

# CT scan in Bowel obstruction



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# Bowel obstruction



# Introduction

Comprehensive approach

Clinical background/patient history/ physical examination/  
laboratory tests

**Radiography**



**CT scan**



# Role of CT scan

## CT can show:

- ▶ Site, level and Cause, Severity of obstruction
- ▶ Complications

# Words to remember

Mechanical/Adynamic ileus

Complete obstruction /partial obstruction

Simple obstruction /Strangulation obstruction

closed-loop obstructions

# Abdominal CT scan

**IV  
contrast**



**Oral  
Contrast**

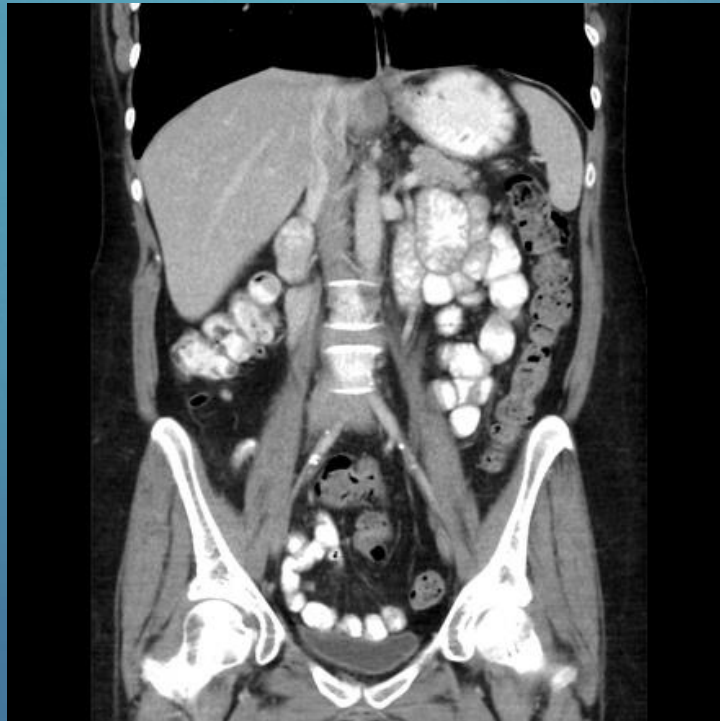


# IV contrast

CT scanning should be performed with **intravenous contrast**

# Oral contrast

**Oral contrast** 30-120 minutes before scanning may be useful for accurately locating the **site** and **degree of obstruction**(partial or complete)





# Why not oral?

Already bowel distension and administering oral contrast material will make the patient even more uncomfortable and likely will cause emesis

The bowel content serves as a neutral contrast agent and i.v. contrast is given to see if there is abnormal enhancement of the bowel wall.

# CT scan features

# How to differentiate Small bowel or large bowel?

## Small bowel

- Central
- valvulae conniventes



## Large bowel

- peripheral
- haustra
- Fecal content





# CT scan features of obstruction:

1. **Transition point** (complete obstruction)
2. **Dilated bowel loops** proximal to the transition point
3. **Bowel wall thickening**
4. **Sign of ischemia** (wall enhancement, thickening, perforation, pneumatosis)

# Note

## Small bowel feces sign

gas and solid material within a dilated small-bowel loop that simulates the appearance of feces.

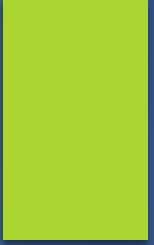


# Adynamic Ileus

**Diffuse symmetric, predominantly gaseous,** distention of bowel

The **small bowel, stomach, and colon** are proportionally dilated without an abrupt transition.

More bowel loops are dilated than with obstruction.  
Occasionally adynamic ileus may result in a **gasless abdomen** with dilated loops of bowel that are filled only with fluid.



