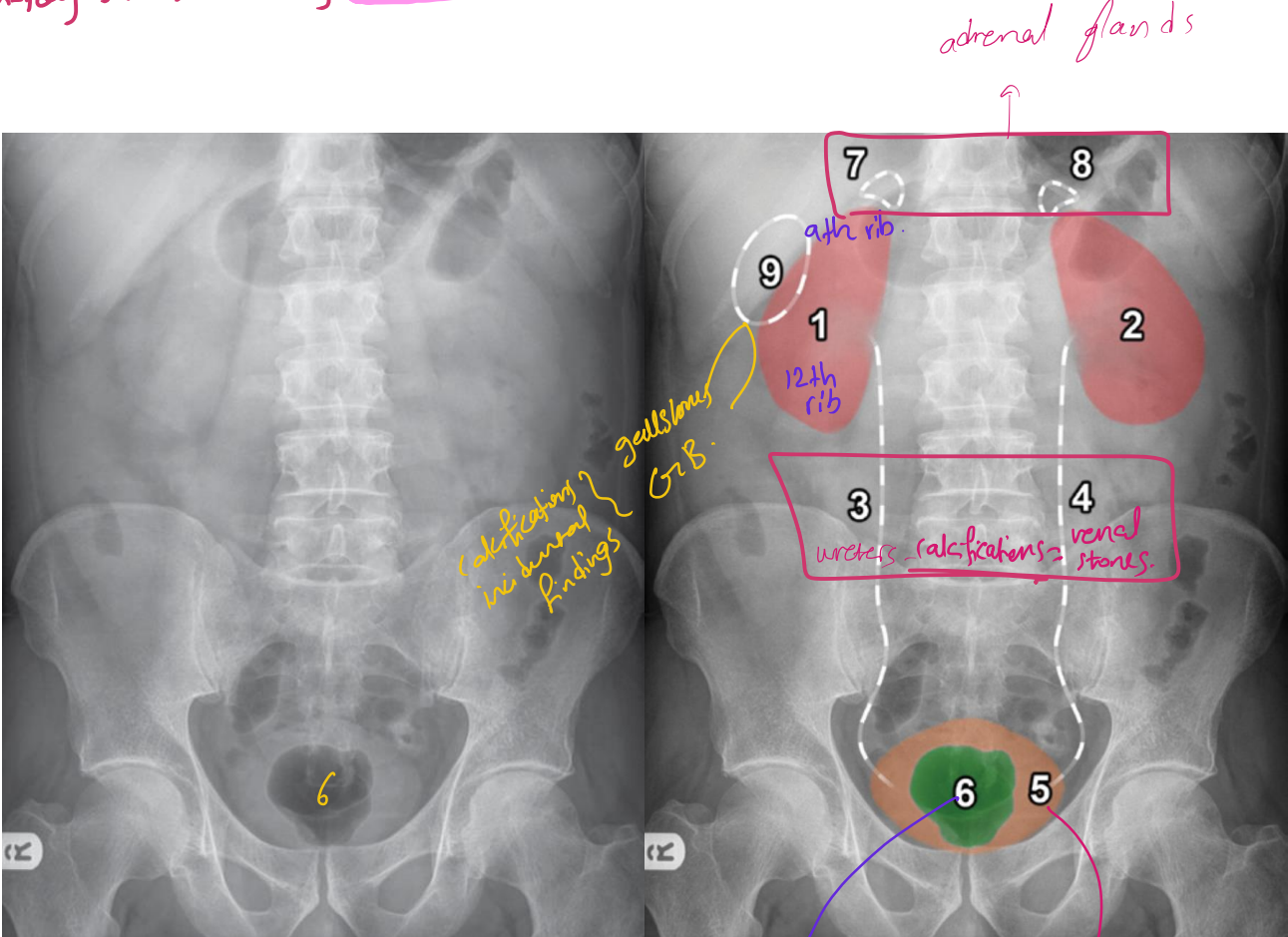


shadows of abdominal organs (not the option for solid organs)



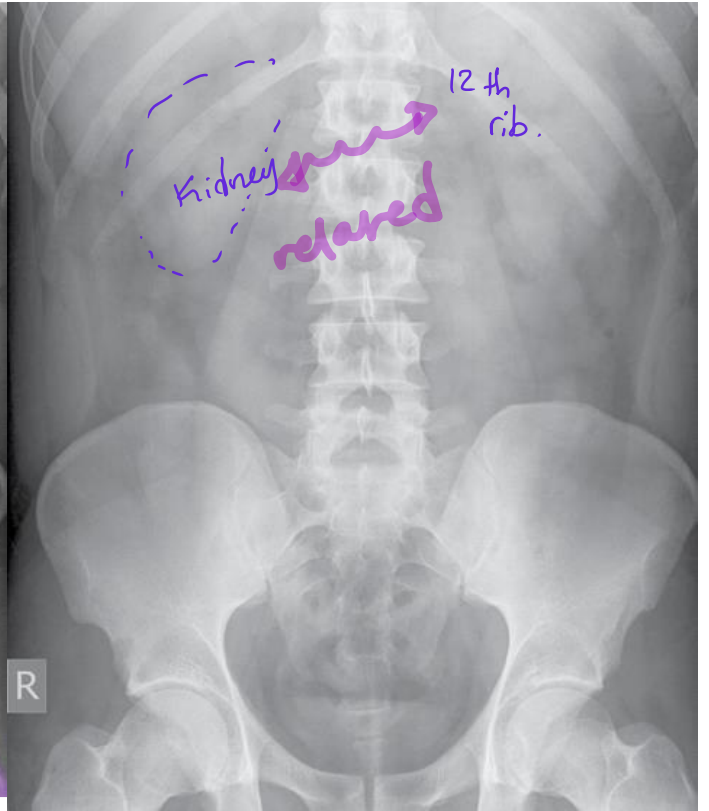
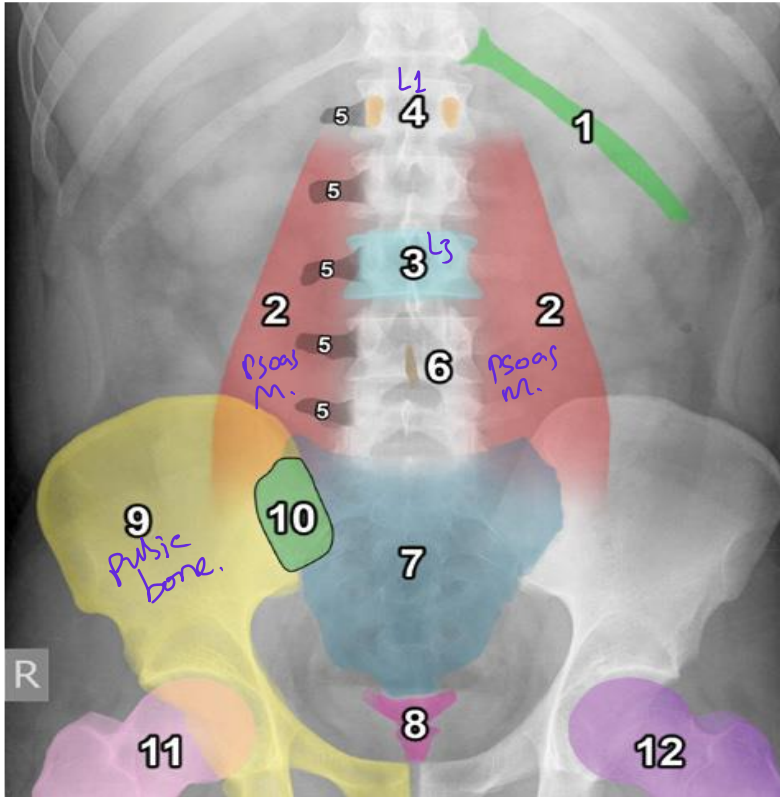
Note from me :

X-ray shows mostly **calcifications**



+ Gas per-rectum.
in intestinal obstruction.

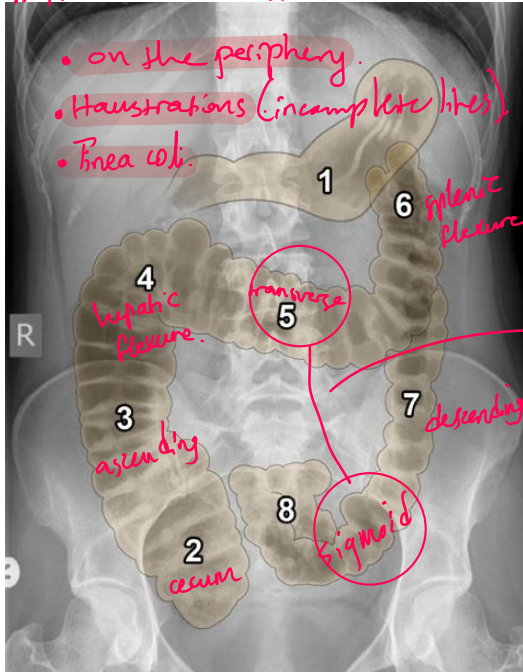
Urinary
Bladder.



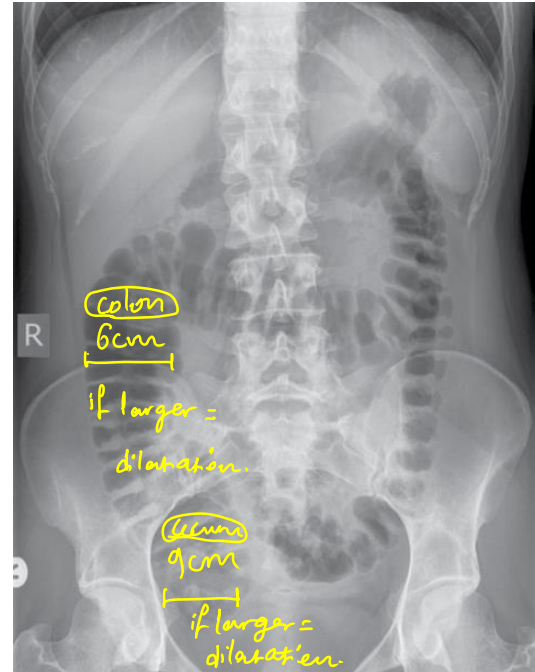
- Bowel has gas \rightarrow visible on X-Ray.
- Normally gas is in the colon and stomach only.

if we could see the small bowel on X-Ray it means it has gas in it which is abnormal and could be due to (ileus, obstruction, senting)
loop

* Norm colons appearance on X-Ray:-

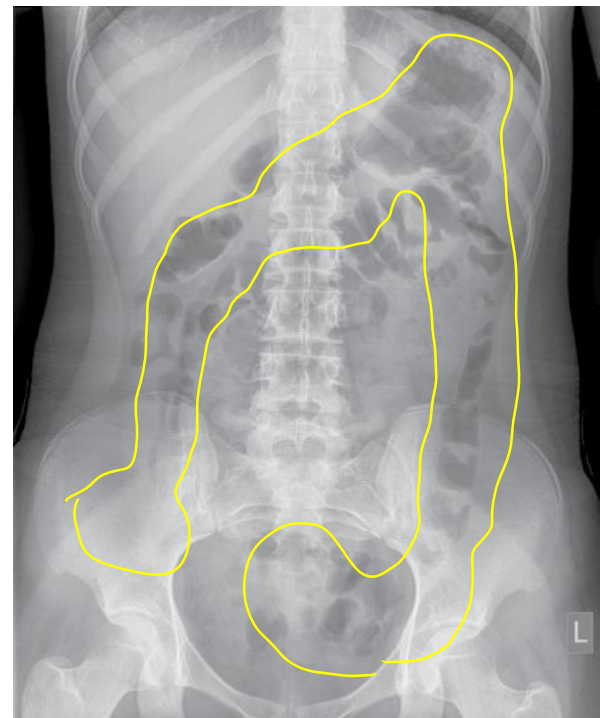
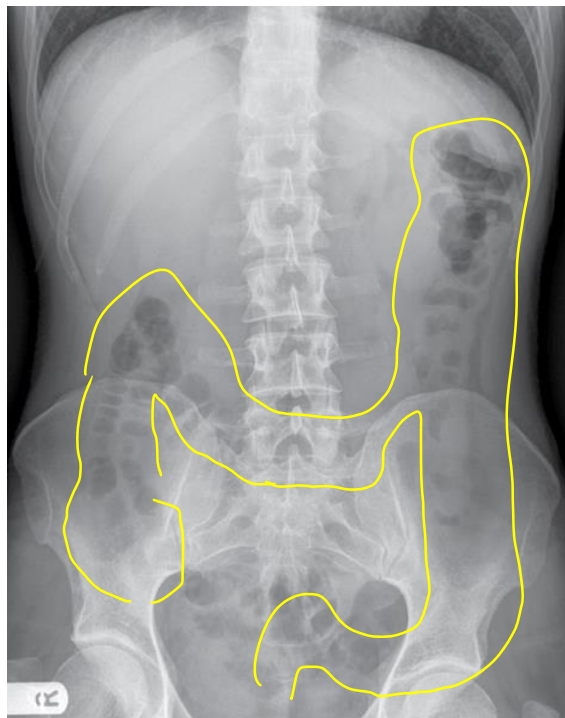


