Imaging of bowel obstruction

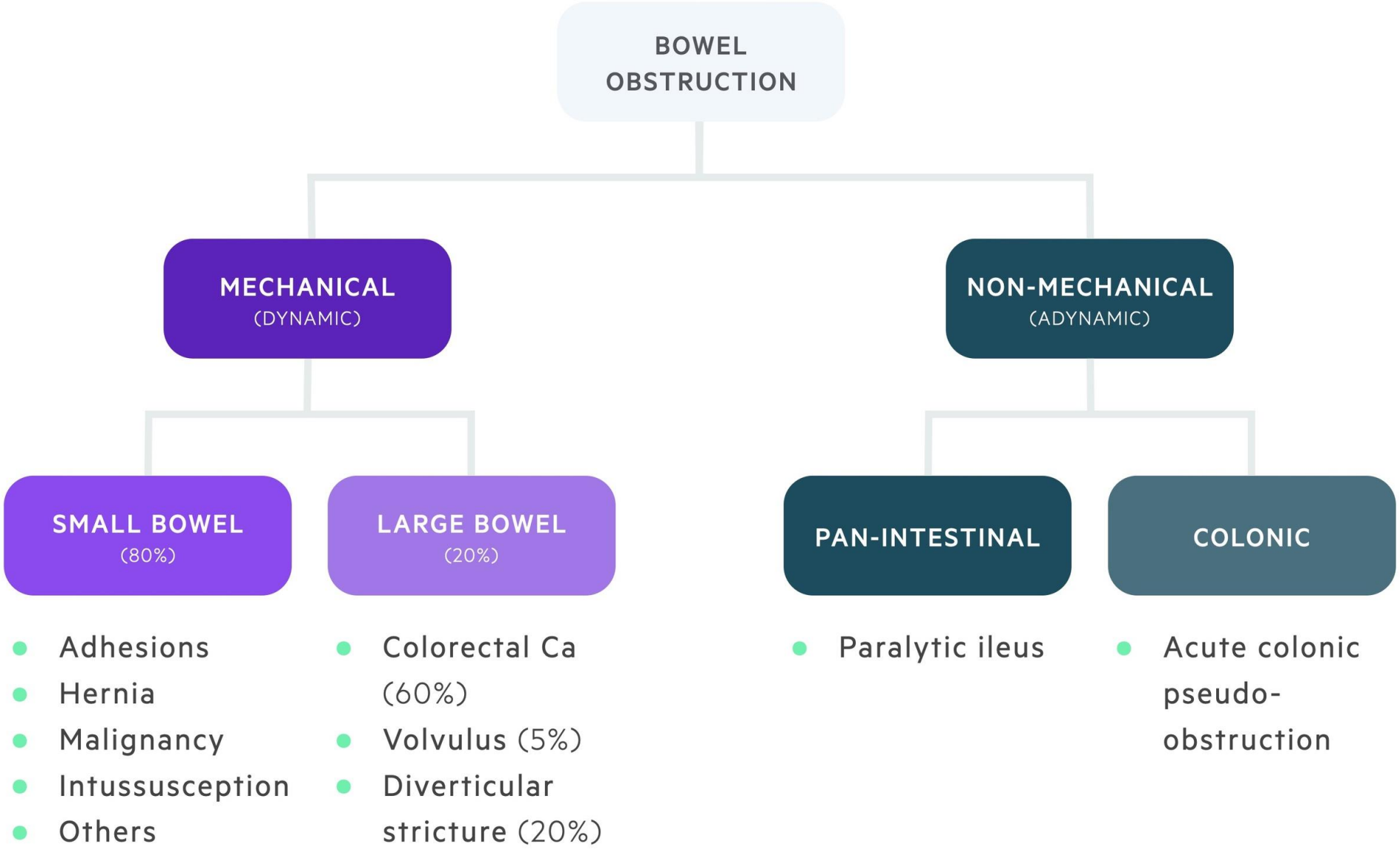
Lecturer DR Huda Hameed Salman

Diyala University College Of Medicine

Learning objectives:

- Imaging technique
- Small bowel obstruction
- Large bowel obstruction

- Bowel obstruction
- Lack of transit of bowel contents
- Small bowel obstruction: high or low
- Large bowel obstruction
- Simple(intact blood supply)vs strangulated


BOWEL OBSTRUCTION
MECHANICAL (DYNAMIC)
NON-MECHANICAL (ADYNAMIC)
SMALL BOWEL (80%)
LARGE BOWEL (20%)
PAN-INTESTINAL
COLONIC
Adhesions
Hernia
Malignancy
Intussusception
Others
Colorectal Ca (60%)
Volvulus (5%)
Diverticular stricture (20%)
Paralytic ileus
Acute colonic pseudo-obstruction

Small bowel obstruction

- Dilated small bowel proximal to site of obstruction with distal decompression
- Clinical presentation:
- Depend upon site of obstruction
- High SBO…vomiting early ,profuse ,rapid dehydration
- Low SBO…pain with distension
- Strangulation… Shock /rigidity (localized /diffuse)