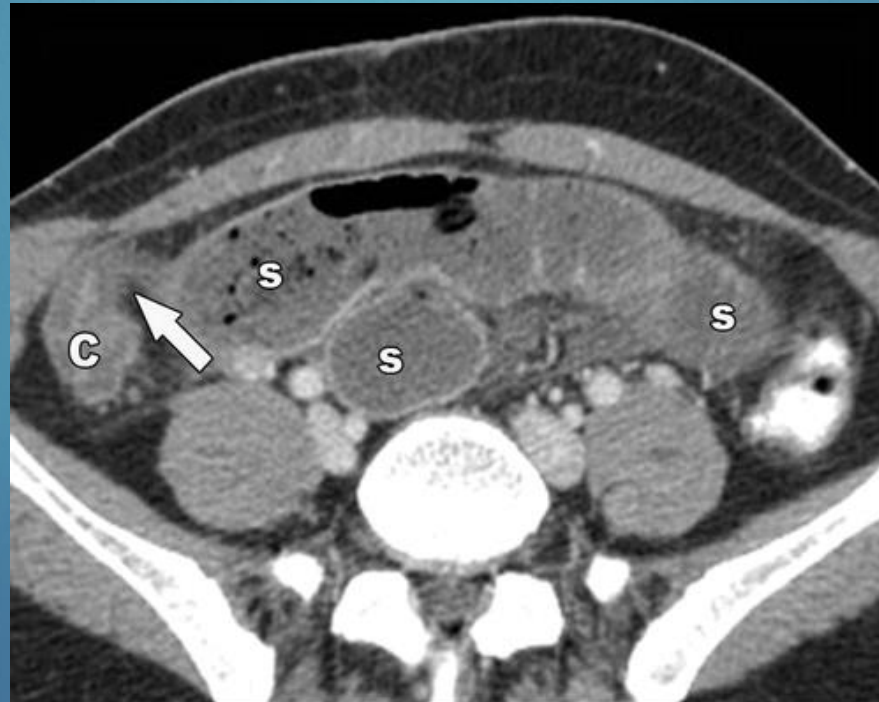


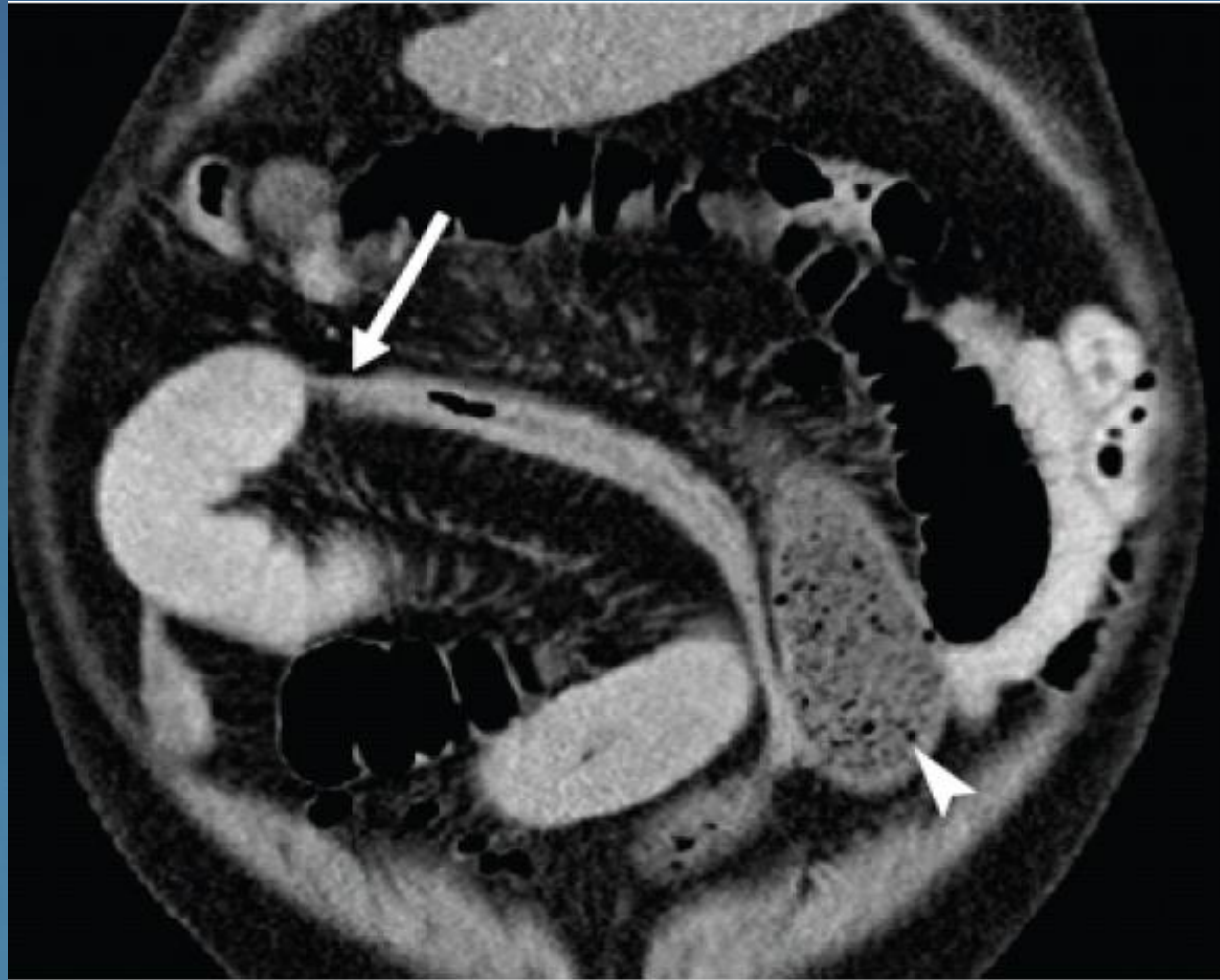
# 1. Transition point

# Transition point

Caliber change between the **dilated proximal** and **collapsed distal bowel loops**