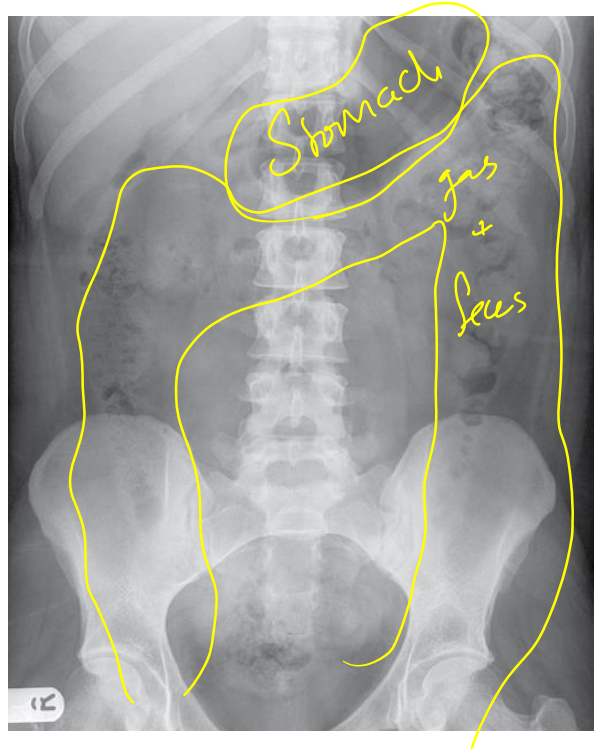
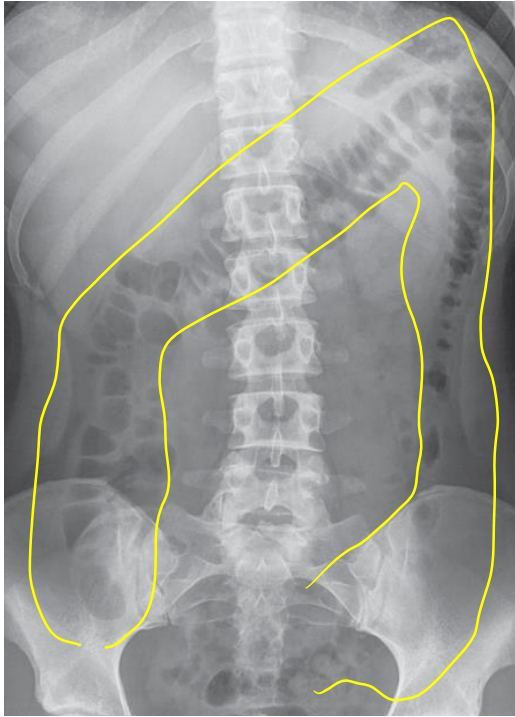
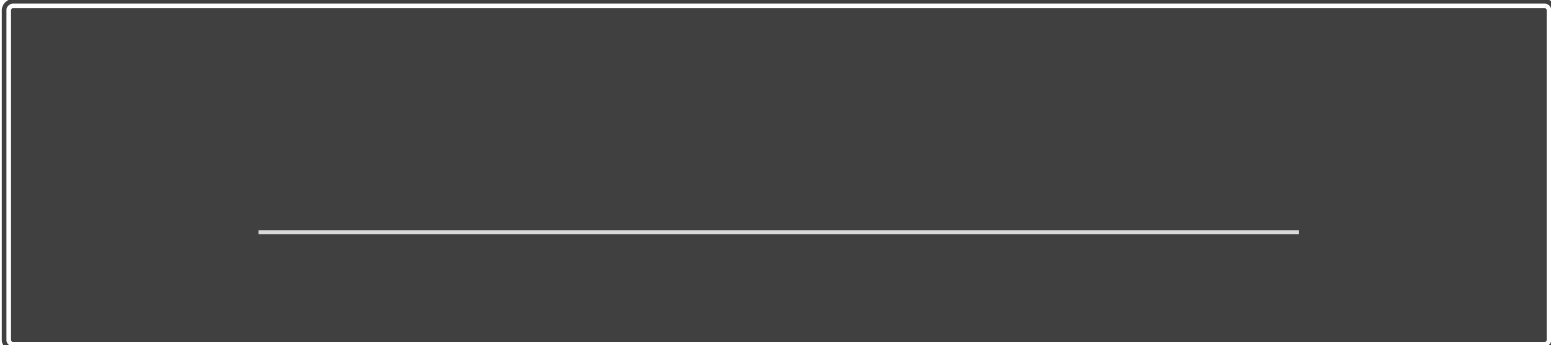
Have some kind of mobility because they're intra-peritoneal structures.



- Abnormalities seen in the colon : 1) Dilatation.
- 2) Abnormal gas distribution

3) Thickened inflamed colon





Be systematic!

- 1. Give the type of radiograph
- 2. Give the patient's name.
- 3. Give the date the radiograph was taken.
- 4. Briefly assess the radiograph quality
- 5. Run through the ABCDE of abdominal radiographs.
- 6. Give a short summary at the end.

supine.
erect.
decubitus
chest XR.

all the levels
are shown?

BBC
↓ ↓ ↓
Bowel Bone Calcification.

if the gas was extra-luminal \therefore it's pathological

normally air in the GIT is intraluminal in the colon + stomach. normally there's no gas in the small intestines, they have water and are collapsed. Gas in the small bowel ??? (oo X)

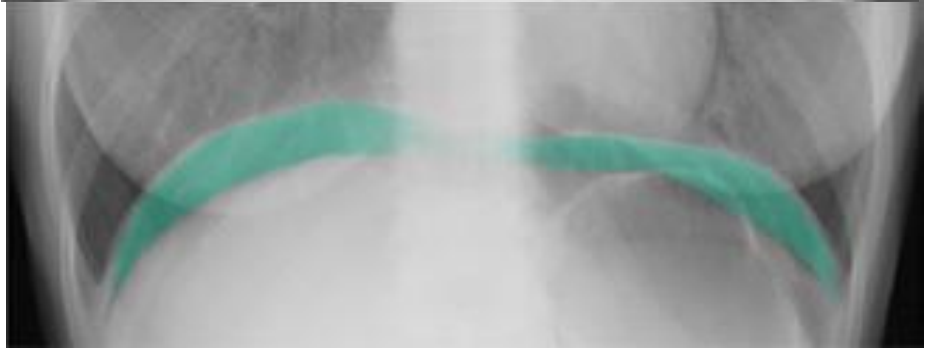
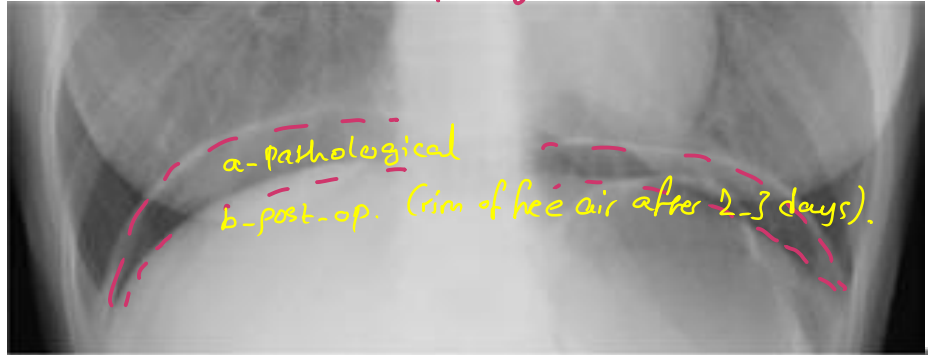
- A is for Air in the wrong place.
- B is for Bowel. $\left\{ \begin{array}{l} \text{small (dilated, prominent). (ileal, jejunal?)} \\ \text{large} \end{array} \right.$
- C is for Calcification. (stones, calcified BVs, calcified pancreas...etc)?
- D is for Disability (bones and solid organs).
- E is for Everything else.
(foreign body, drain, suture... etc?)

A

free intra-peritoneal air.

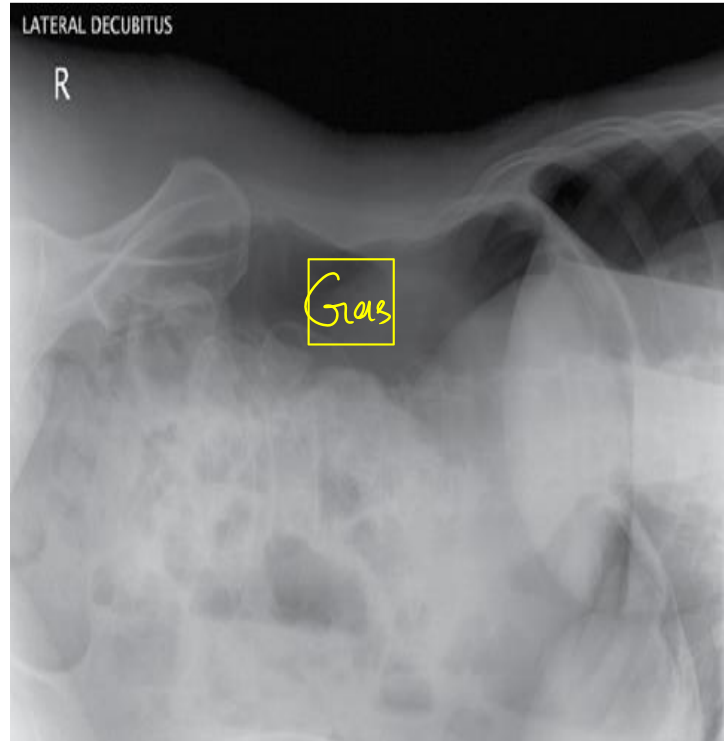
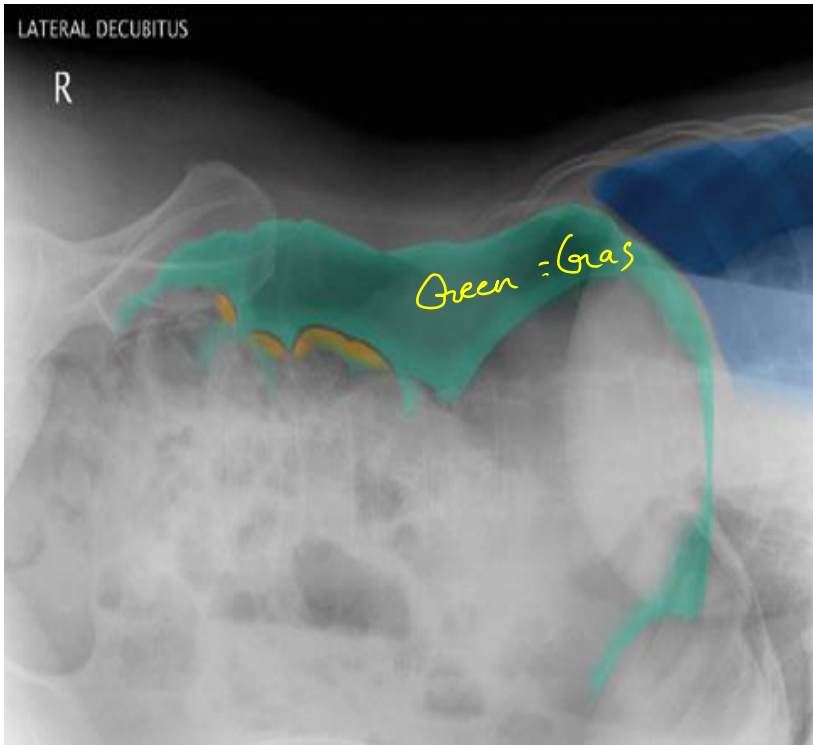
o Erect chest X-Ray :

Air. under diaphragm.



A

* Lateral decubitus abdominal X-Ray:



Ascending

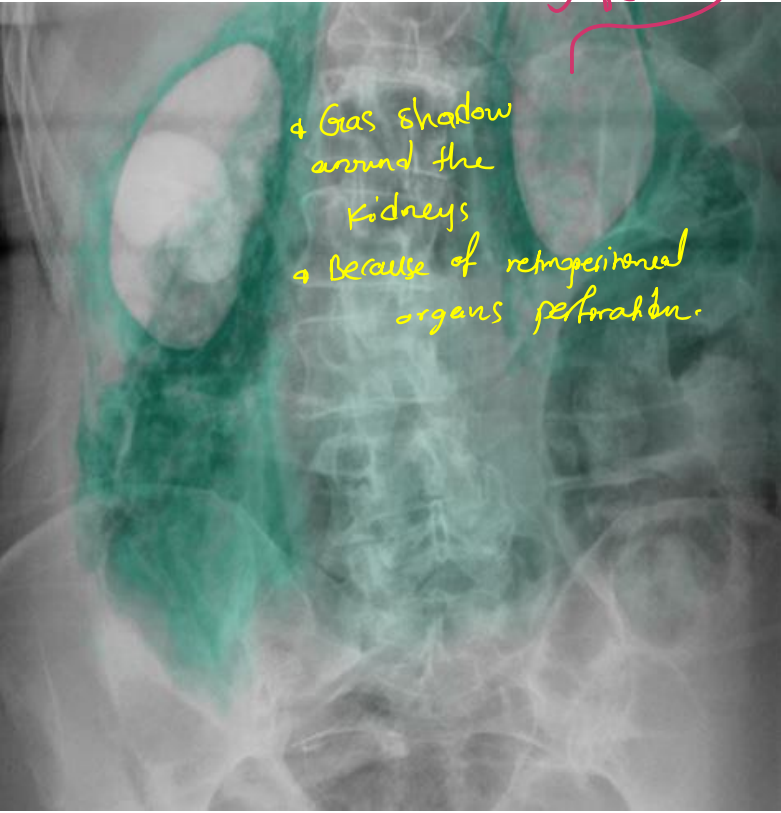
Descending

A

Those are retroperitoneal structures, so free intraperitoneal air wouldn't be shown under the diaphragm.

Rectum

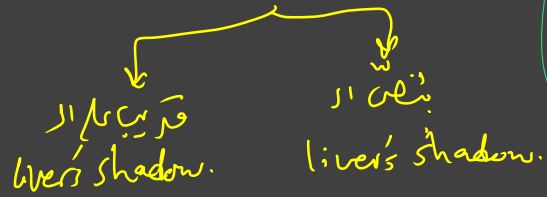
Gas shadow around the kidneys
because of retroperitoneal organs perforation.



• Second example of air in abnormal place:

Anything that doesn't contain air cannot be observed on x-ray.

- Gas in the biliary system.

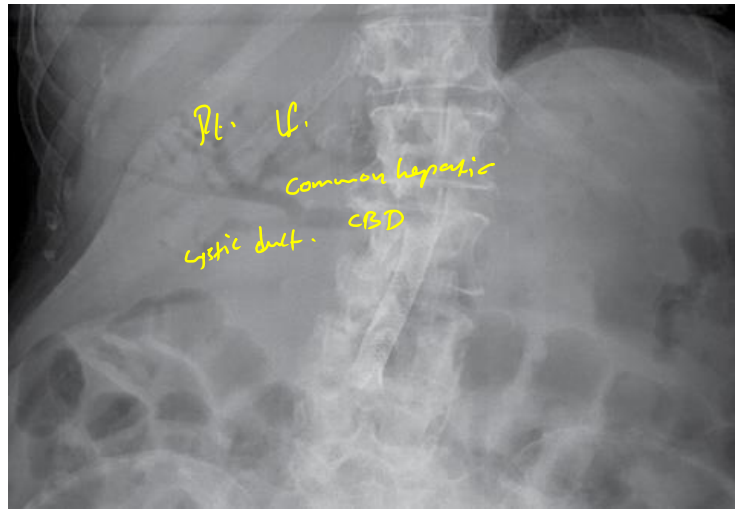


Cholecystoduodenal fistula.