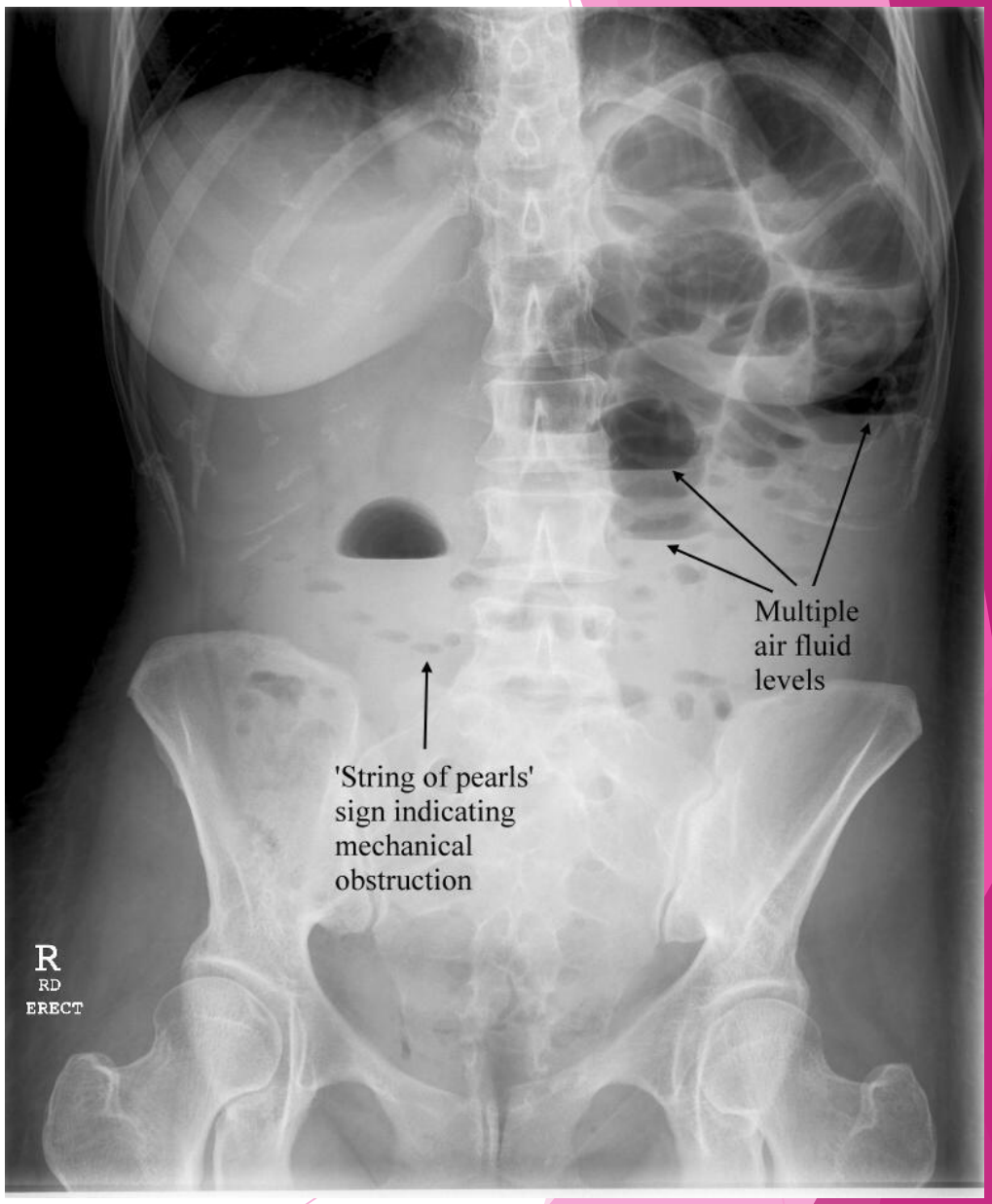
Aim of imaging

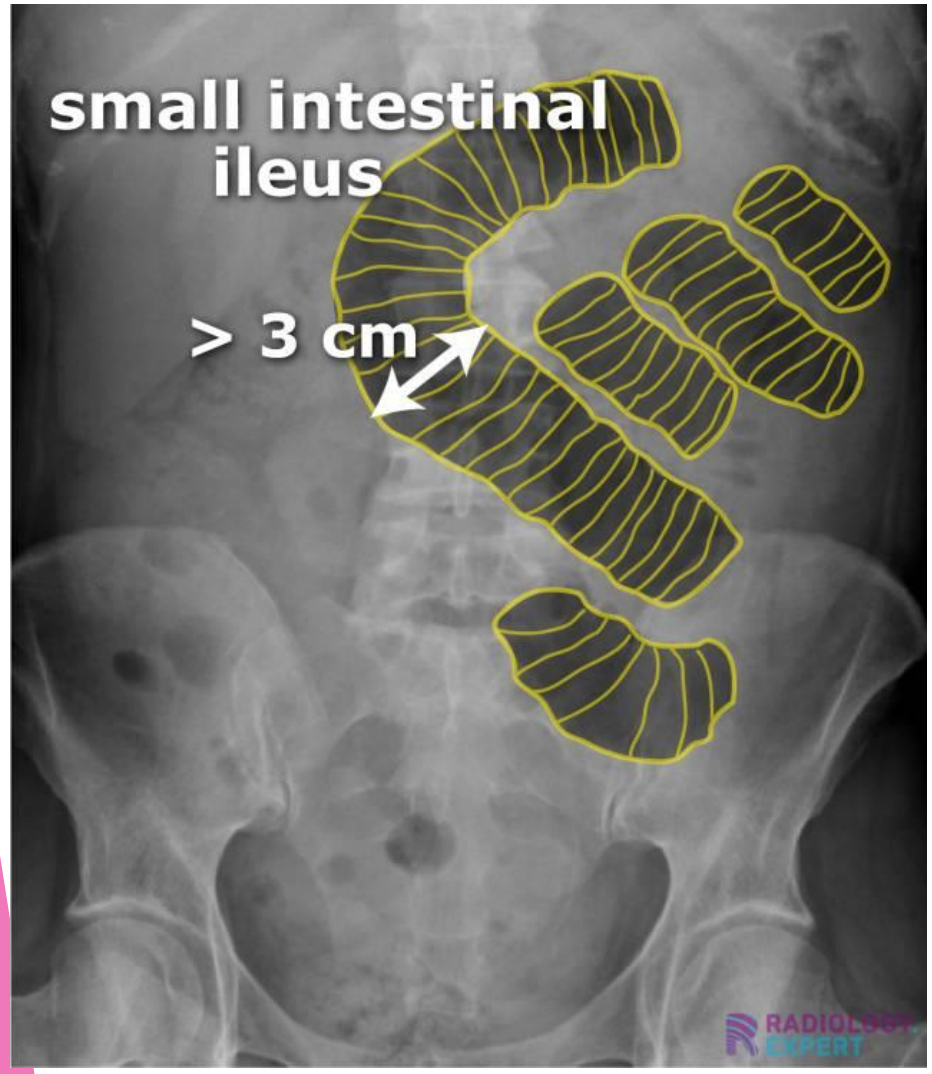
- Is obstruction present?
- Where is the location?
- What is the cause?
- Is emergent surgery needed?
    - Strangulation
    - Closed loop
    - Obstructed hernia

Radiography

CT

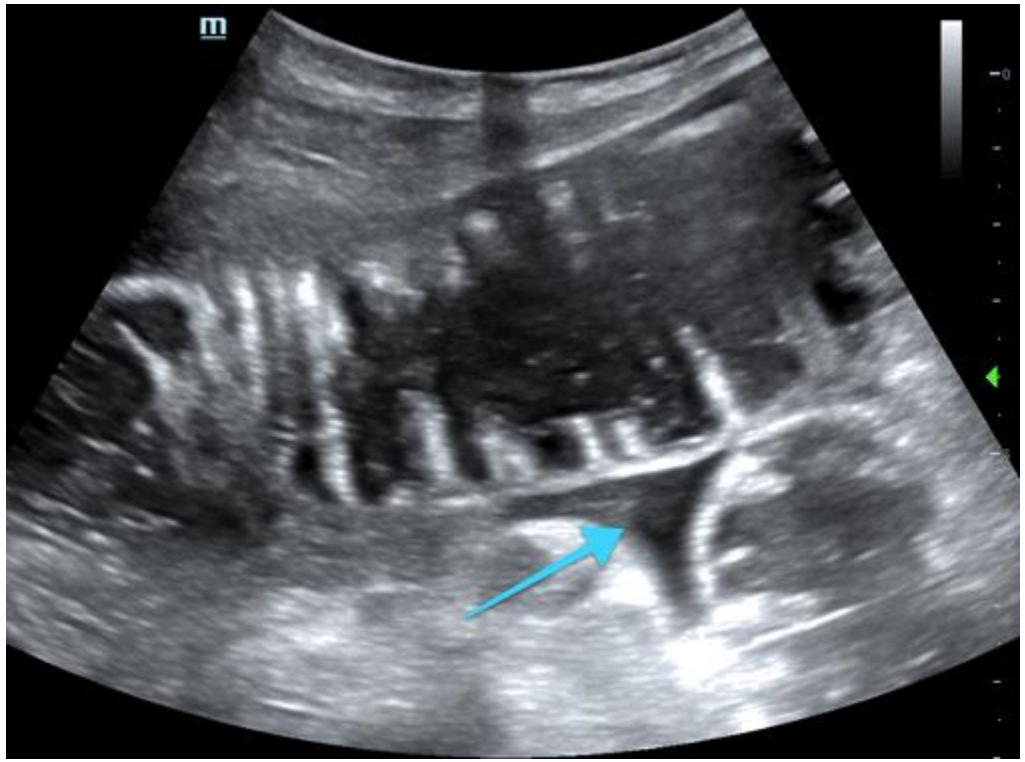
- Radiography
- Diagnostic in 50-60%
- Non diagnostic or misleading in 40%
- Poor predictor of location ,cause and complication
- Radiographic findings:
- Dilated small bowel loops ≥3 cm
- Paucity of colonic gas
- Air fluid levels / multiple/ longer than 2.5cm
- String of bed sign