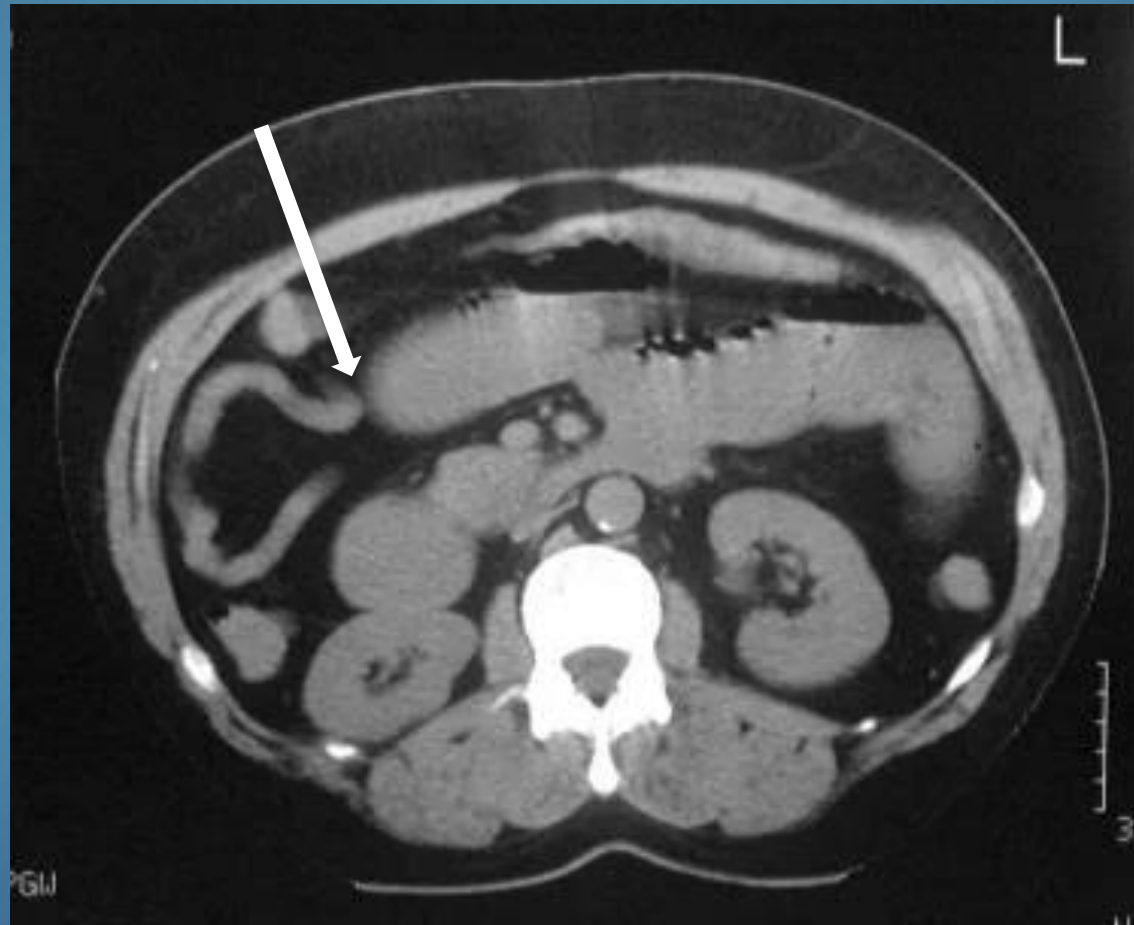
**site of obstruction**



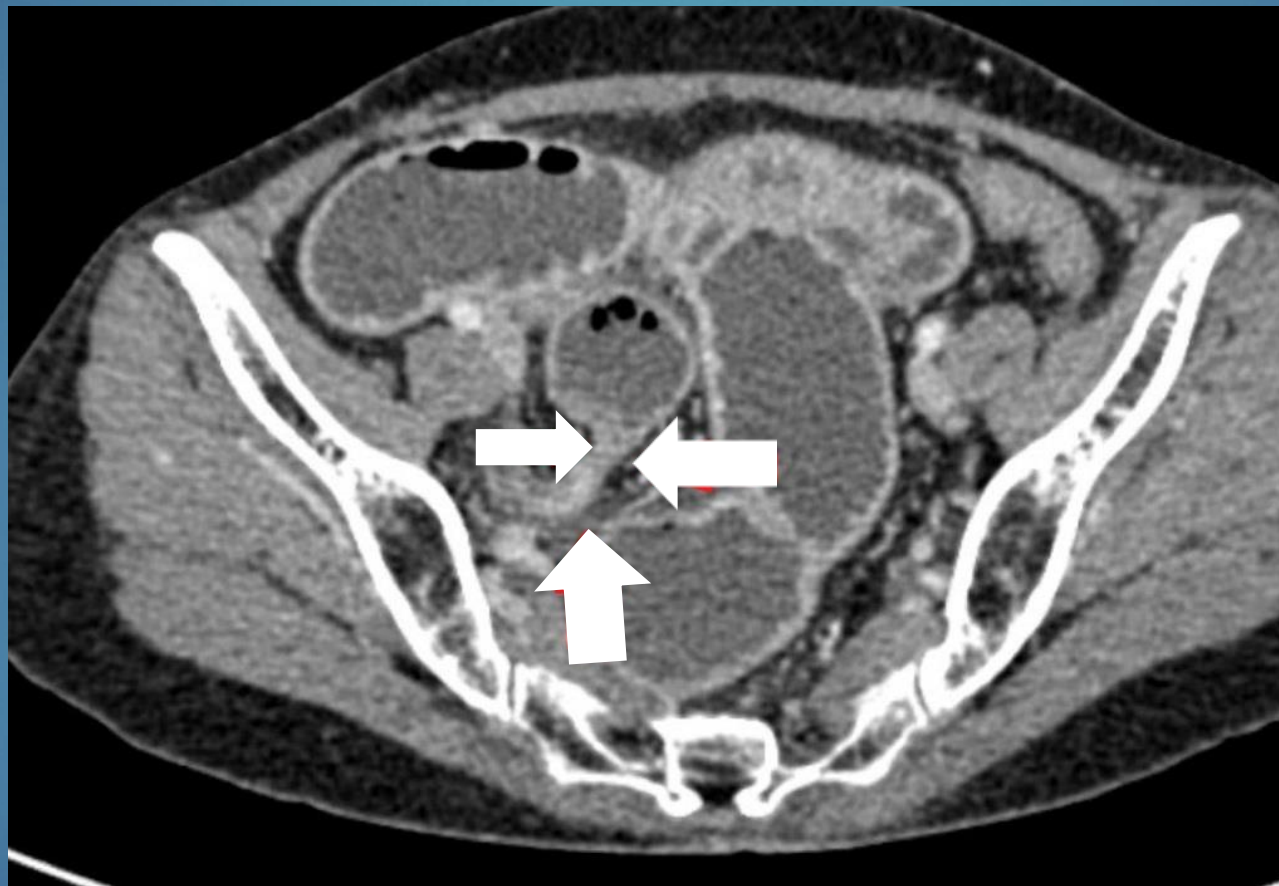


abrupt transition (arrow) between dilated and nondilated small bowel in this patient with radiation enteritis causing small bowel obstruction. The small bowel feces sign (arrowhead) is also evident