A

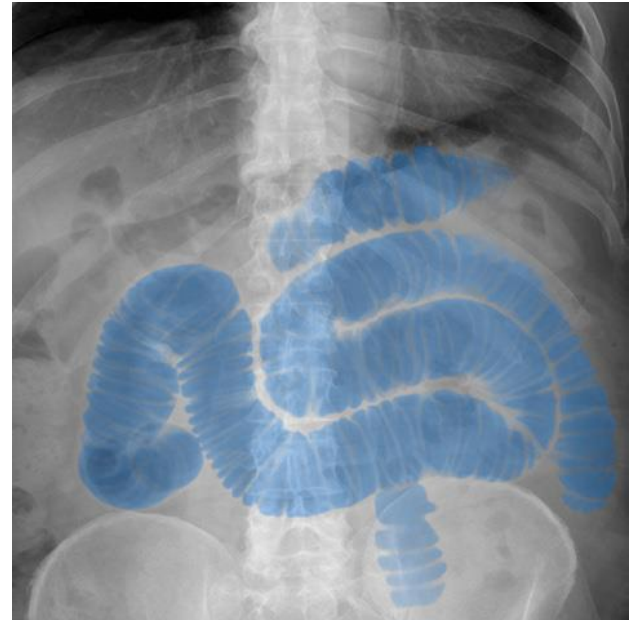
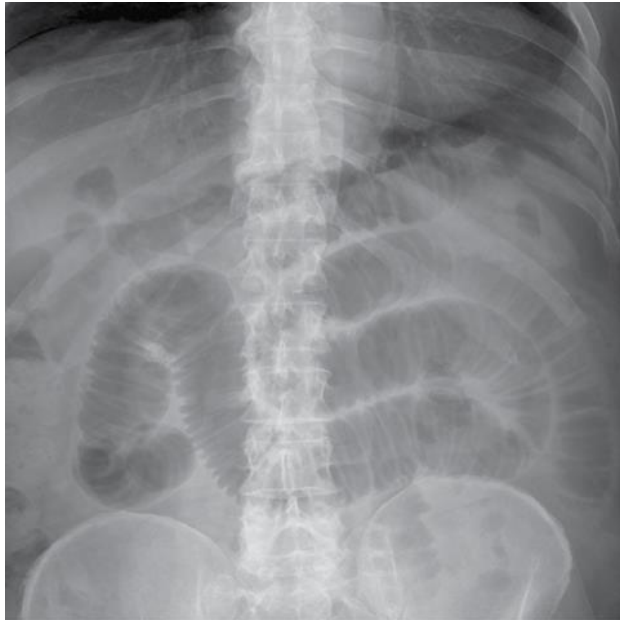
ERCP.

Severe infection, emphysematous idk or ascending bacterial cholangitis



⊕ another picture: Gas in the portal system (very bad prognosis and high mortality rate)
 mesenteric ischemia Enterocolitis

- * **B** - Bowel
 - centrally located.
 - plicae circularis (jejunum) ^{step} ladder appearance.
- Diameter of small bowel
 - < 3cm → prominent.
 - > 3cm → Dilated



✦ Erect abdominal X-Ray:

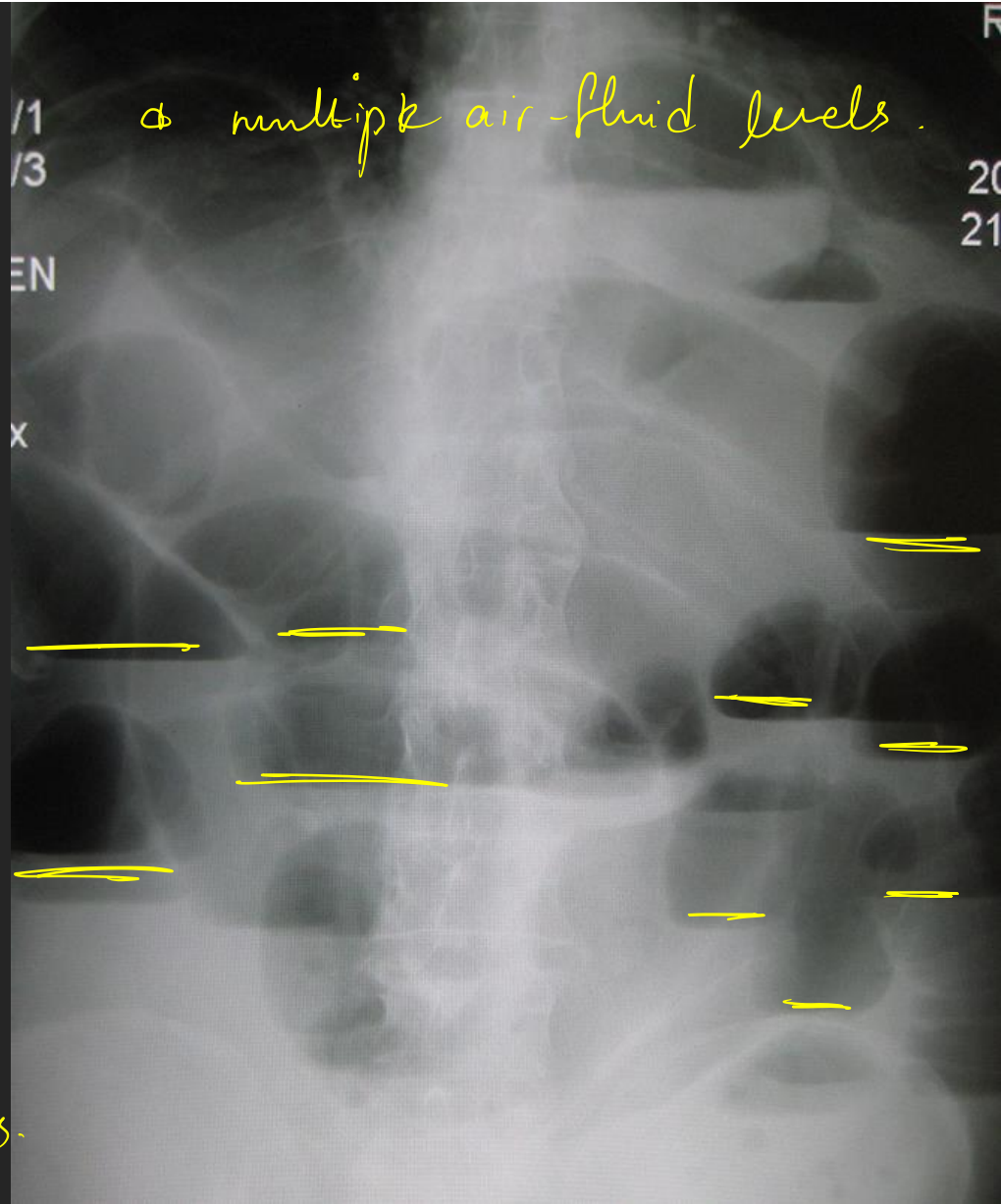
Erect air / fluid level

✦ ileus

✦ Gastroenteritis.

✦ Obstruction

}
clinical
Hx determines.



↳ localized jejunal dilatation

→ sentinel loop.

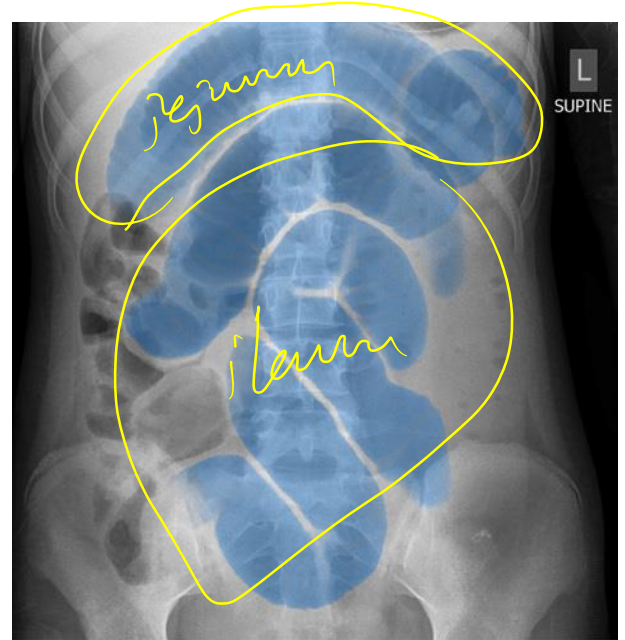
Localized ileus due to
(pancreatitis, diverticulitis, appendicitis) inflammatory process



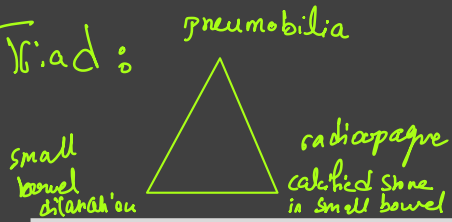
Second



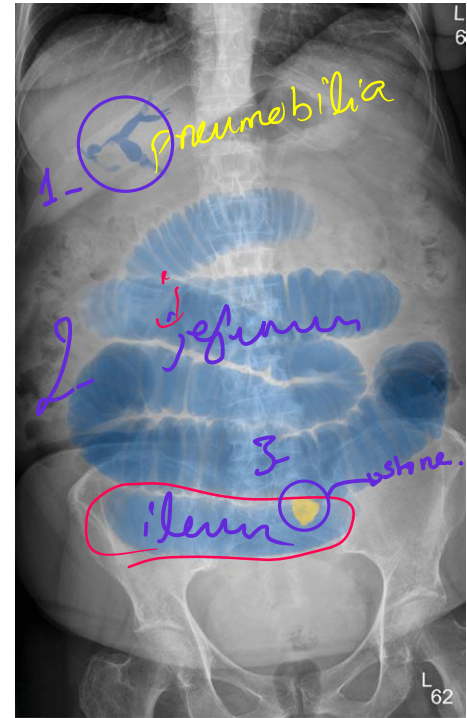
* featureless ~ tube like \Rightarrow ileum.



Richter's Triad:



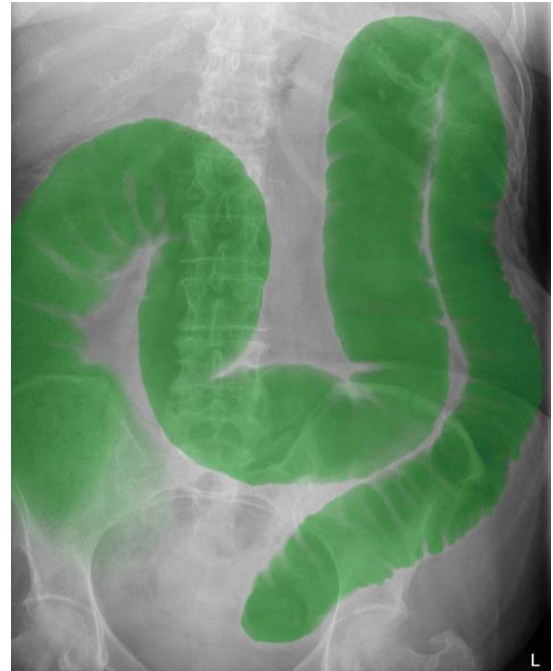
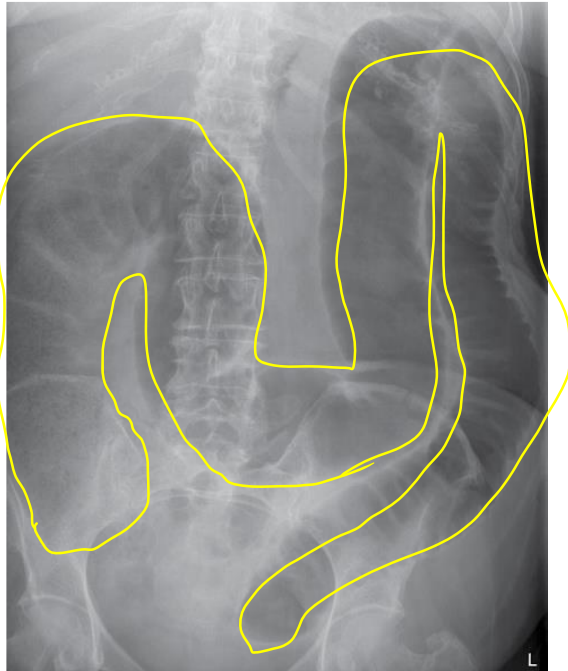
intestinal obstruction 2^ory to gallstones.
gallstone ileus



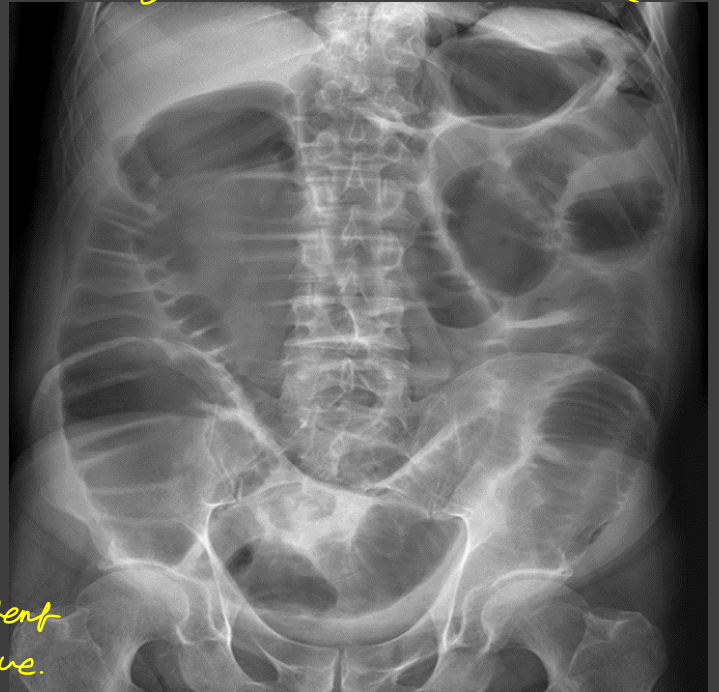
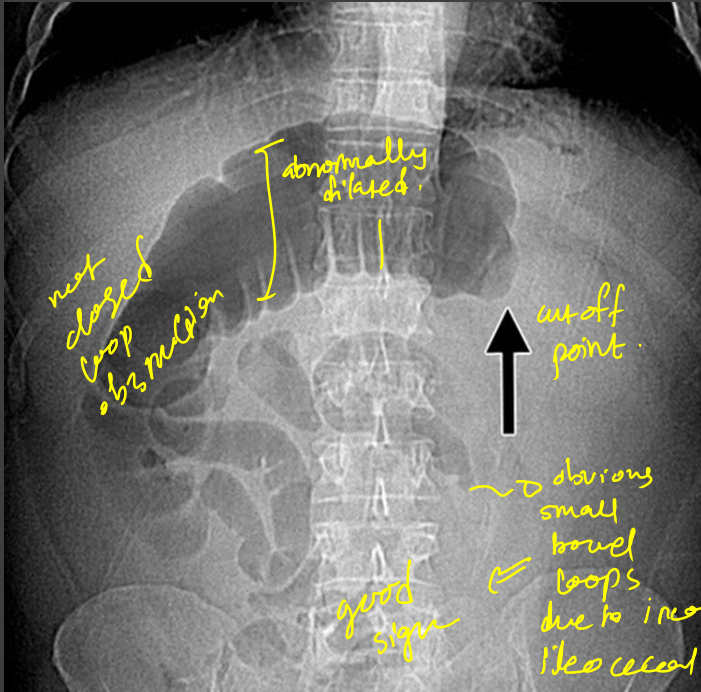
• Colon → Dilated
see if it's >6cm.