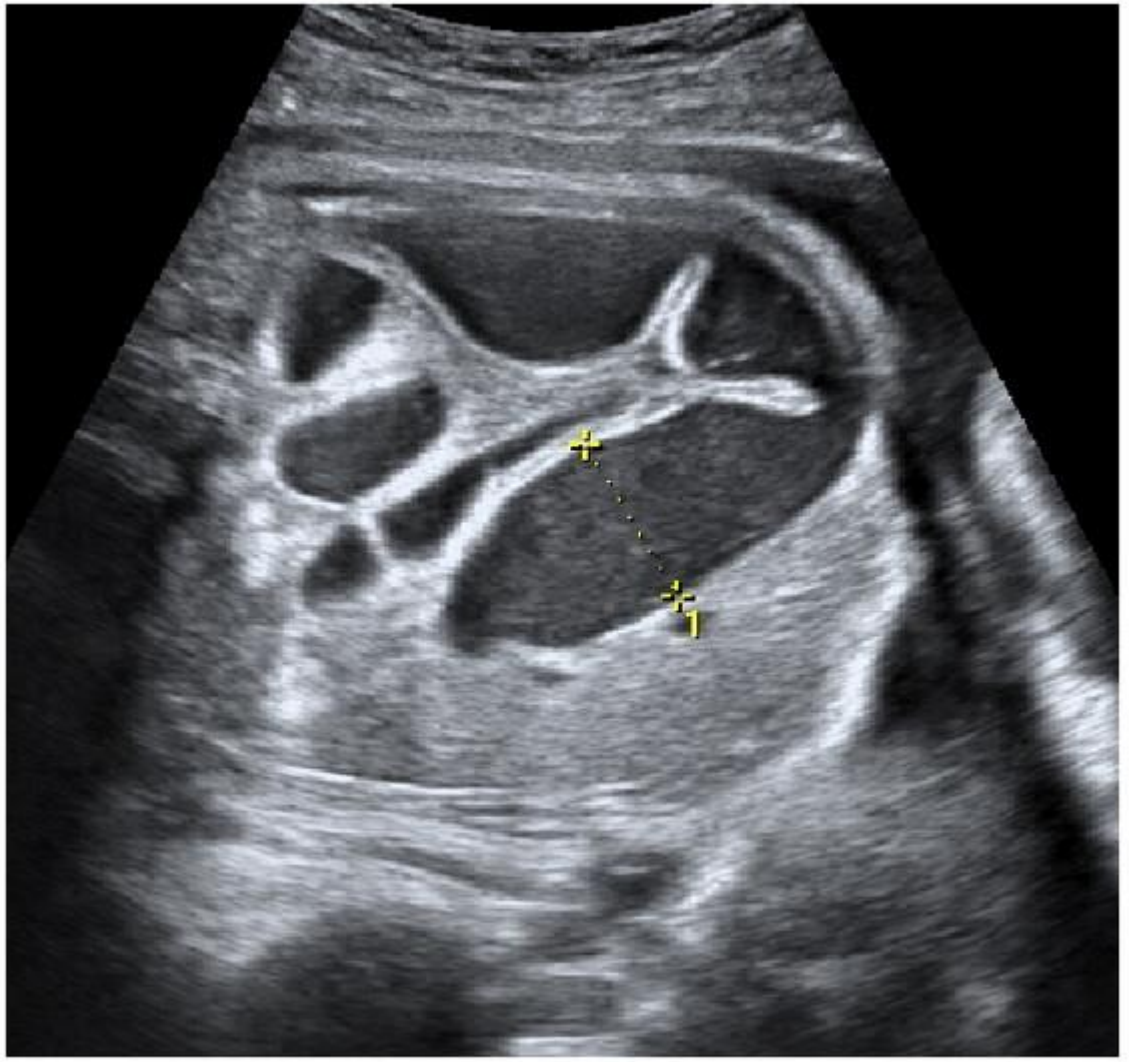



small intestinal
ileus
> 3 cm
RADIOLOGY
EXPERT

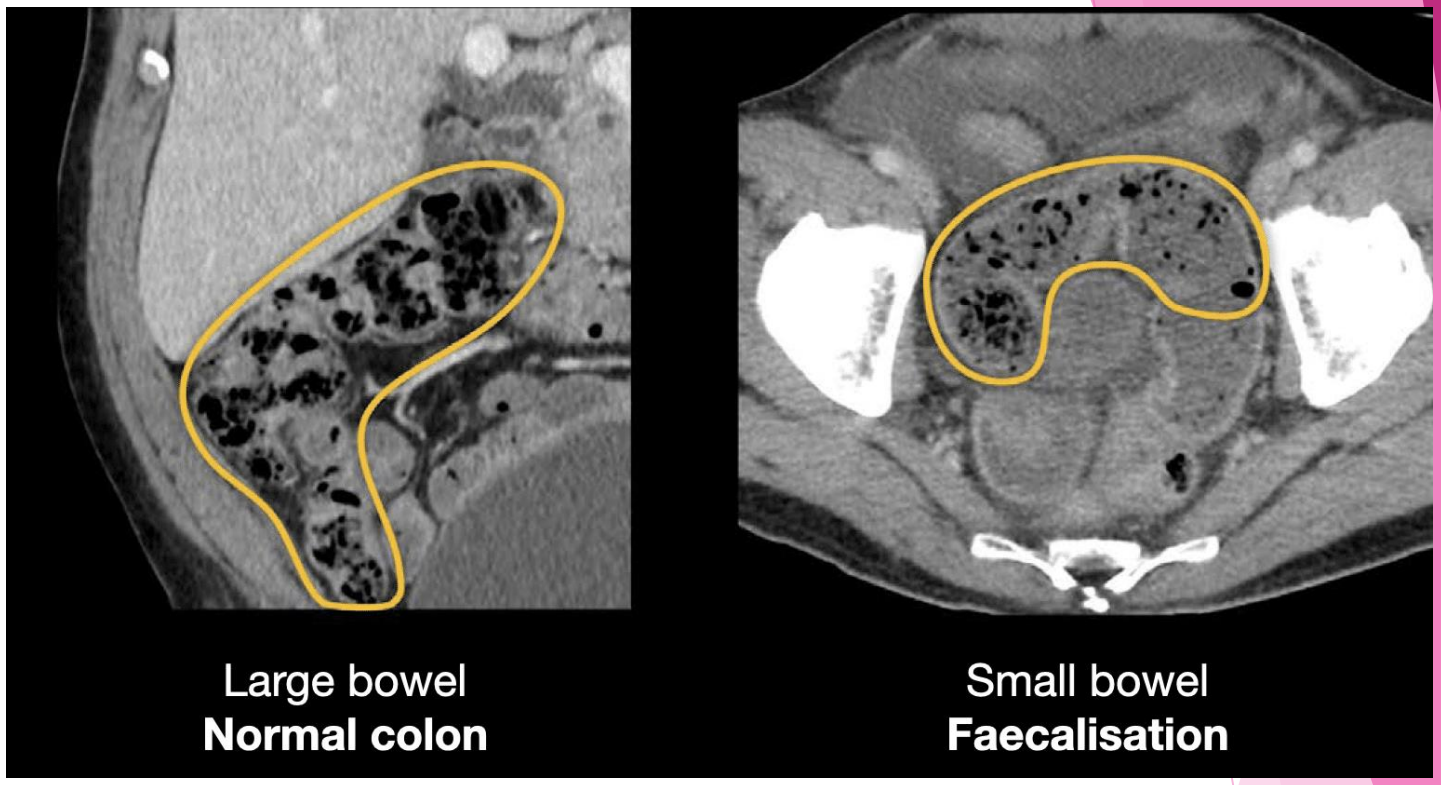

Right
ERECT

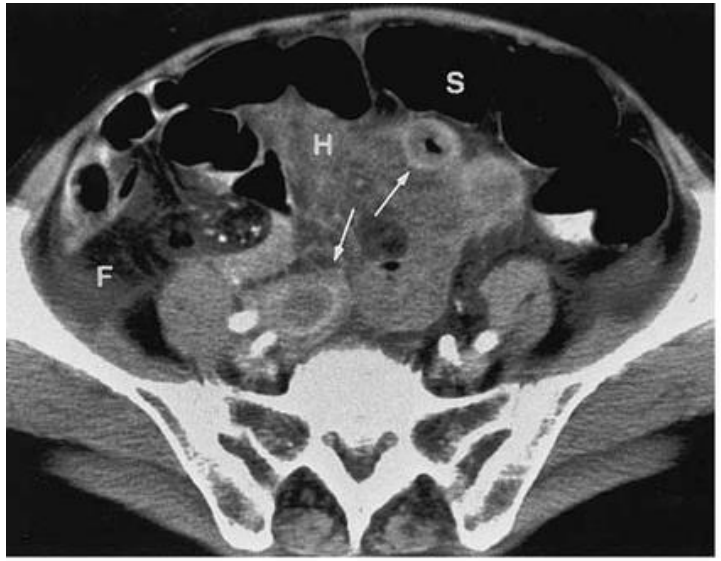
- Ultrasound findings of SBO
- 1-dilated bowel loops more than 2.5cm
- 2-increased intraluminal fluid
- 3-Characteristic alternating peristalsis
- 4-plica circularis or valvulae conniventes in jejunum (keyboard sign)