# Transition point



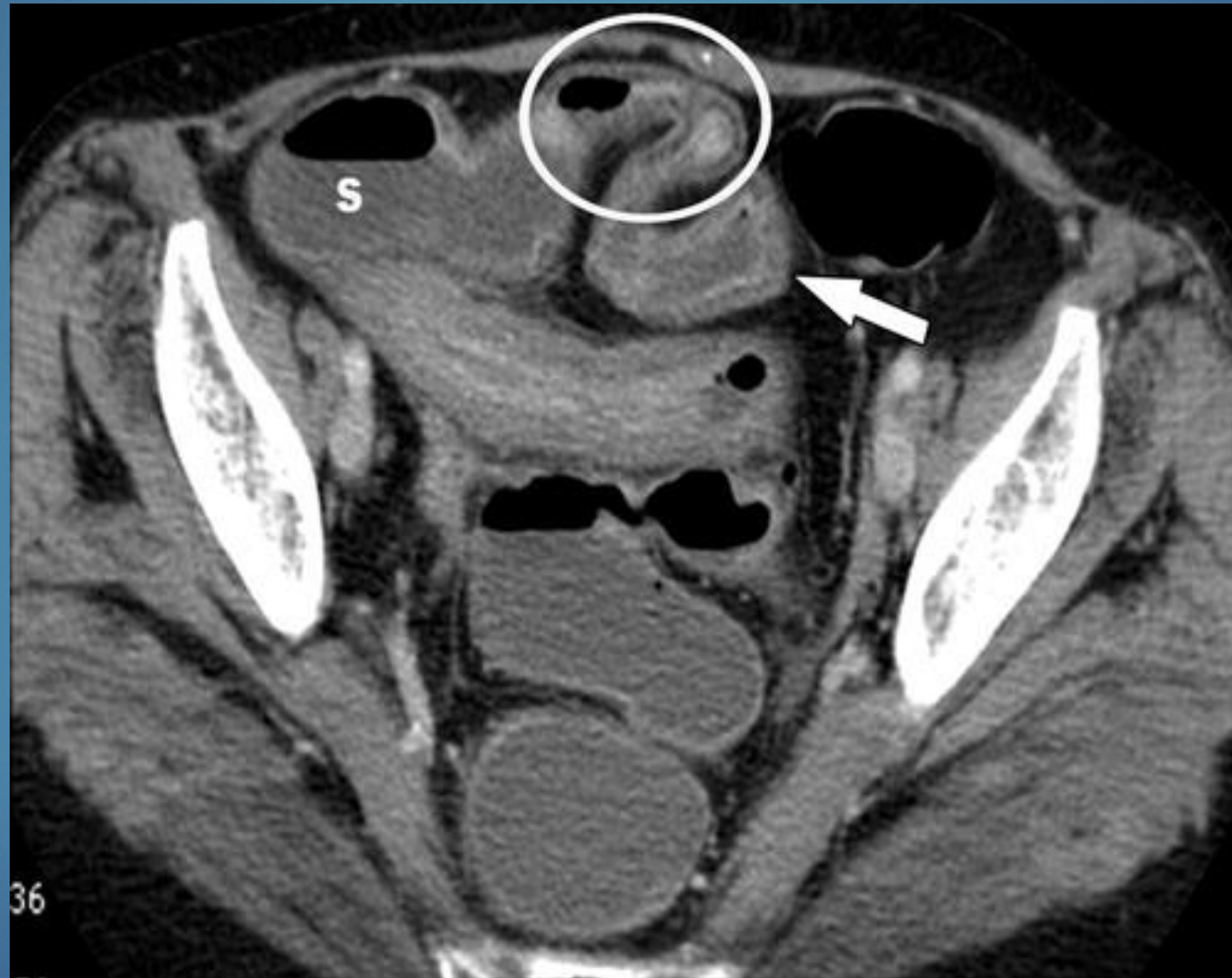
# Transition point



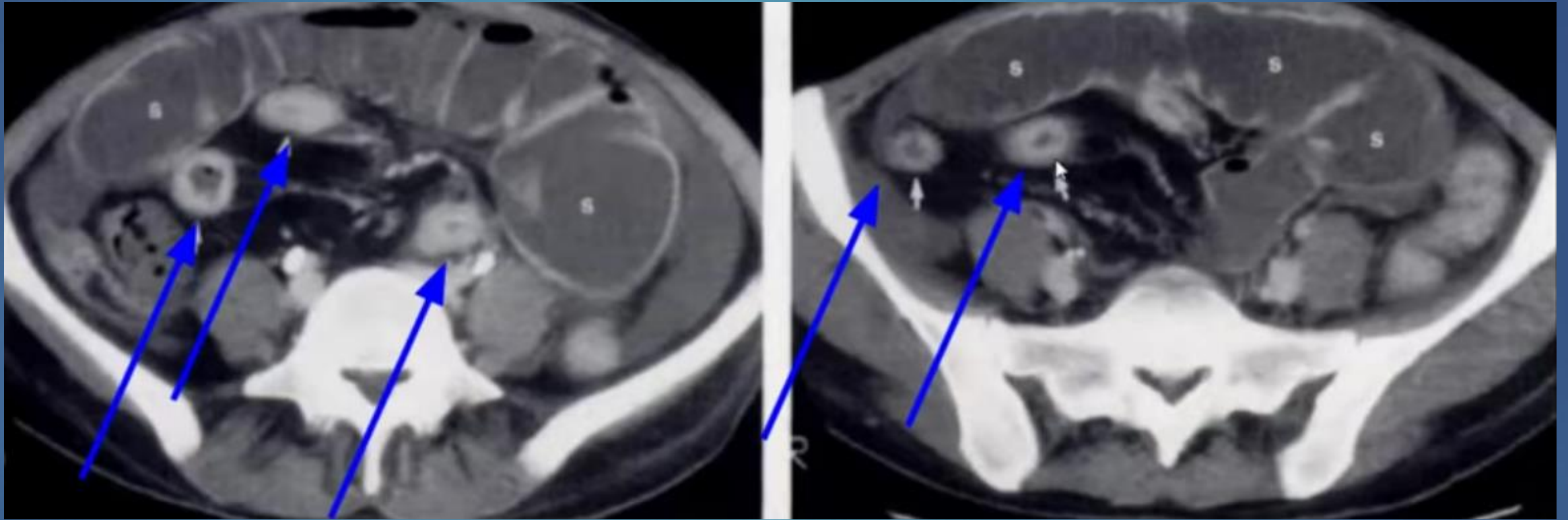
# Transition point



# Transition point



# Partial obstruction