∴ abnormally dilated
full gaseous, almost
no haustrations.

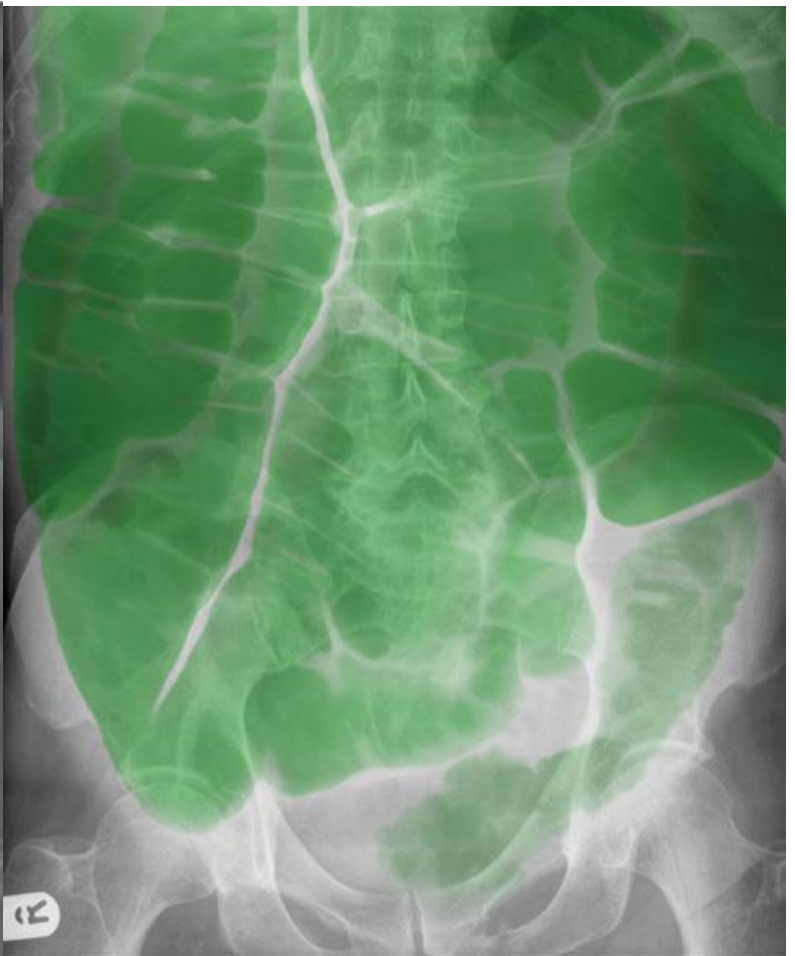
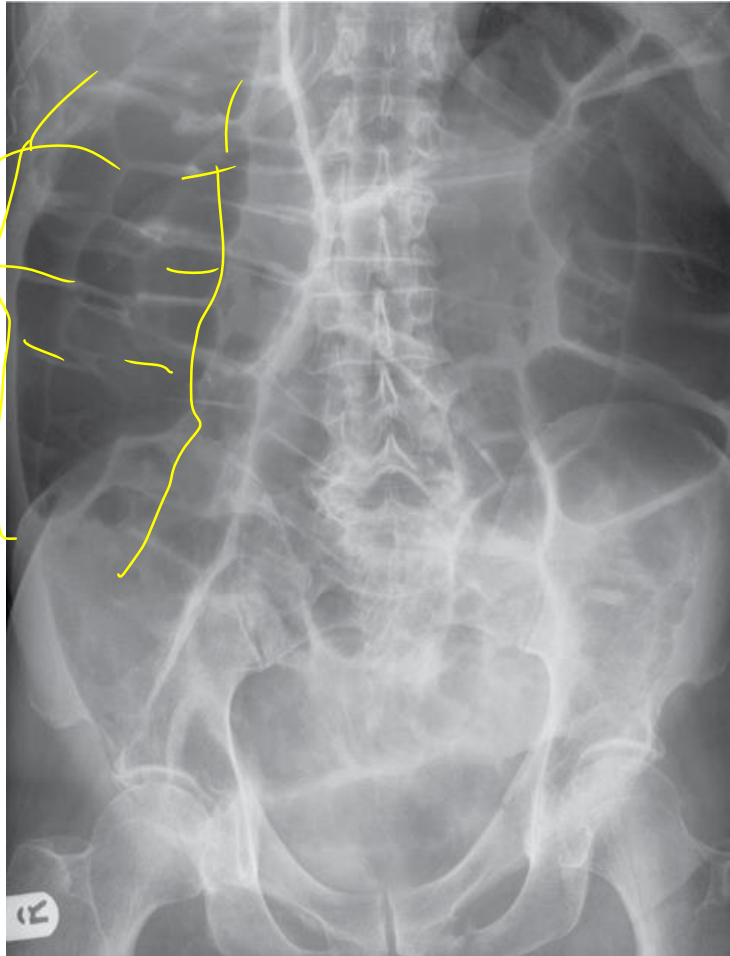
* mostly due to colonic obstruction
due to tumor at the rectosigmoid
junction.



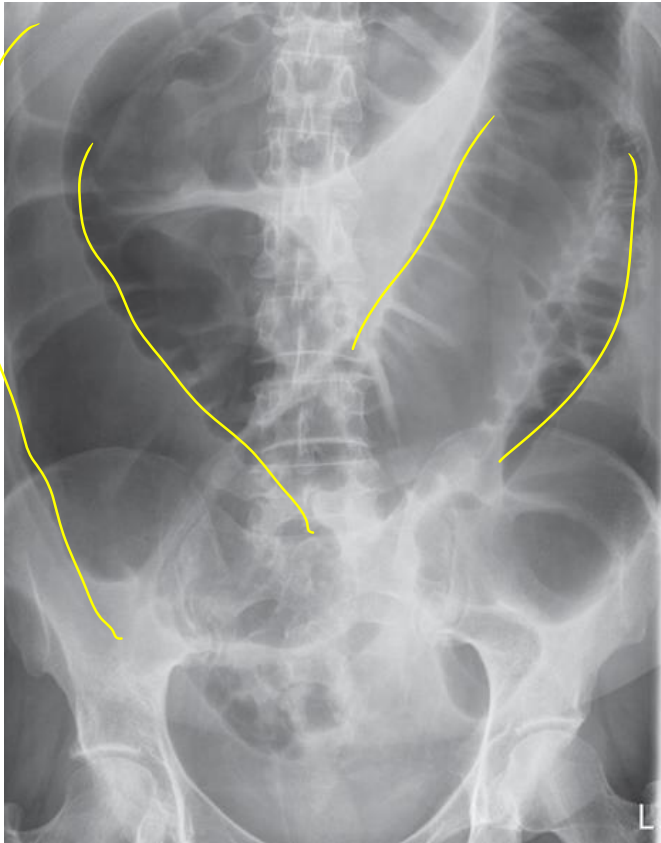
gaseous distention of the colon



o uncomplete lines → hausrations due to tension of linea coli.



→ Dilated colon >6cm.



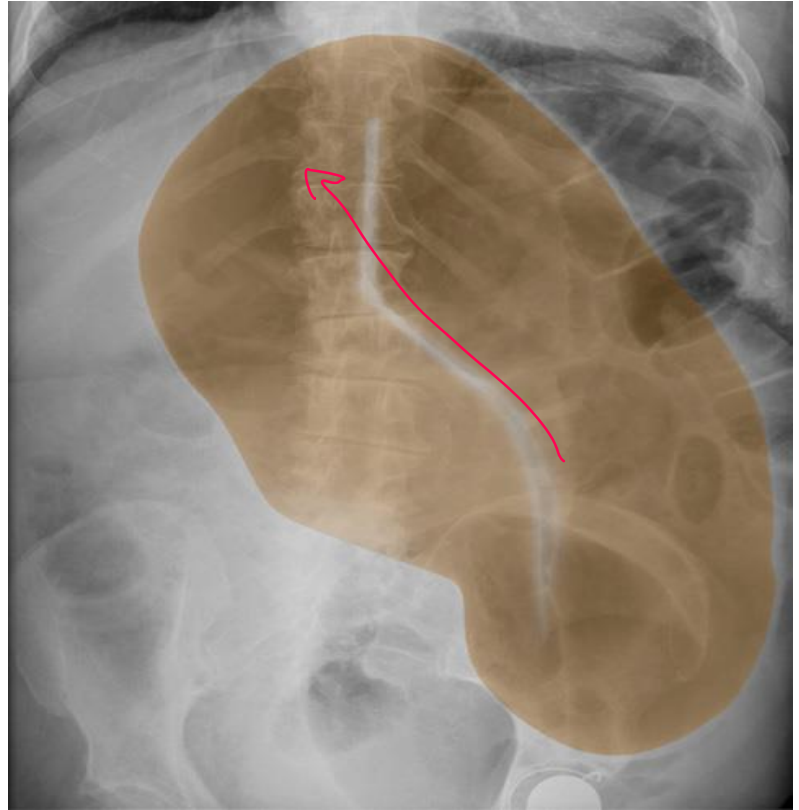
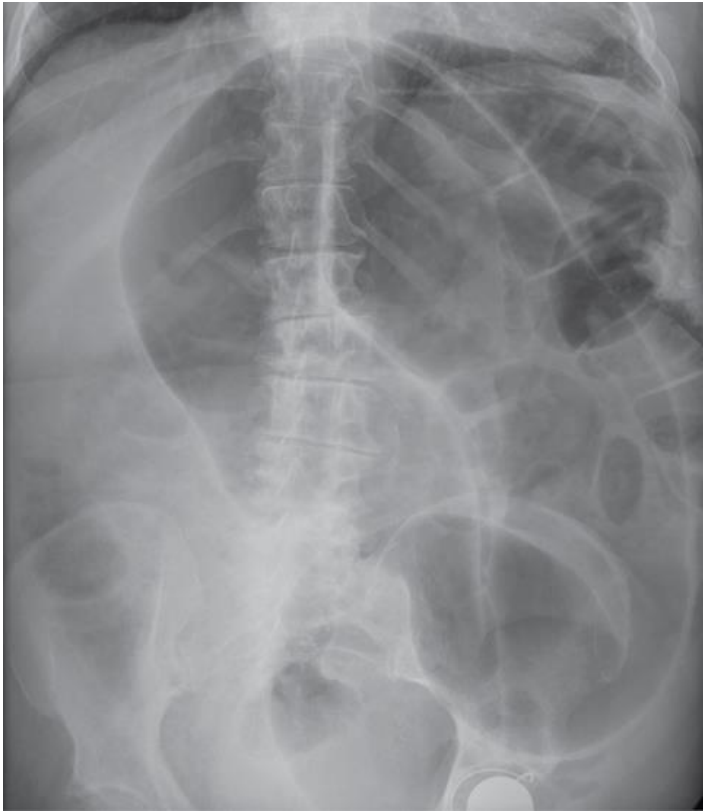
→ Two types of colonic volvulus:



when the colon twists over its mesentery.

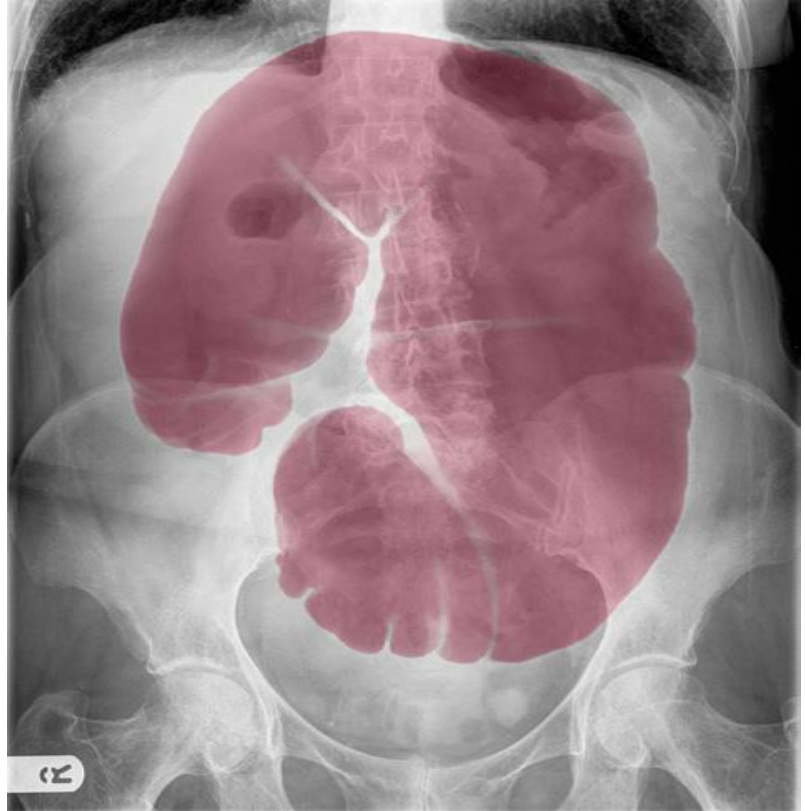
Sigmoid
Volvulus

- 1. Toward RUQ.
- 2. Coffee bean-like.
- 3. no haustrations
- 4. ? apparent proximal of large bowel.