- 5- free fluid (tanga sign)





- CT imaging
- Quick and accurate
- No need for luminal contrast
- Bowel wall assessment
- Exraluminal abnormalities
- Transition point:
  Dilated loops change in caliber
  to decompressed loops
  small bowel feces

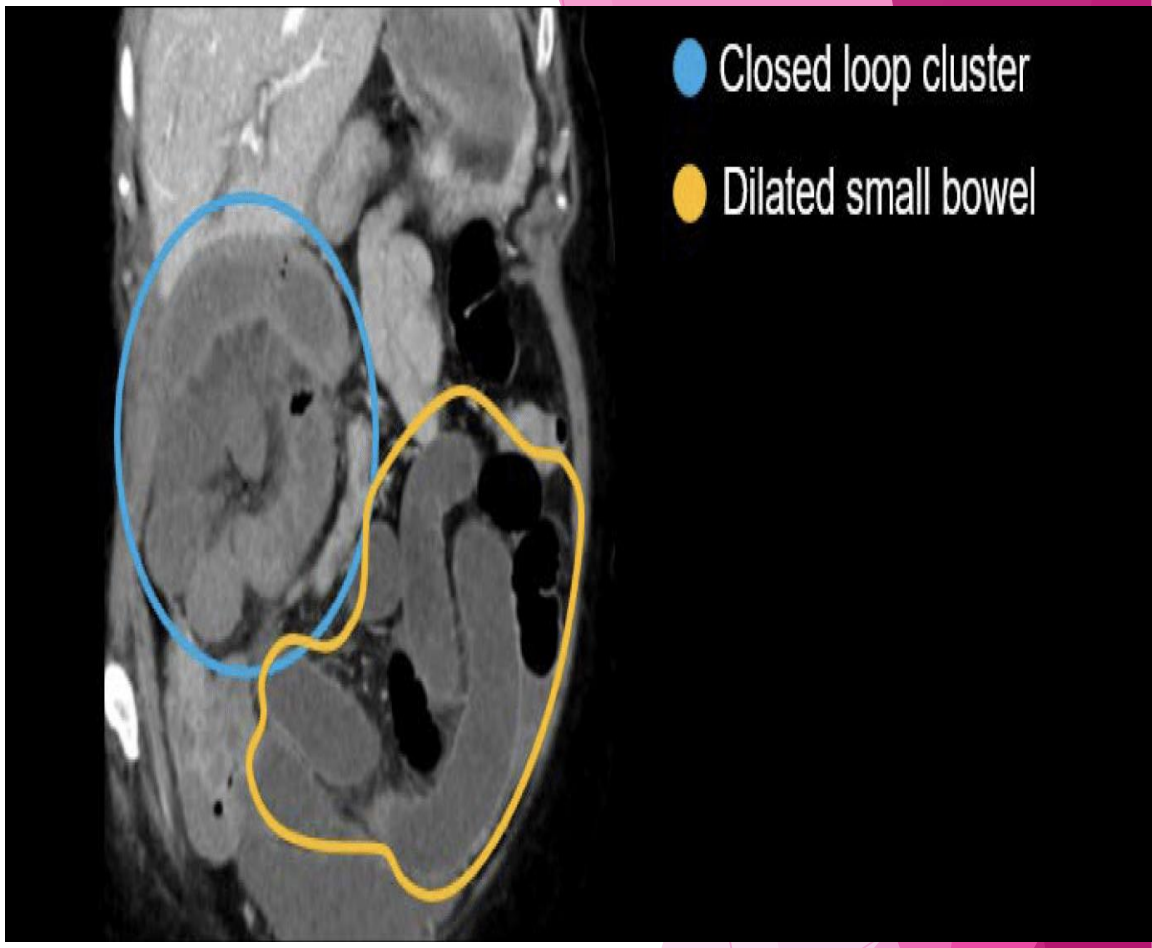


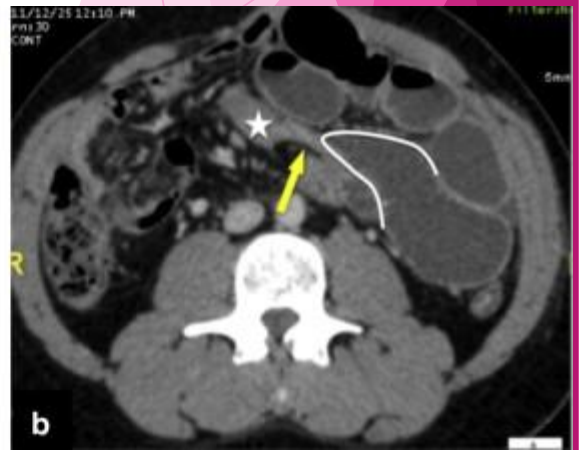


7.