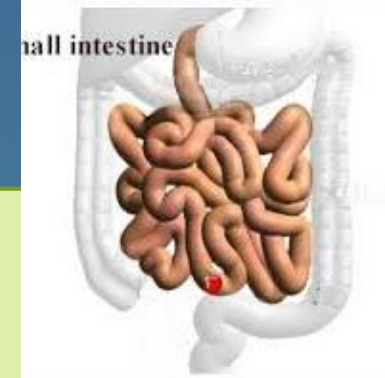




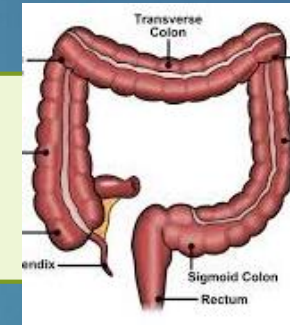
## 2. Dilated bowel loops

# Dilated bowel loops

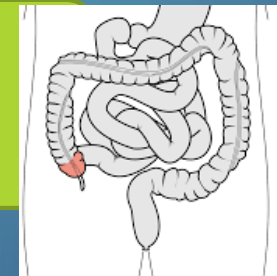
Small bowel > 2.5 to 3.0 cm



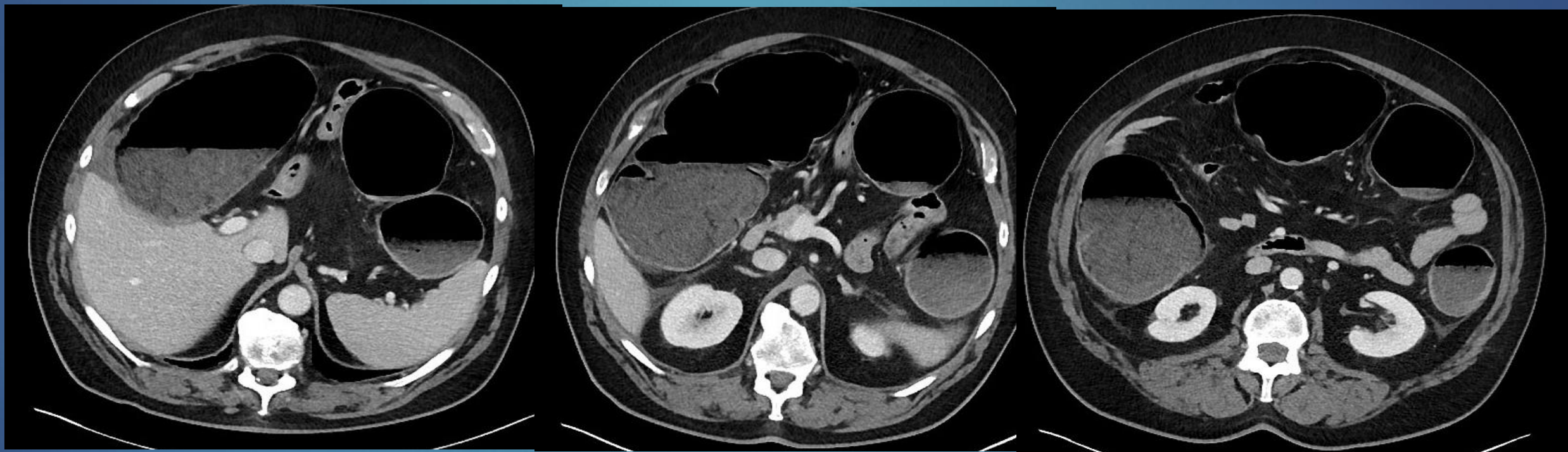
Colon > 5 cm



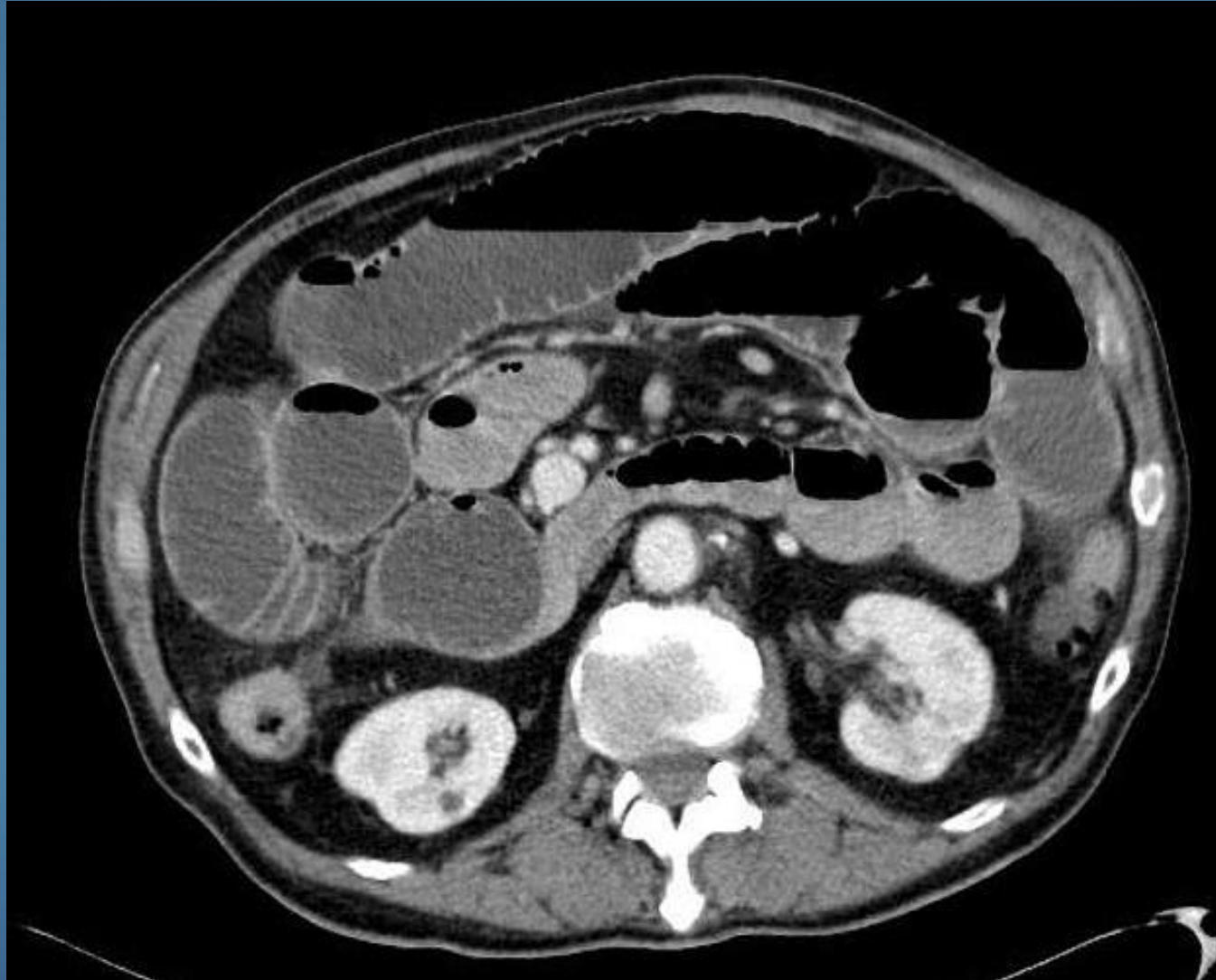
Cecum > 8 cm



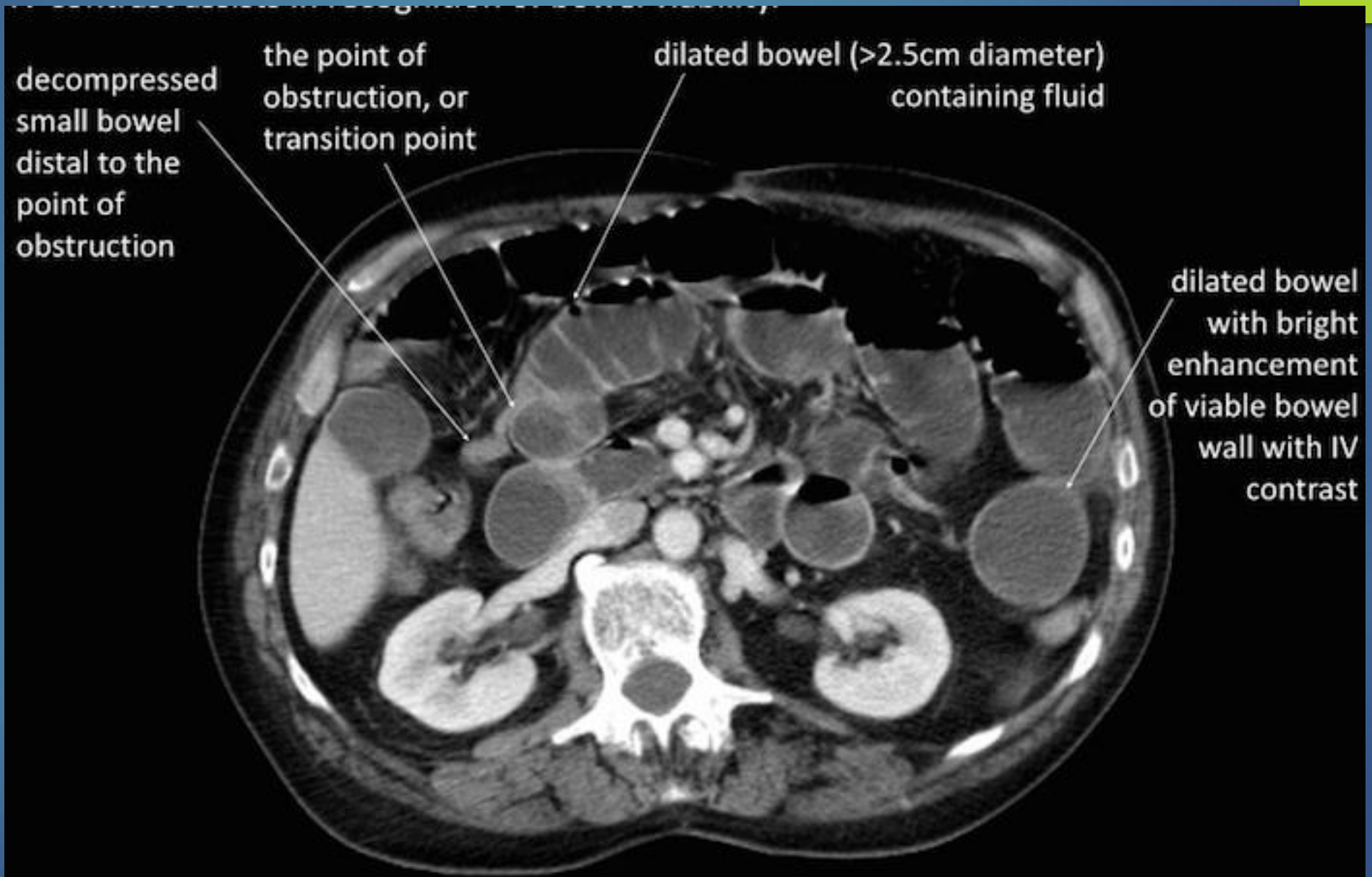
# Dilated bowel loops



# Dilated bowel