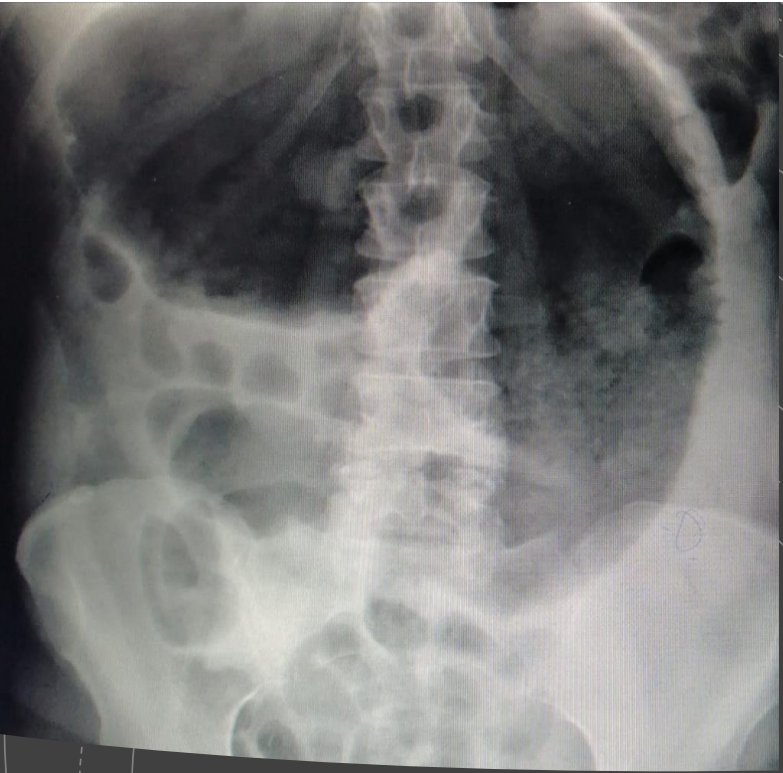


cecal
colicns .

- 1- Embryo sign / coma sign.
- 2- Towards LUQ.
- 3- Haustrations.
- 4- Distal large bowel won't be apparent on X-Ray.

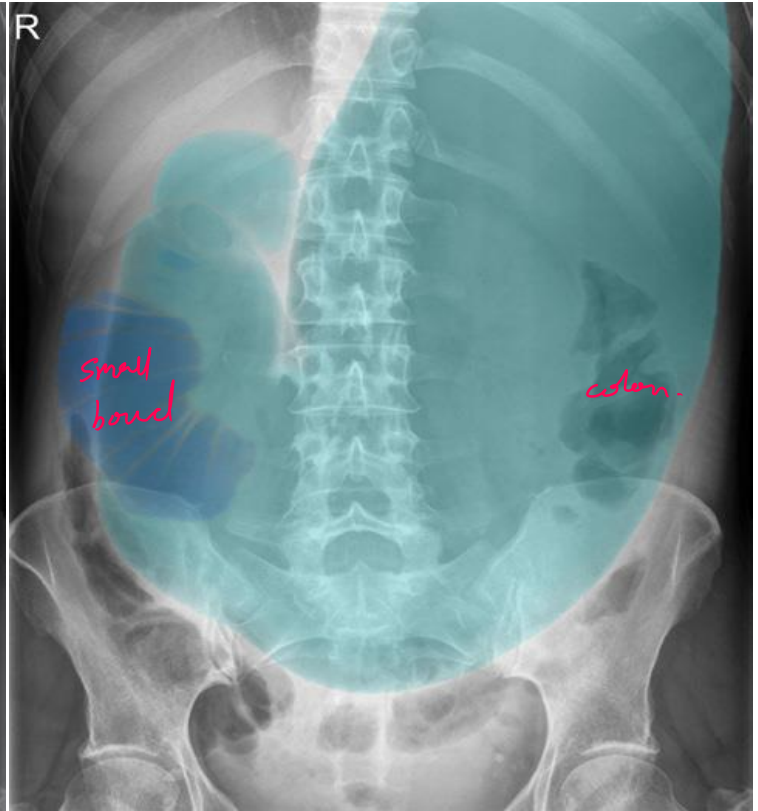


Caecal volvulus - 'Caecal embryo' sign

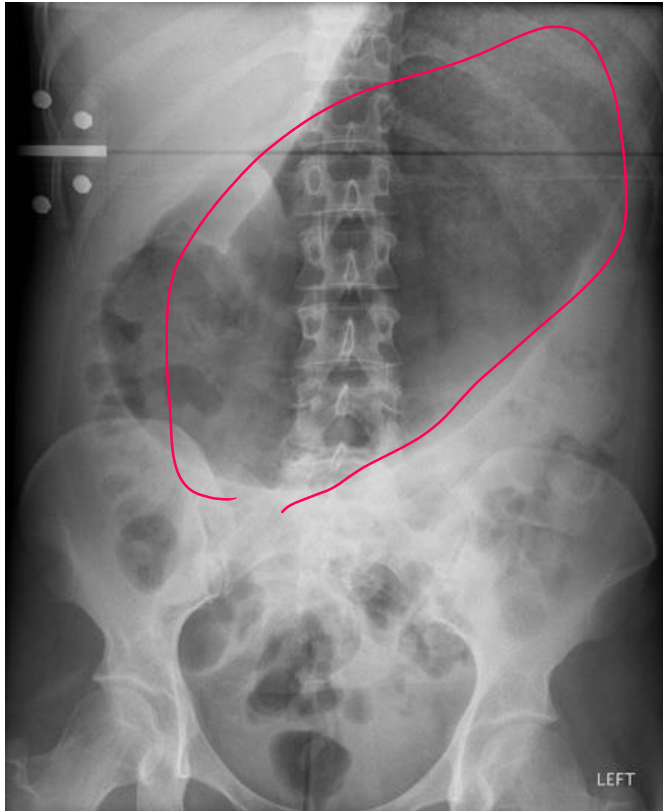


• Stomach dilatation : Gaseous.

NG-insertion Decompression.

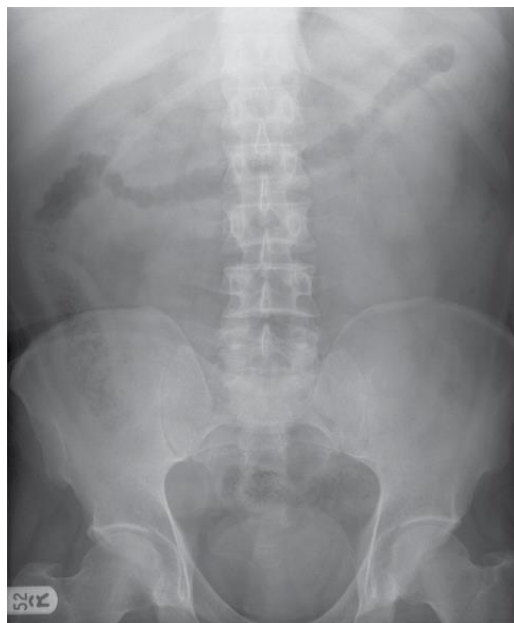


also



• small bowel hernia.

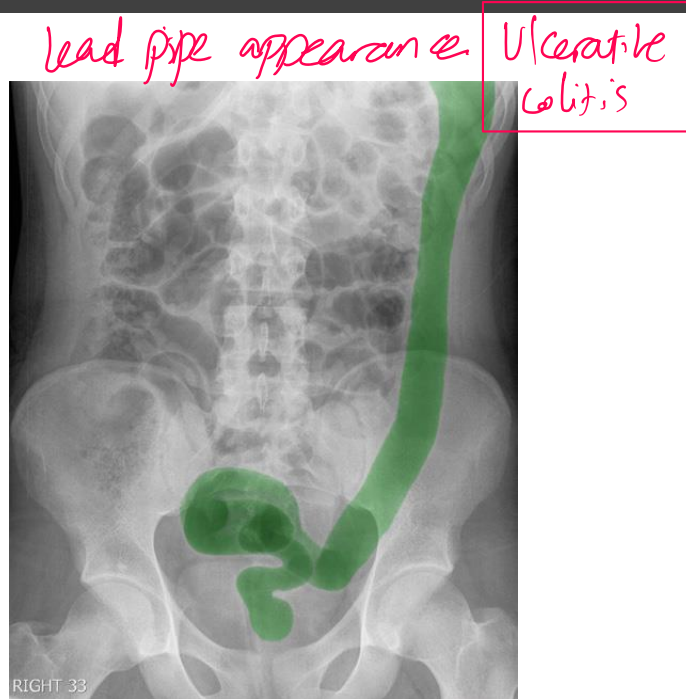


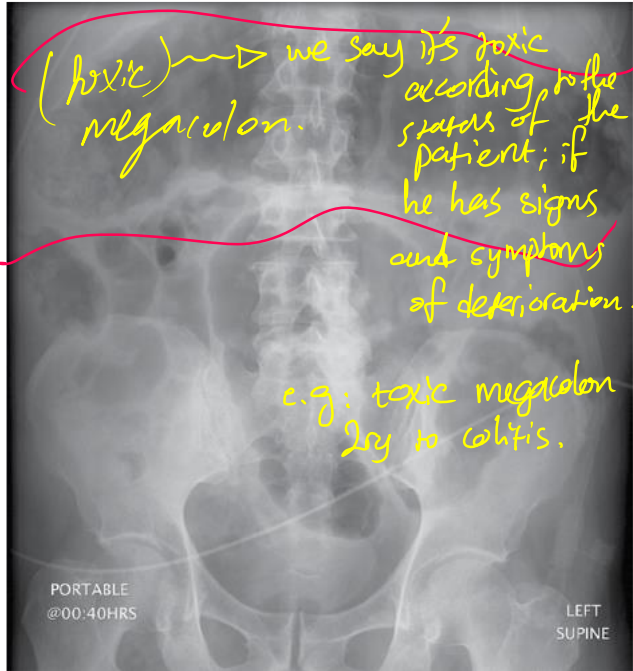


Thickened + no haustrations

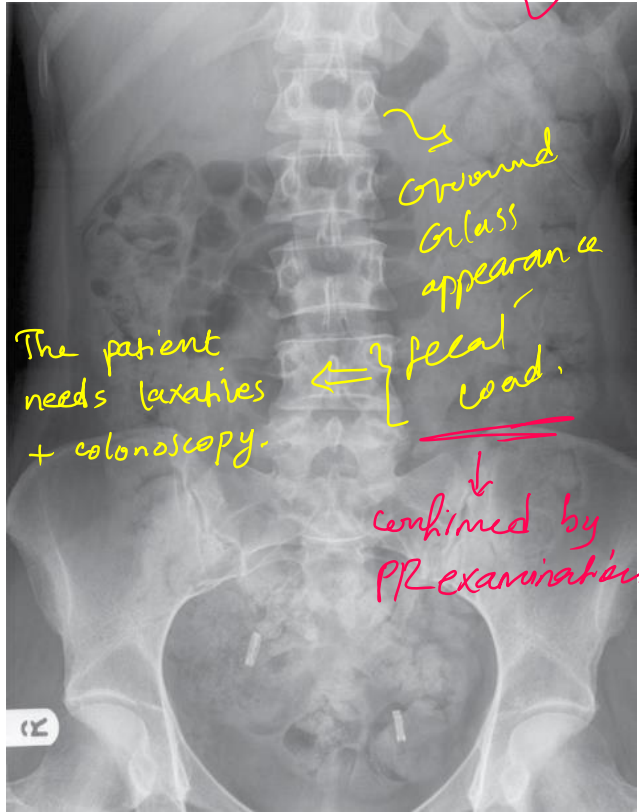
↓

maybe Colitis →



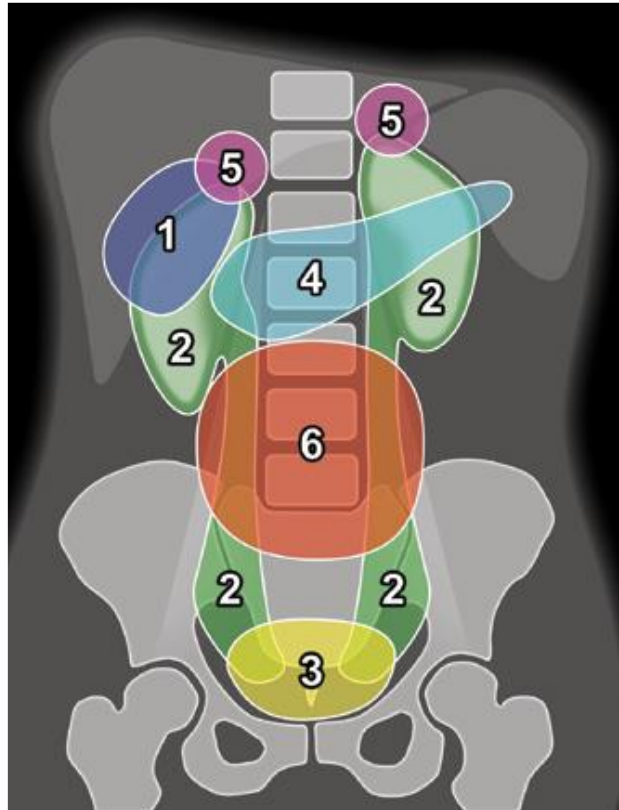


Clinical case: A patient complains of intestinal obstruction symptoms like (constipation, distention...) and on abdominal X-Ray we don't find dilated bowel or abnormal gas distribution but we find \Rightarrow



Calculations.

4 Common Sites :



1- Gallbladder / Gallstones

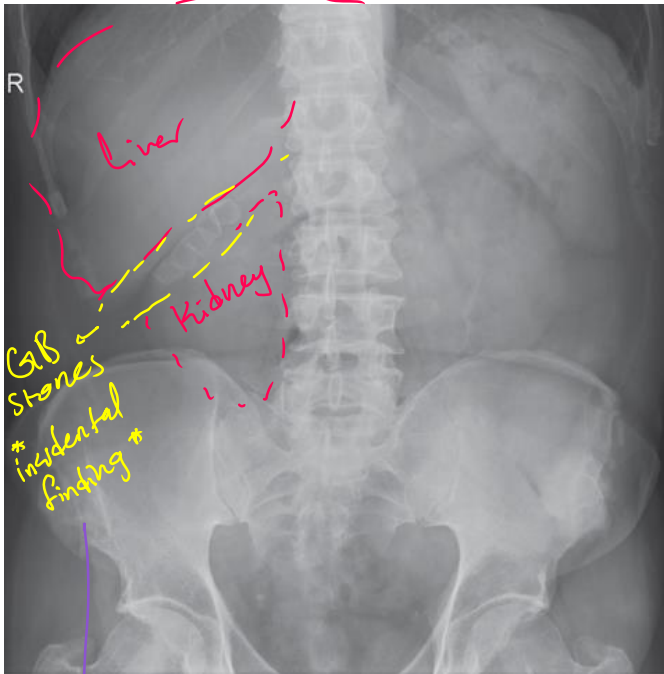
2- Against the 12th
rib → kidneys.