8.

- Closed loop obstruction
- Obstruction of 2 adjacent locations
- Bowel between 2 points more dilated than upstream to the proximal obstruction.
- Risk of torsion and volvulus.
- Hernia and adhesion





Large bowel obstruction

- More in elderly
- Causes: malignancy 60%

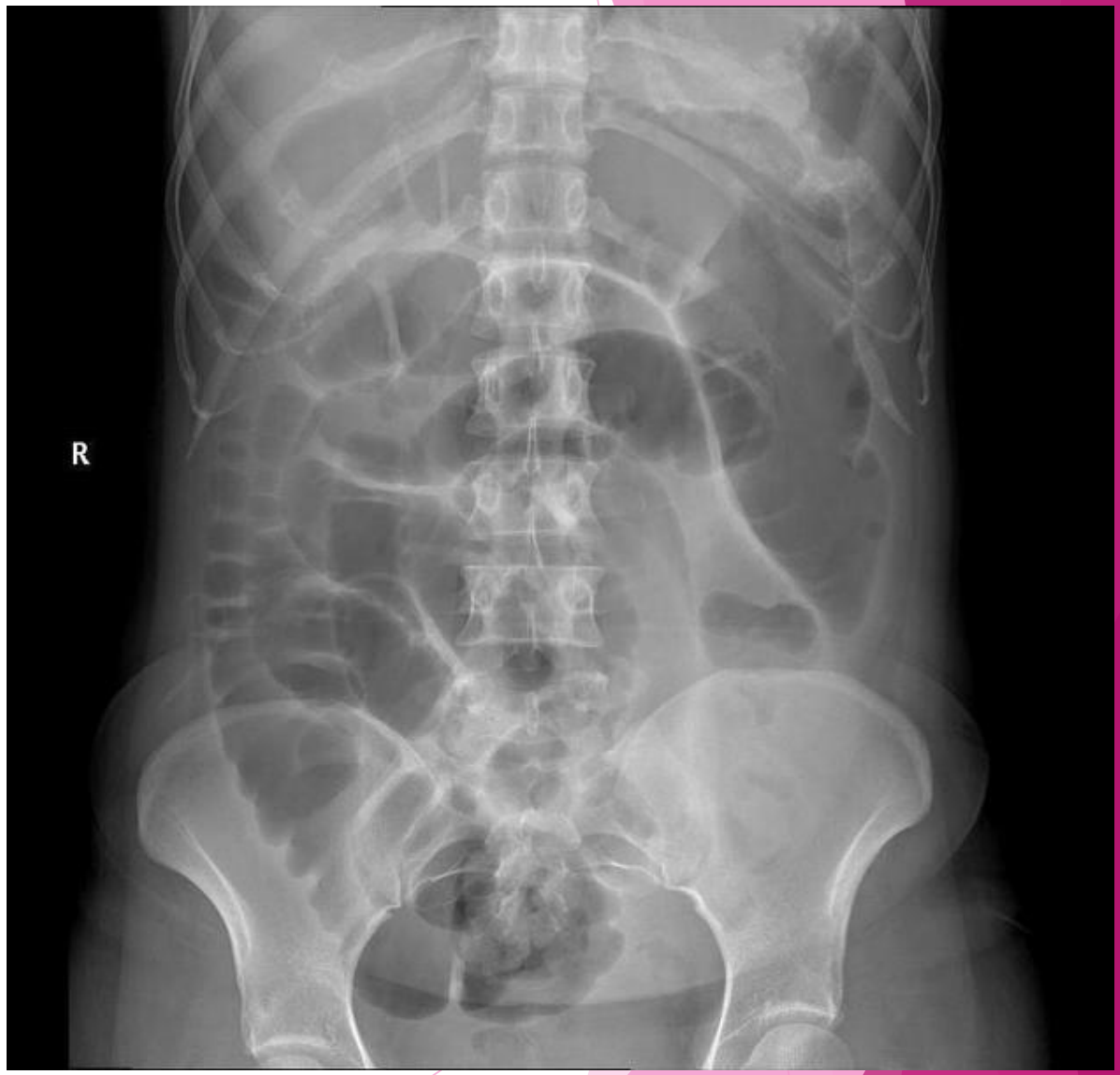
  volvulus 15%

  diverticulitis 10%

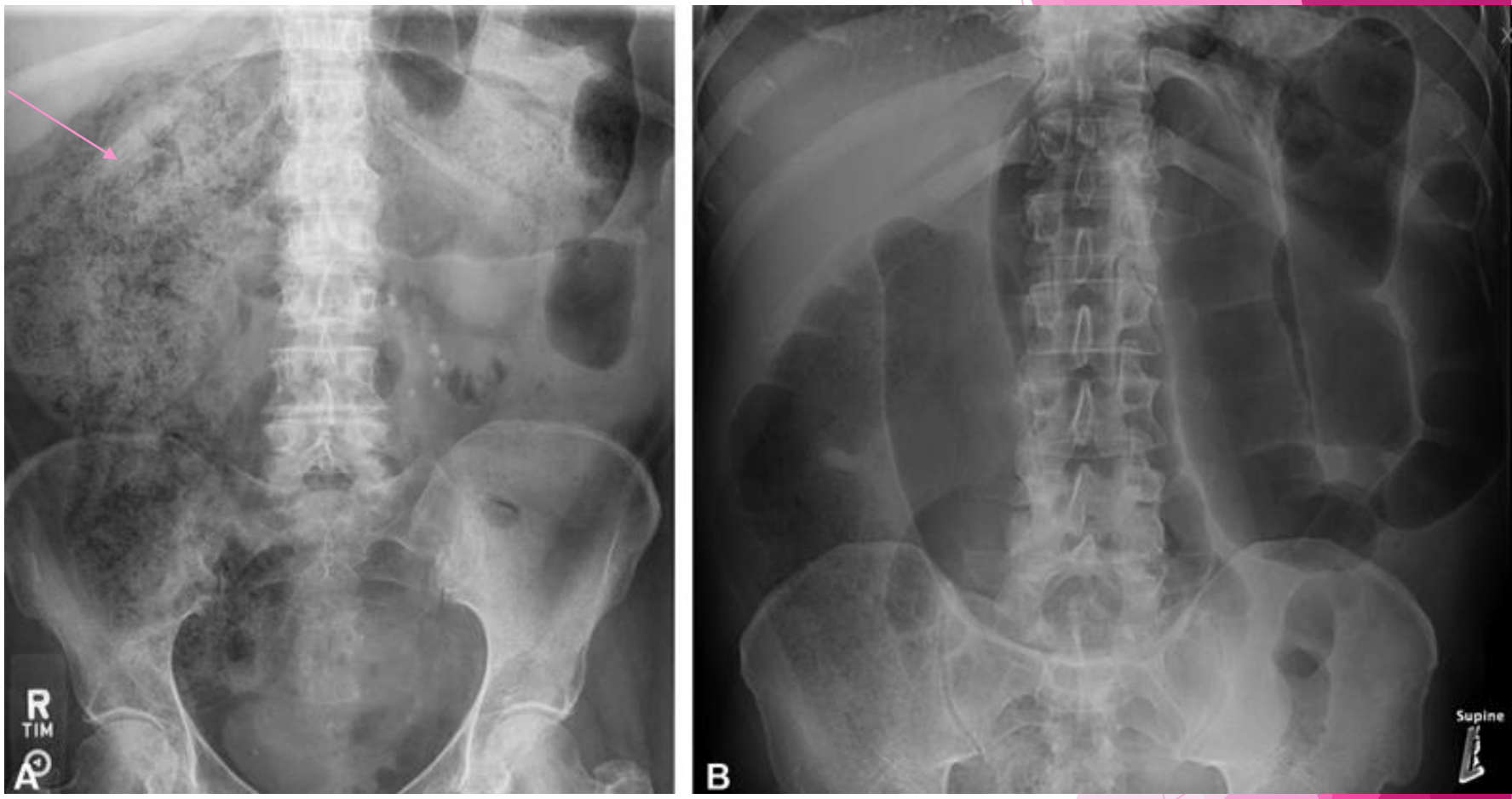
Others: incarcerated hernia ,fecal impaction ,adhesion