3- US.

4- Pancreas.

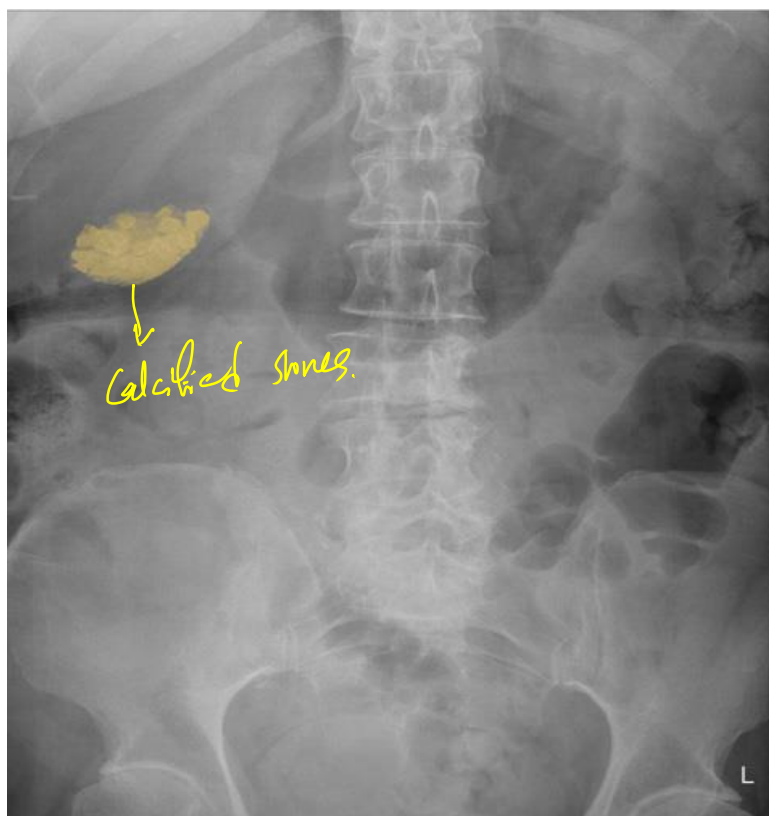
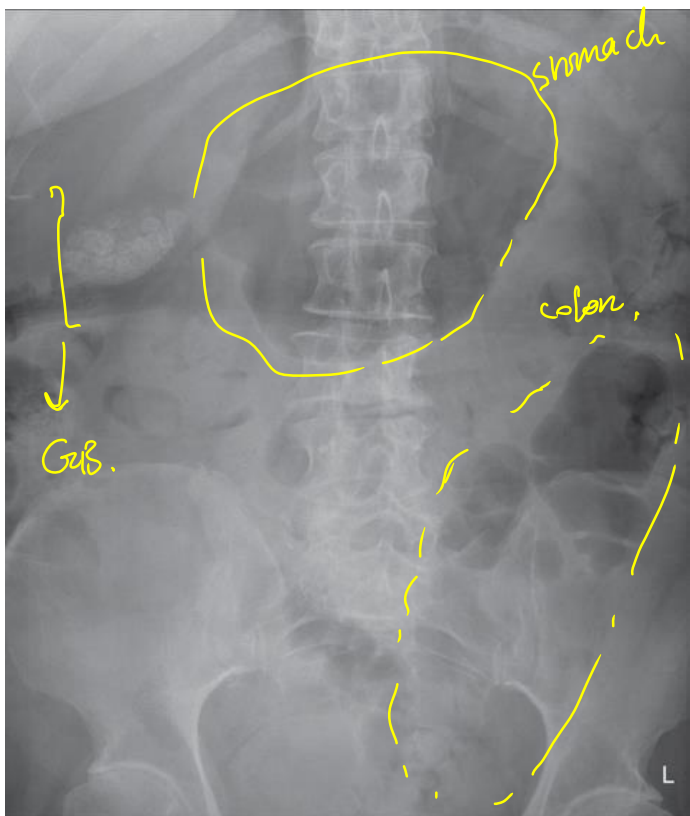
5- Adrenal glands
(after hemorrhage)

6- Abdominal aorta.



↳ Because the first imaging modality to evaluate the biliary system

↳ Abdominal Ultra Sound



⊕ calcification of the gallbladder itself.

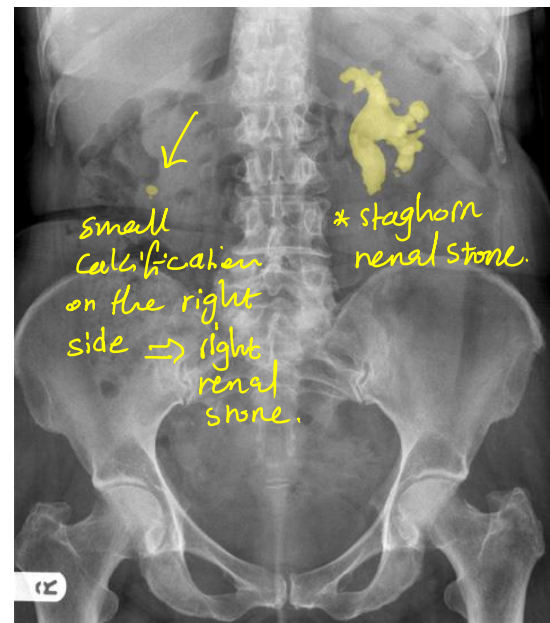
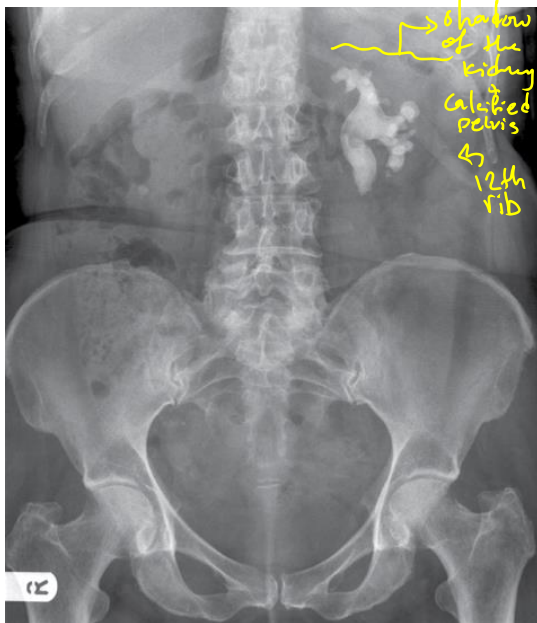


"Porcelain GB"

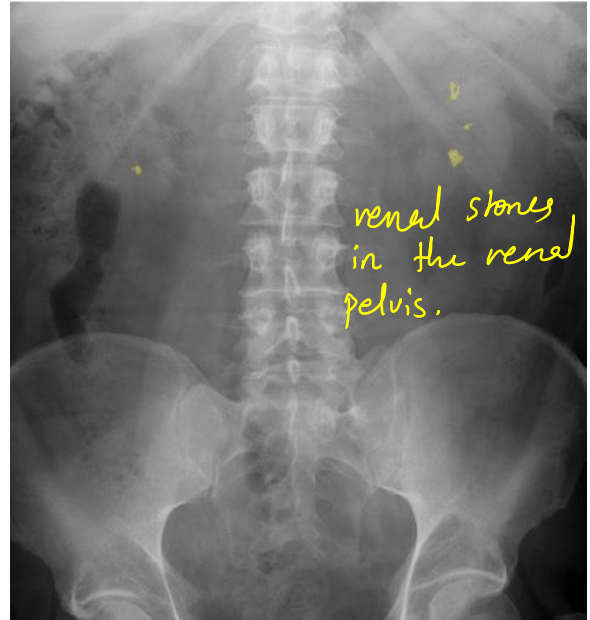
- * incidental finding.
- * ↑ risk of malignancy.
- * Cholecystectomy is advised.



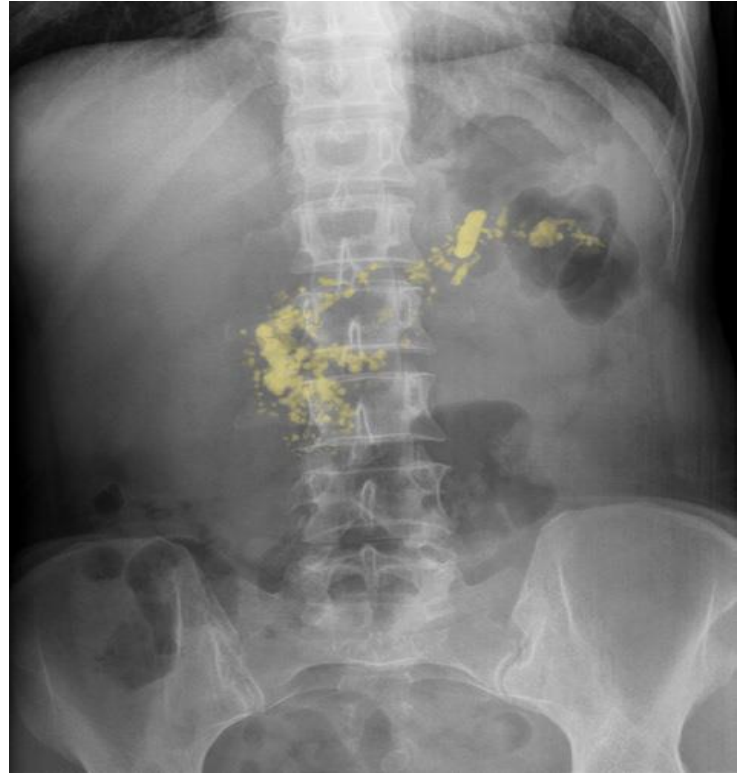
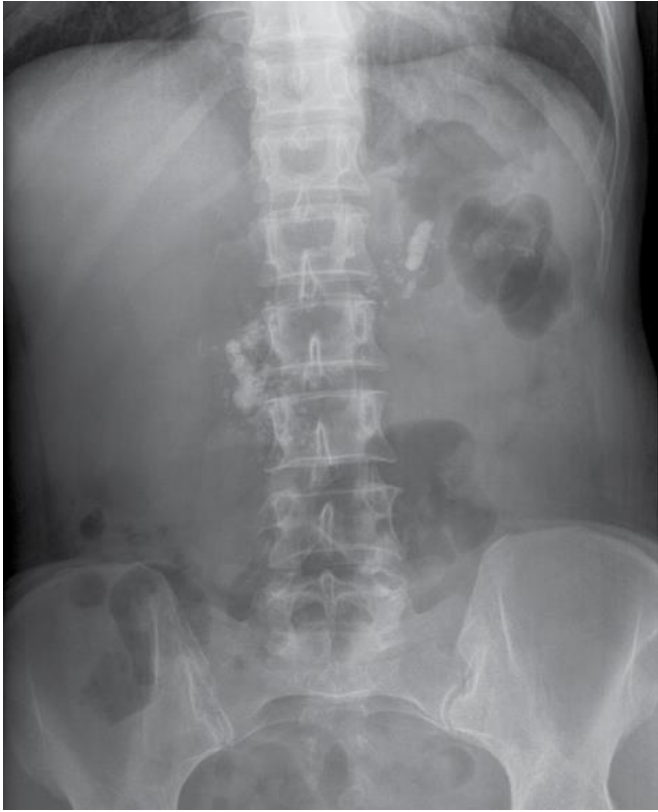
Staghorn stones are large and branching stones that fill part or all of the pelvicalyceal system. They are usually unilateral and less common in men. They are linked to urease-producing bacterial infections and, hence, known as struvite infection stones.

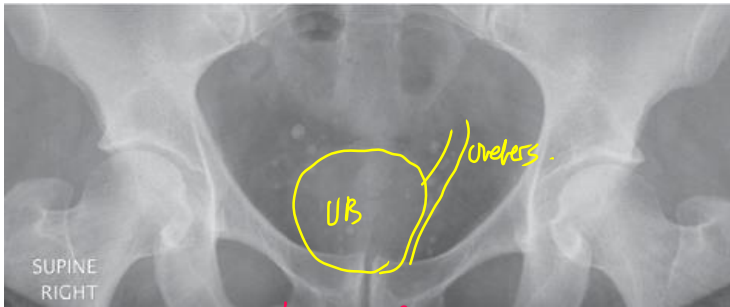


→ our landmark anatomical structure is the 12th rib → the shadow against it is the kidney's.



The calcification here is at the distribution of the pancreas → suggesting chronic pancreatitis.





✦ small rounded calcifications in the
 the UB site, but some are outside the UB
 ∴ might be in the ureters and others are totally
 outside the UB and ureters' course →
 those are called **Phleboliths** (calcifications in the veins)

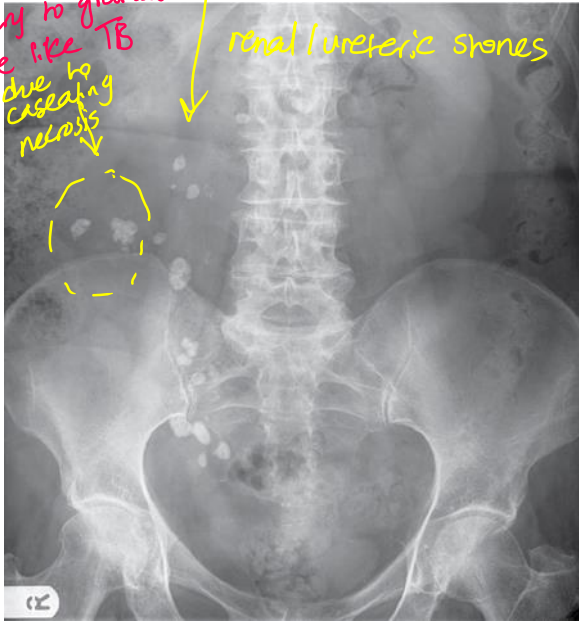


✦ calcified ribs; in the elderly with
 osteoporosis.

confirmed by CT contrast (without contrast if we were suspicious about their site).