15-20% of colonic malignancy presented as LBO

- Radiographic findings:
- Marked colonic dilatation with disproportionate distension of cecum include colonic and cecal dilation (> 6 and > 9 cm, respectively),
- relative paucity of gas in the rectum, and a proximal colonic fecal burden

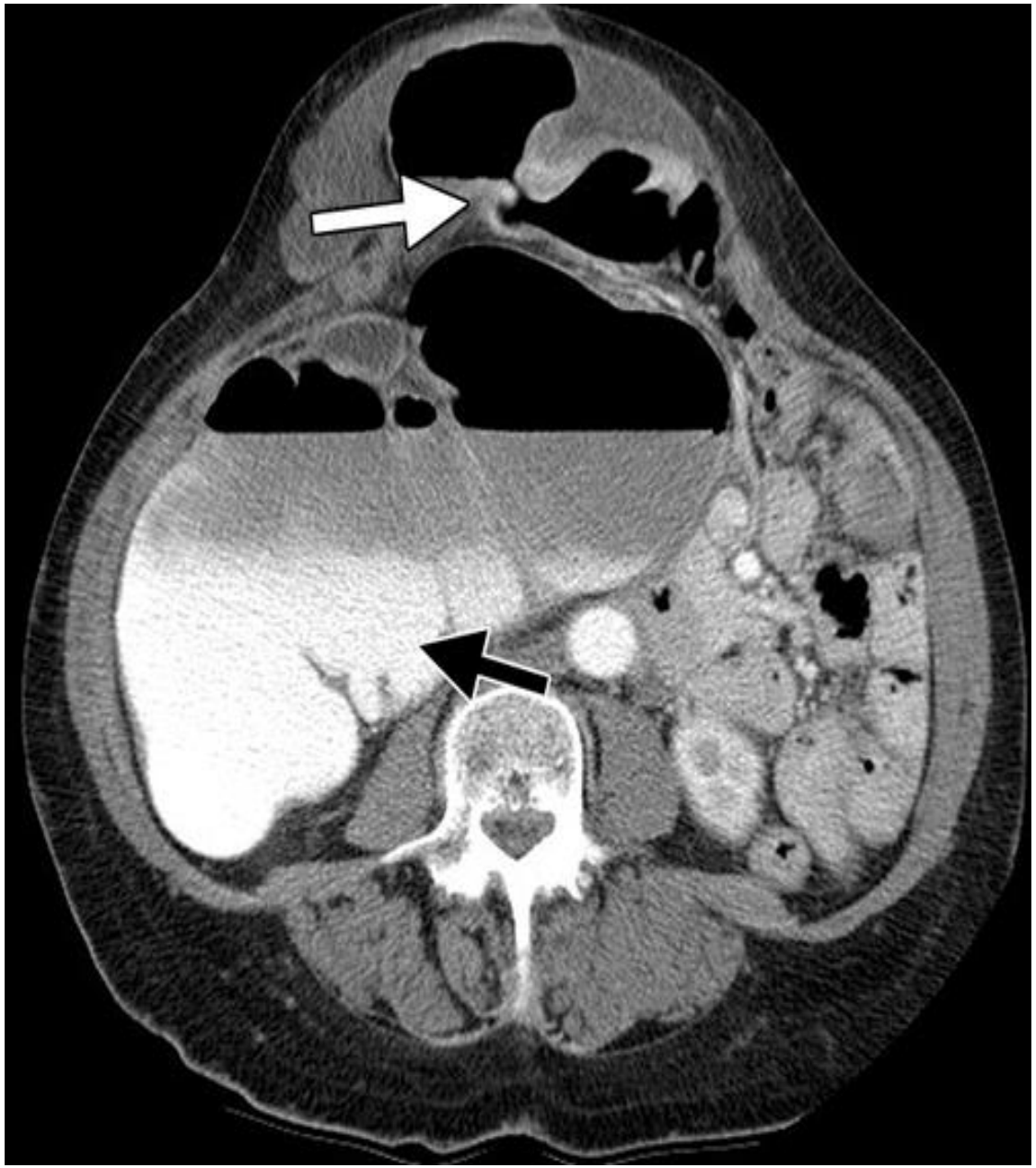


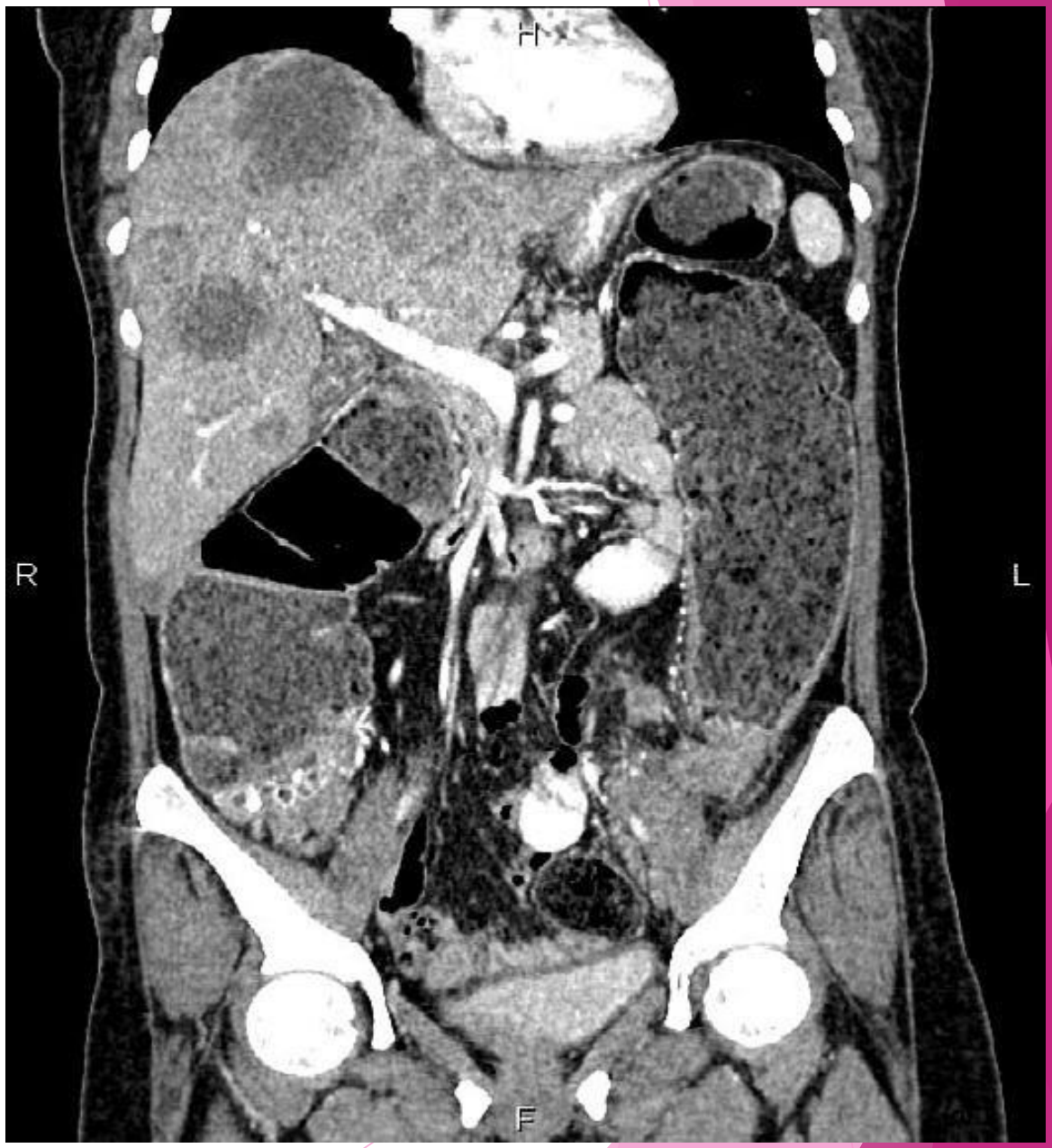
- In advanced cases one may see the stigmata of an ischemic colon, namely:
- intramural gas (pneumatosis coli)
- portal venous gas
- free intra-abdominal gas (pneumoperitoneum)



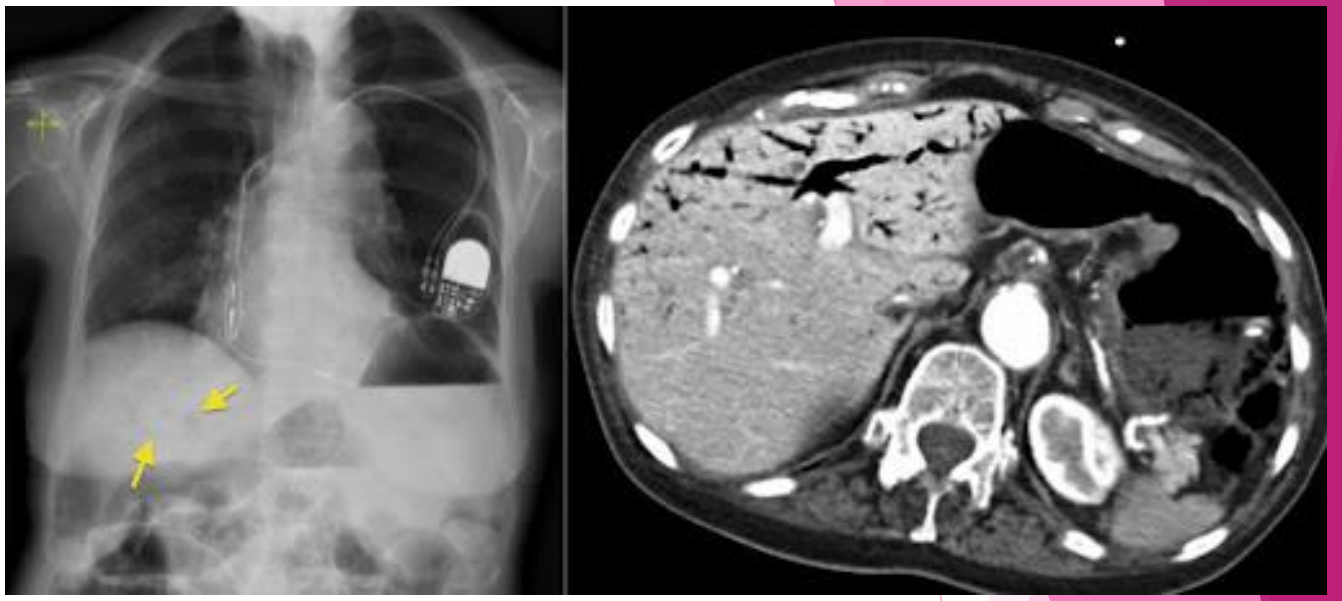
Proximal colonic fecal impaction

- **CT imaging**
- CT is the most widely used modality for assessment of large bowel obstructions.
- confirm the diagnosis and localize the location of obstruction , identify the cause.
- The large bowel will be distended with a thinned stretched wall but should enhance (unless ischemic). If the ileocecal valve is competent then the small bowel may be mostly collapsed.
- Complications, such as those of ischemia or perforation, should be assessed.