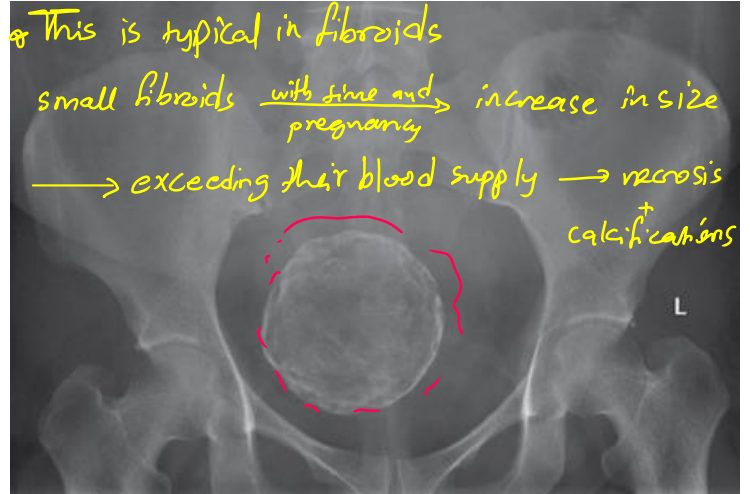
calcified mesenteric
LNs, due to granulomatous
disease like TB
due to caseating
necrosis

renal/ureteric stones

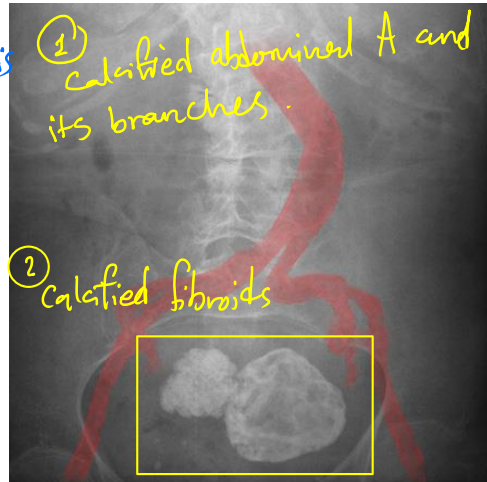


Calcified fibroids

This is typical in fibroids
small fibroids $\xrightarrow{\text{with time and pregnancy}}$ increase in size
 \rightarrow exceeding their blood supply \rightarrow necrosis
calcifications



* Tortuous calcifications at the course of the splenic artery → 2ry to atherosclerosis





∞ incidental finding of pregnancy on XRay

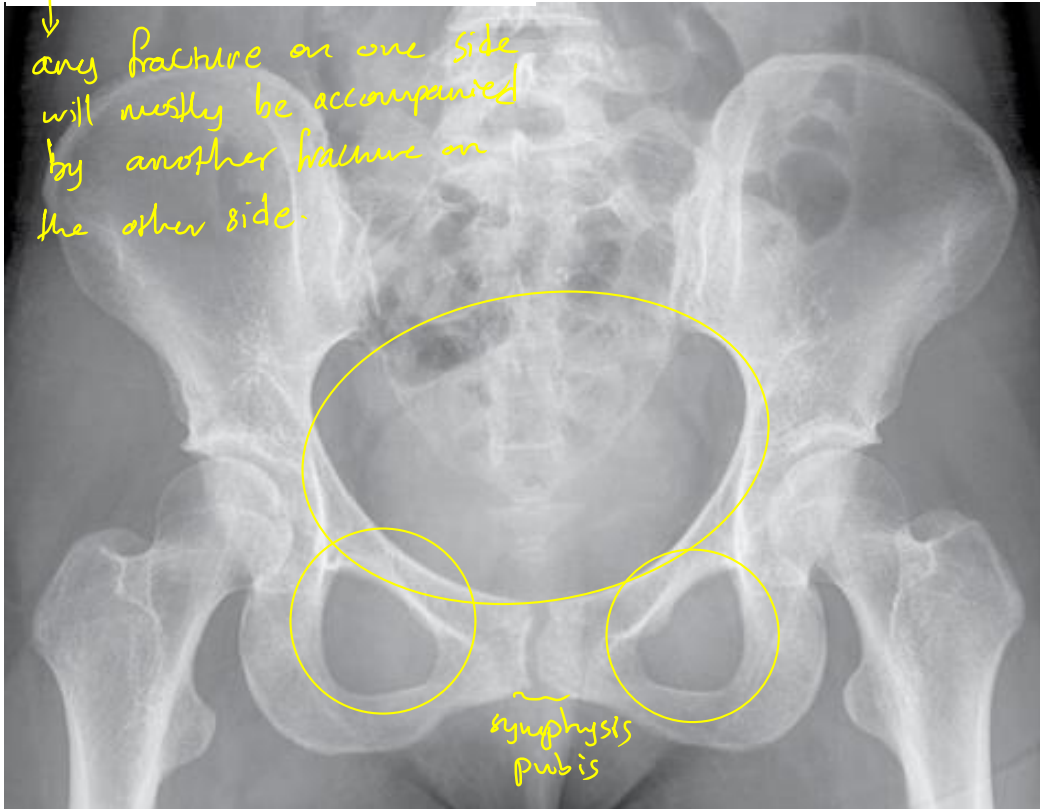
Disability.

- Pelvic fractures – 3 Polo rings test
- Sclerotic and lucent bone lesions \leadsto Inf to mets.
- Spine pathology
- Solid organ enlargement \leadsto X-Ray is not perfect choice for this.

3 Polo rings test

pelvic ring.
obturator foramen
= .

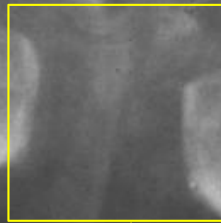
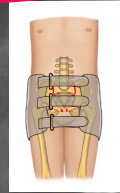
↓
any fracture on one side
will mostly be accompanied
by another fracture on
the other side.



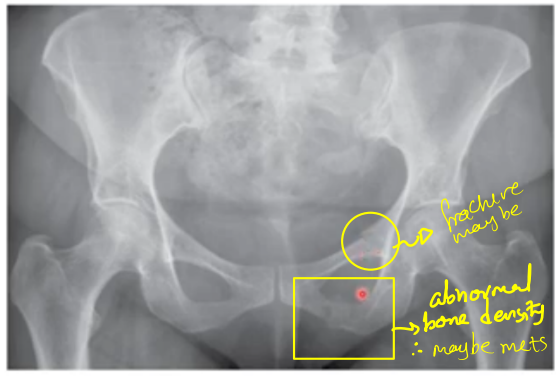
(احتياطاً في علاجها)

⊕ pelvic open book fracture (common + post trauma)

- High risk of massive bleeding in the pelvis
- it's an emergency and we put a pelvic binder. (Tamponade effect on bleeding or hematoma to stop them).

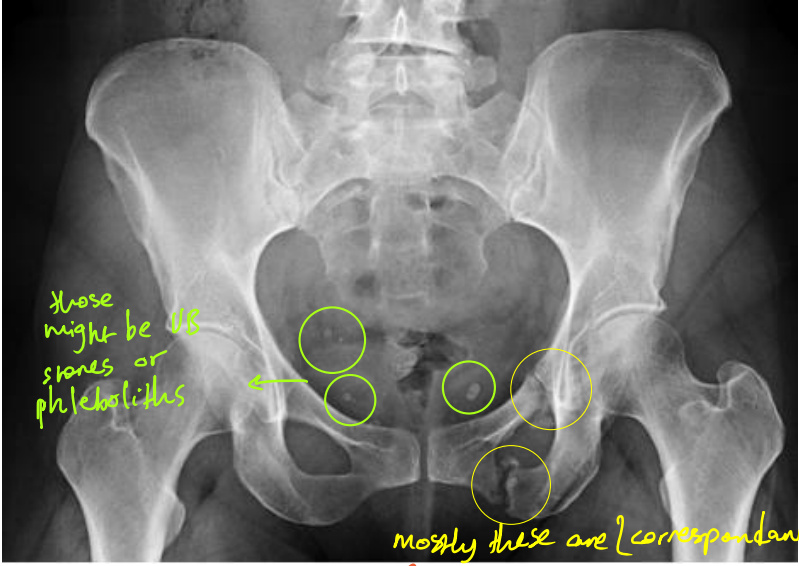


⊕ widely separated pelvic bones.



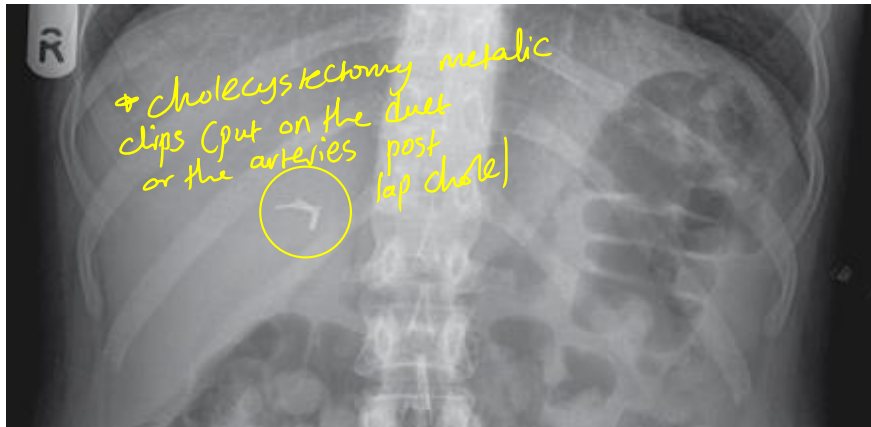
fracture
may be

abnormal
bone density
∴ maybe mets

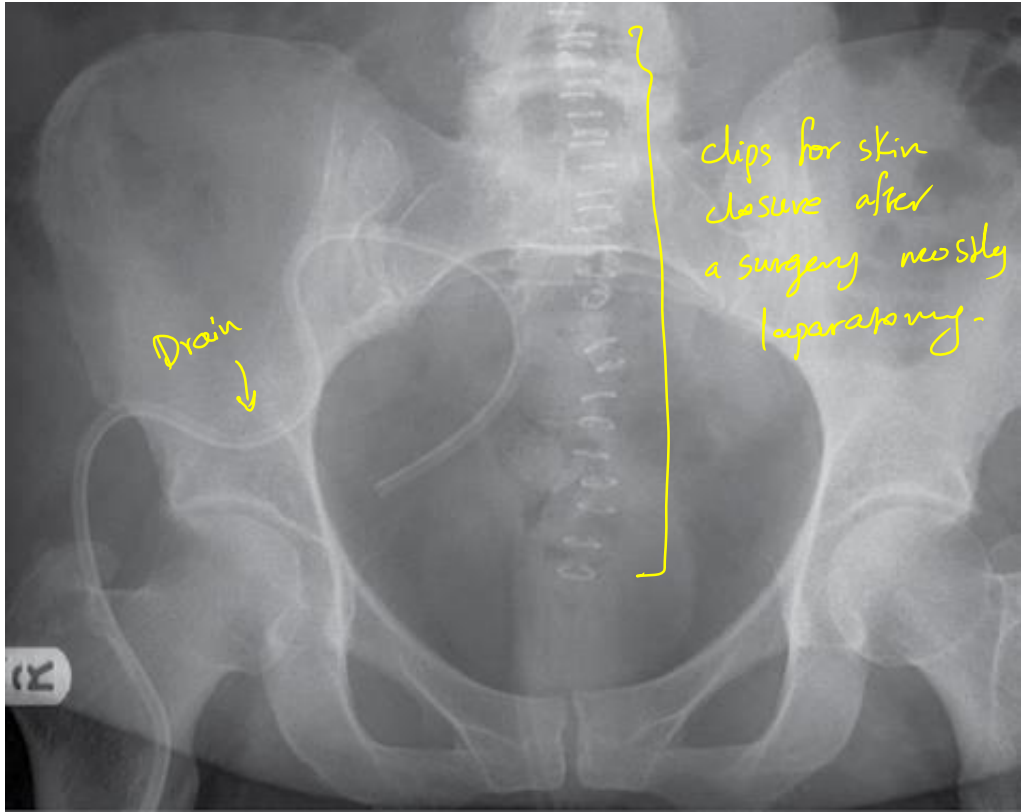


those
might be US
stones or
phlebotitis

mostly these are [correspondant
fractures.



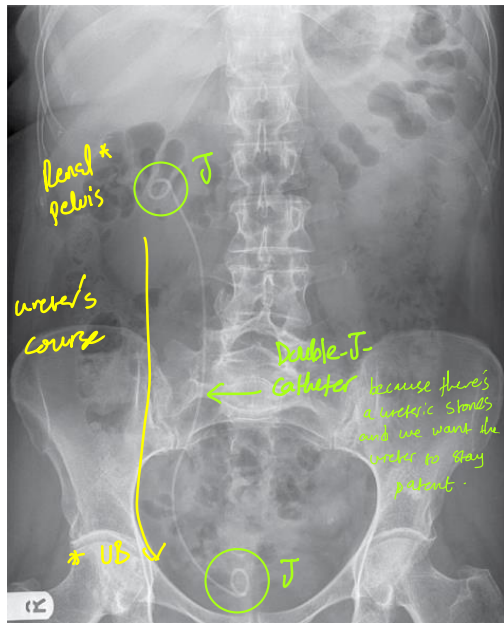
Everything else.



Drain
↓

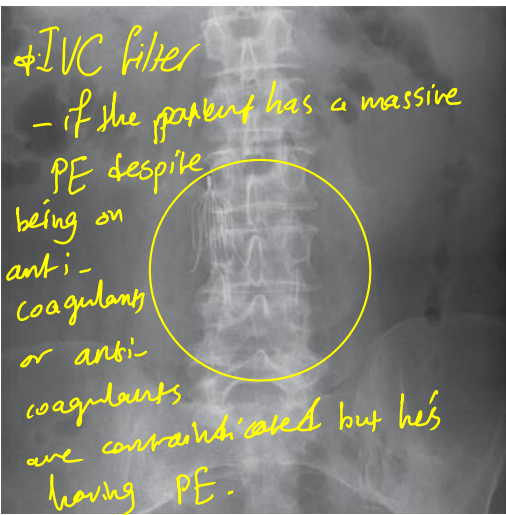
clips for skin
closure after
a surgery mostly
laparotomy.

21

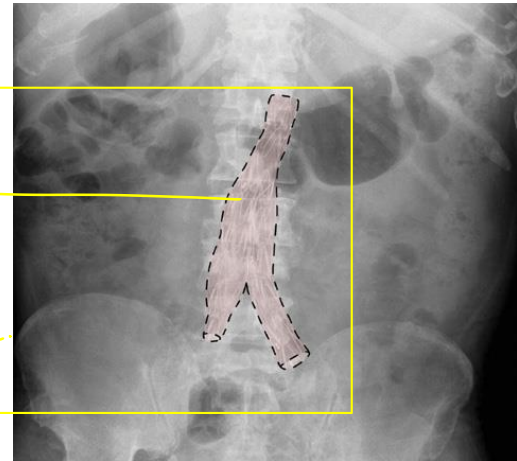


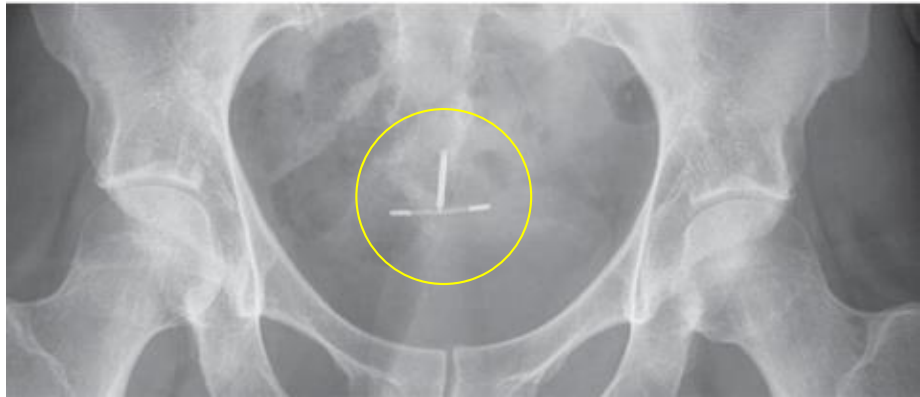
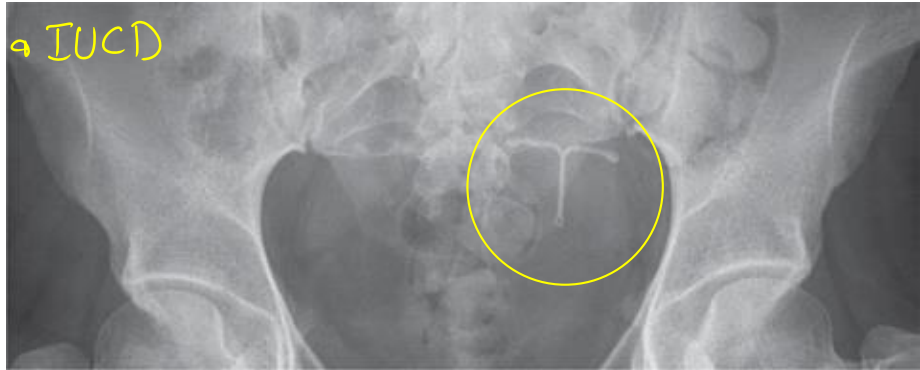


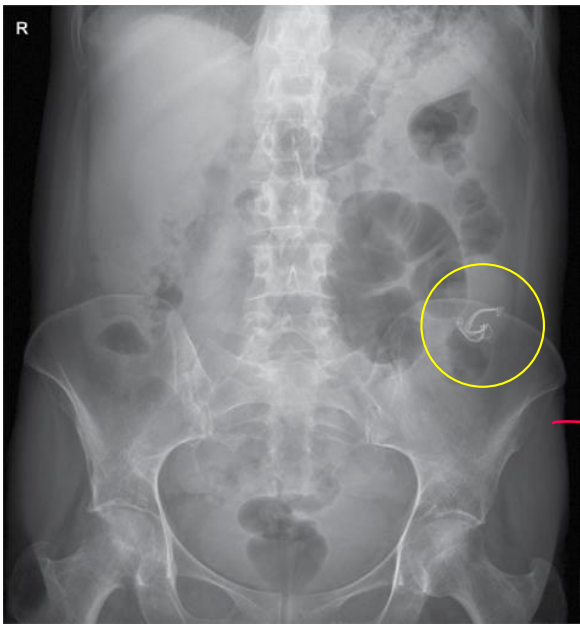
Typical image of IVC filter



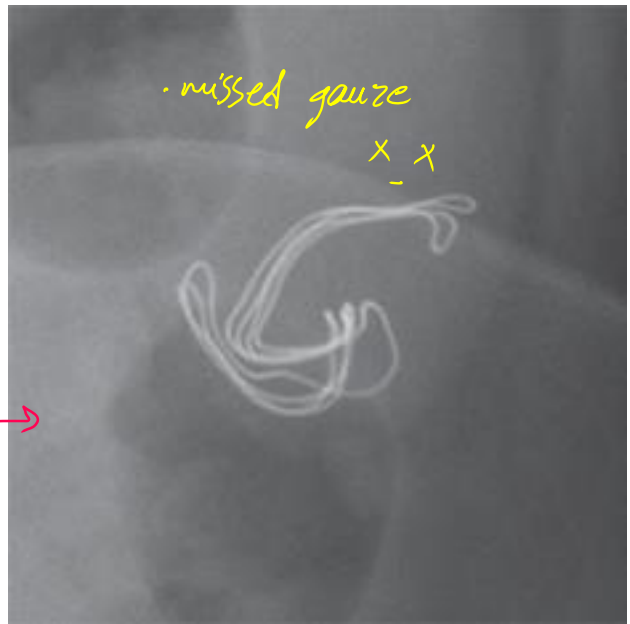
⊕ This a graft mostly this patient has abdominal aortic aneurysm.

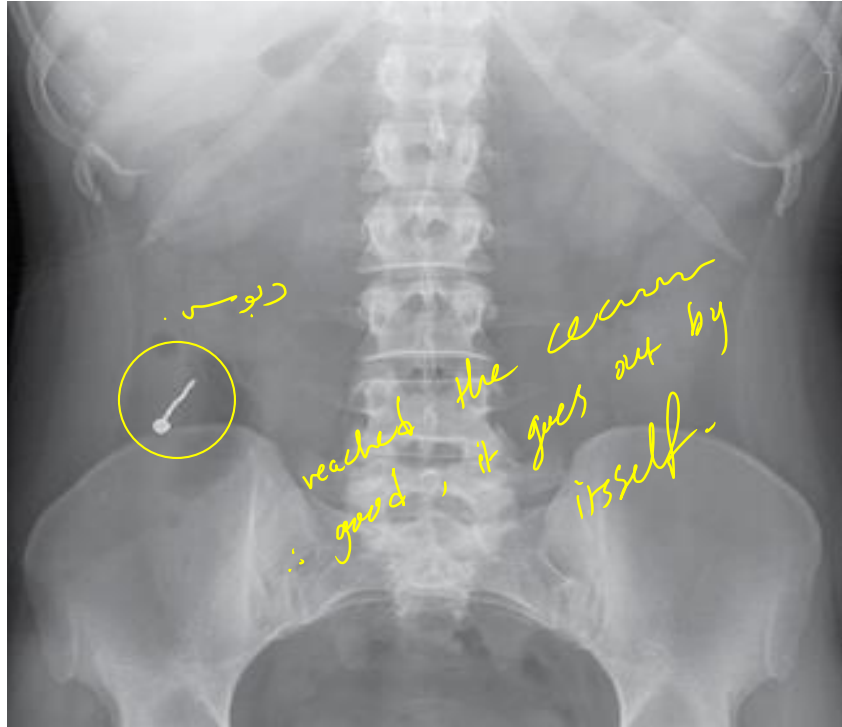






200x →







A: check if there's air in an abnormal place.

pneumobilia.

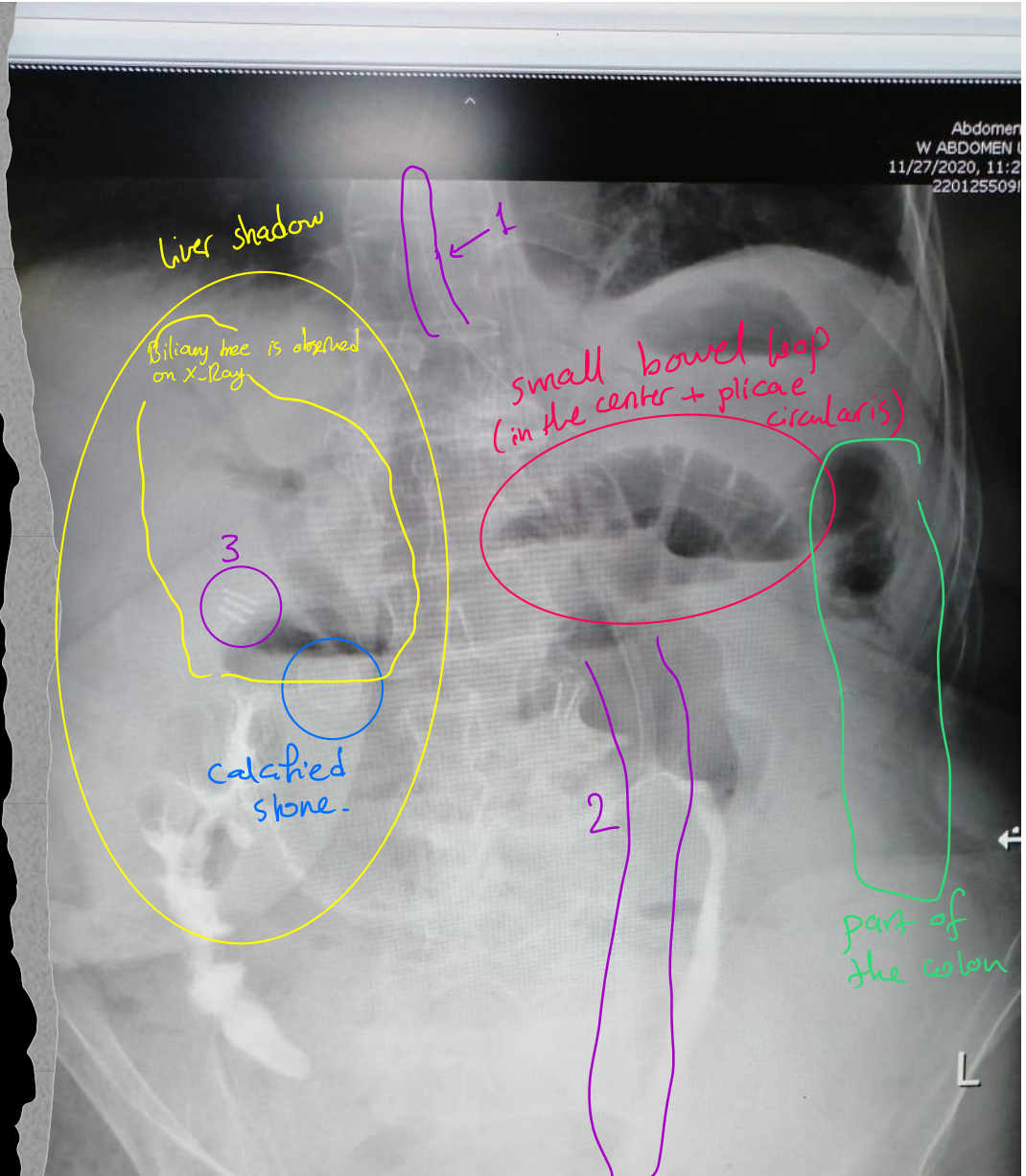
B: jejunal loop.

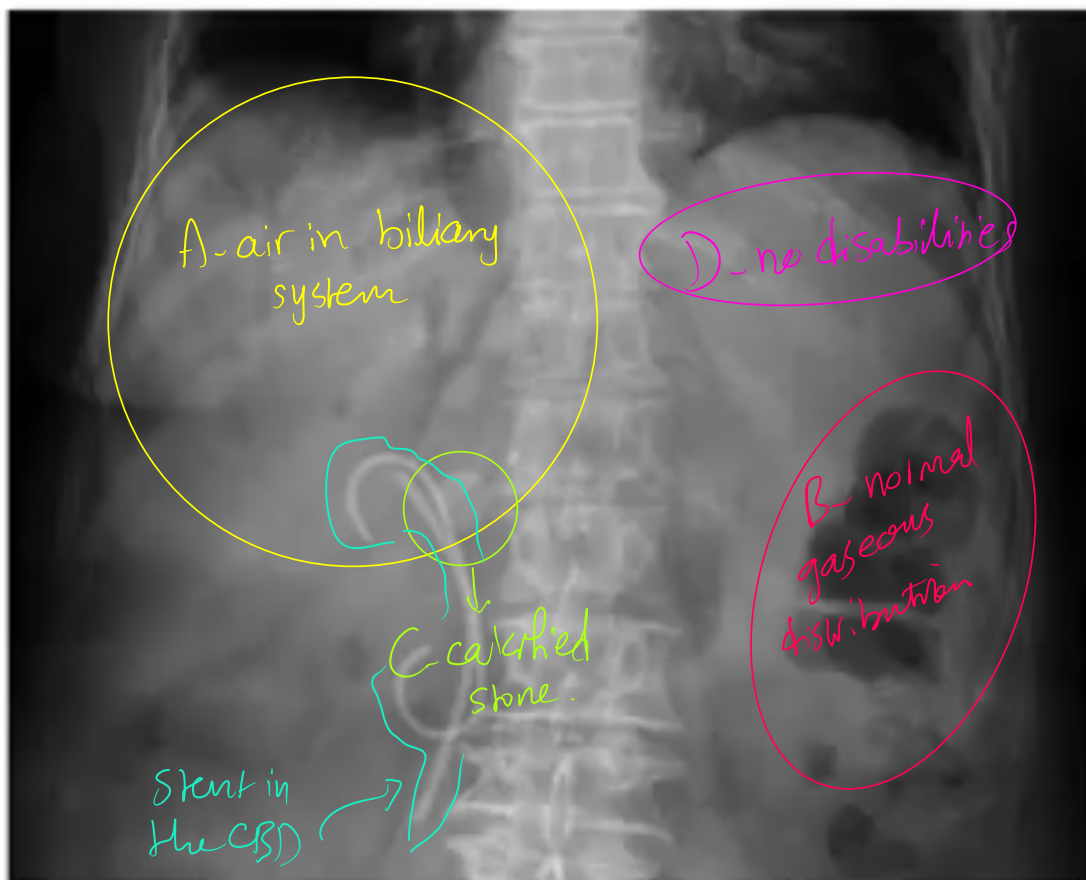
C: calcified CBD stone.

D: X spine is normal

E: 1- NG tube.
2- Drain
3- Cholecystectomy clips.

• Mostly this patient has had an ERCP due to gallstones and it caused him pneumobilia.





• Possible scenario:-

The patient has **cholangitis** try
 to **CBD stone** → underwent **ERCP**
 → caused **pneumobilia** and failed to
 remove the stone → put **stent** to drain
 the bile temporarily until the surgery is done