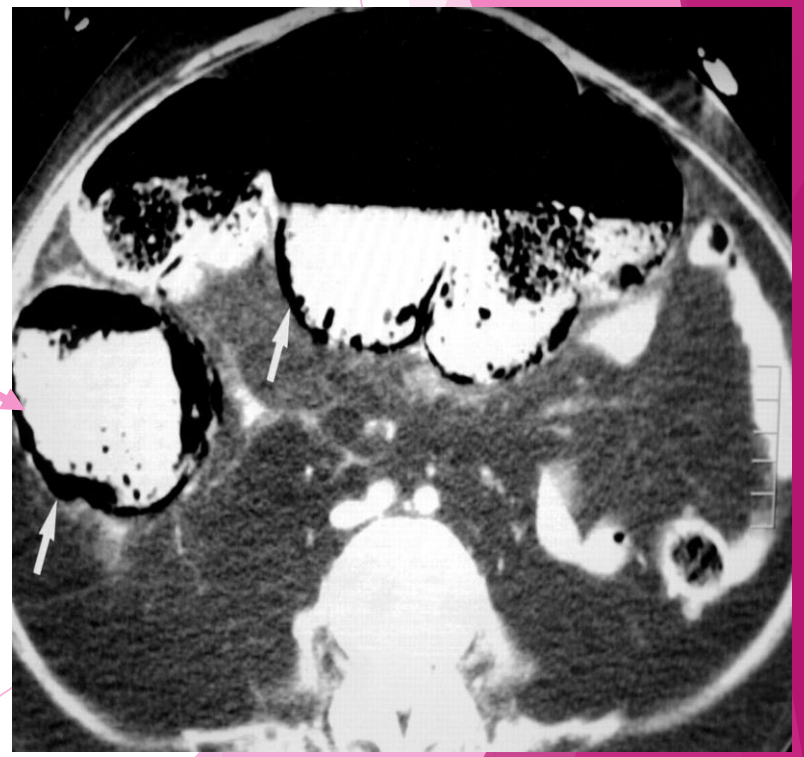


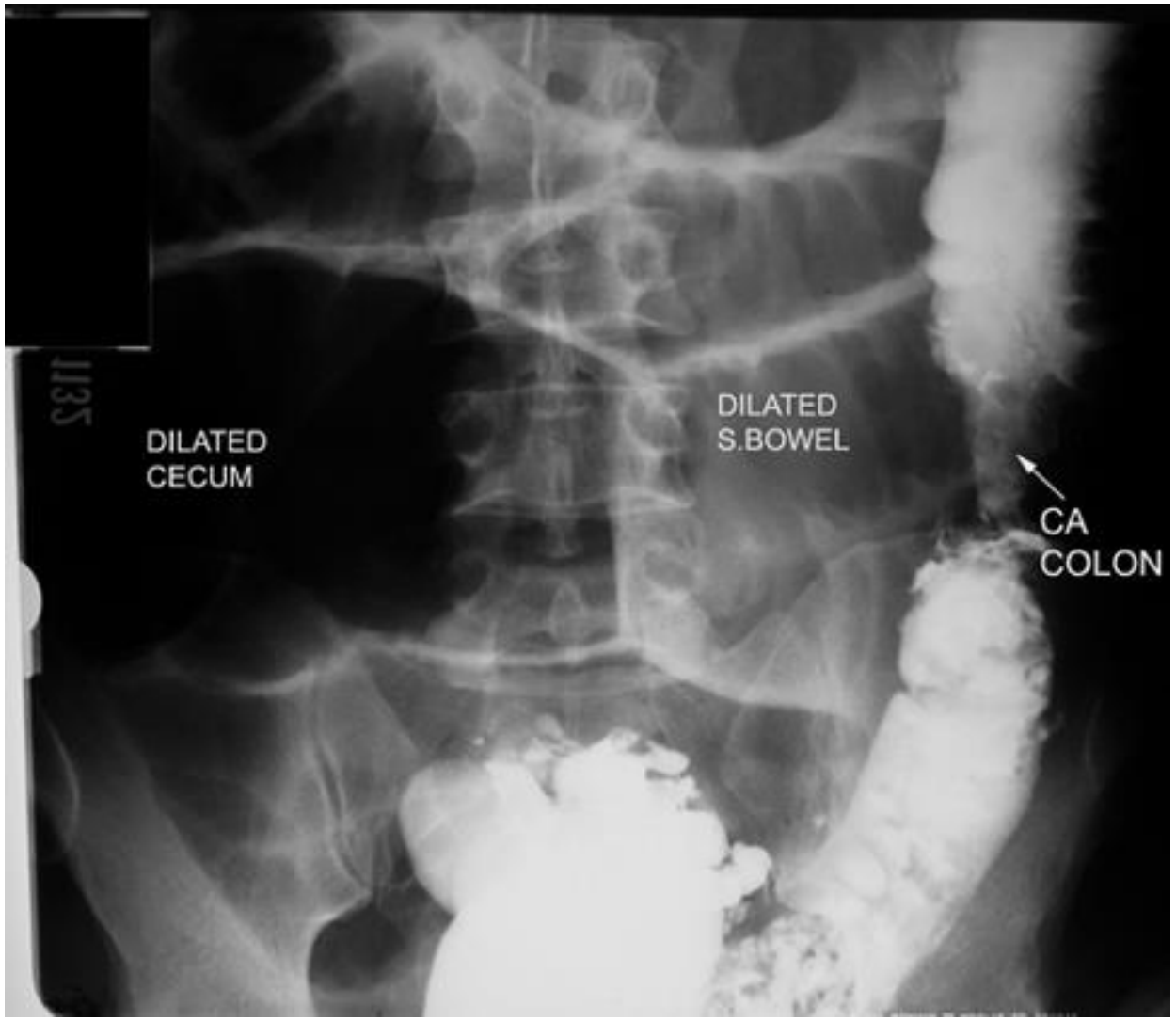

H
R
L
F

Pneumatosis intestinalis



Portal venous gas




DILATED
CECUM
DILATED
S.BOWEL
CA
COLON

Plain Films: Abdominal X-Ray (AXR)

Findings: Small (SBO) vs. Large Bowel Obstructions (LBO)

- Look at caliber, lines, and location to differentiate SBO vs LBO
- Air fluid levels on upright x ray are neither specific nor sensitive and cannot help distinguish ileus, enteritis, or partial from complete SBO

Small Bowel Obstruction

SMALL	LARGE
3cm max diameter	6cm max diameter
Lines all the way across the bowel (Plicae Circulares)	Lines not fully across (Haustra)
Central	Peripheral

Large Bowel Obstruction

A dynamic ileus

- **A dynamic ileus** is the failure of passage of enteric contents through the small bowel and colon that are not mechanically obstructed; i.e. it represents a paralysis of intestinal motility.
- **Clinical presentation**
- Patients may be asymptomatic or present with symptoms similar to mechanical bowel obstruction such as nausea/vomiting, distension, and reduced or absent bowel movements. Bowel sounds may also be absent .
- Etiology:
- drugs, e.g. opioids
- metabolic, e.g. hyponatremia
- sepsis: especially gram-negative bacteria
- abdominal trauma or surgery (see below)
- myocardial infarction / congestive heart failure
- head injury or neurosurgery
- intra-abdominal inflammation and peritonitis
- retroperitoneal hematoma
- acute mesenteric ischemia

- **Radiographic features**
- **Plain radiograph**
- generalized, uniform, gaseous distension of the large and small bowel
  - involvement of large bowel and lack of a transition point help distinguish it from small bowel obstruction

	Air in Rectum or Sigmoid	Air in Small Bowel	Air in Large Bowel
Normal	Yes	Yes—1-2 loops	Rectum and/or sigmoid
Localized ileus	Yes	2-3 distended loops	Rectum and/or sigmoid
Generalized ileus	Yes	Multiple distended loops	Yes—distended
SBO	No	Multiple dilated loops	No
LBO	No	None—unless ileocecal valve incompetent	Yes—dilated

SBO vs. Ileus

- Patient recently post-op with hypoactive/ absent bowel sounds and:
  - Dilated bowel <25mm
  - Bowel filled with with gas rather than fluid
  - Both small and large bowel will be dilated
  - Lack of peristalsis


Thank You!