loops



# Dilated bowel loops



Dilate



# 3. Bowel wall thickening

# Bowel wall thickening

- ▶ **Small bowel** ; 3-4 mm normal collapsed  
1-2 mm normal distended
- ▶ **Colon** : > 3 mm



# Bowel wall thickening

## Enhancement pattern





**Gray**

**No  
enhancem  
ent with iv  
contrast  
ischemia**



**Target  
Water**

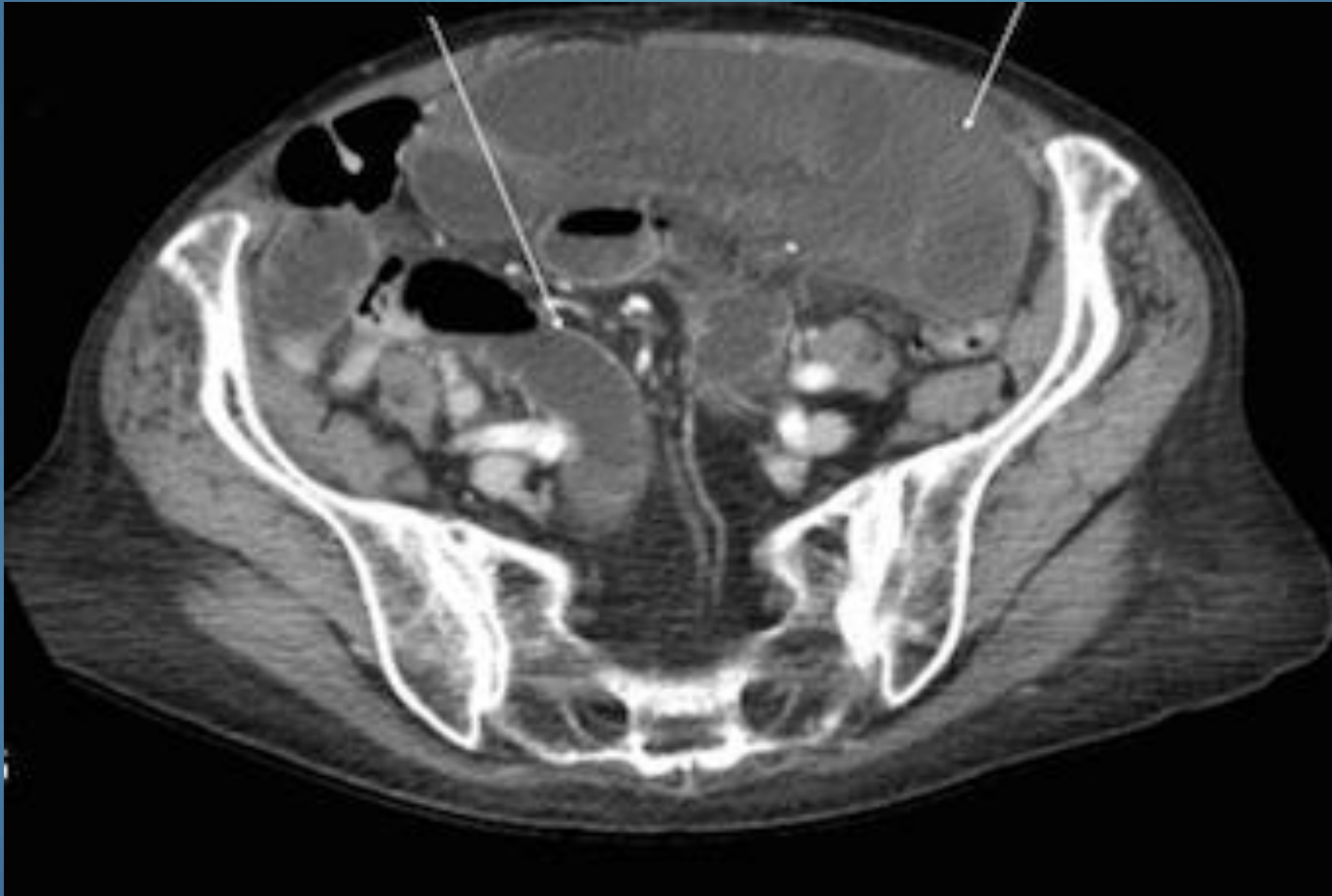
**Target  
sign**



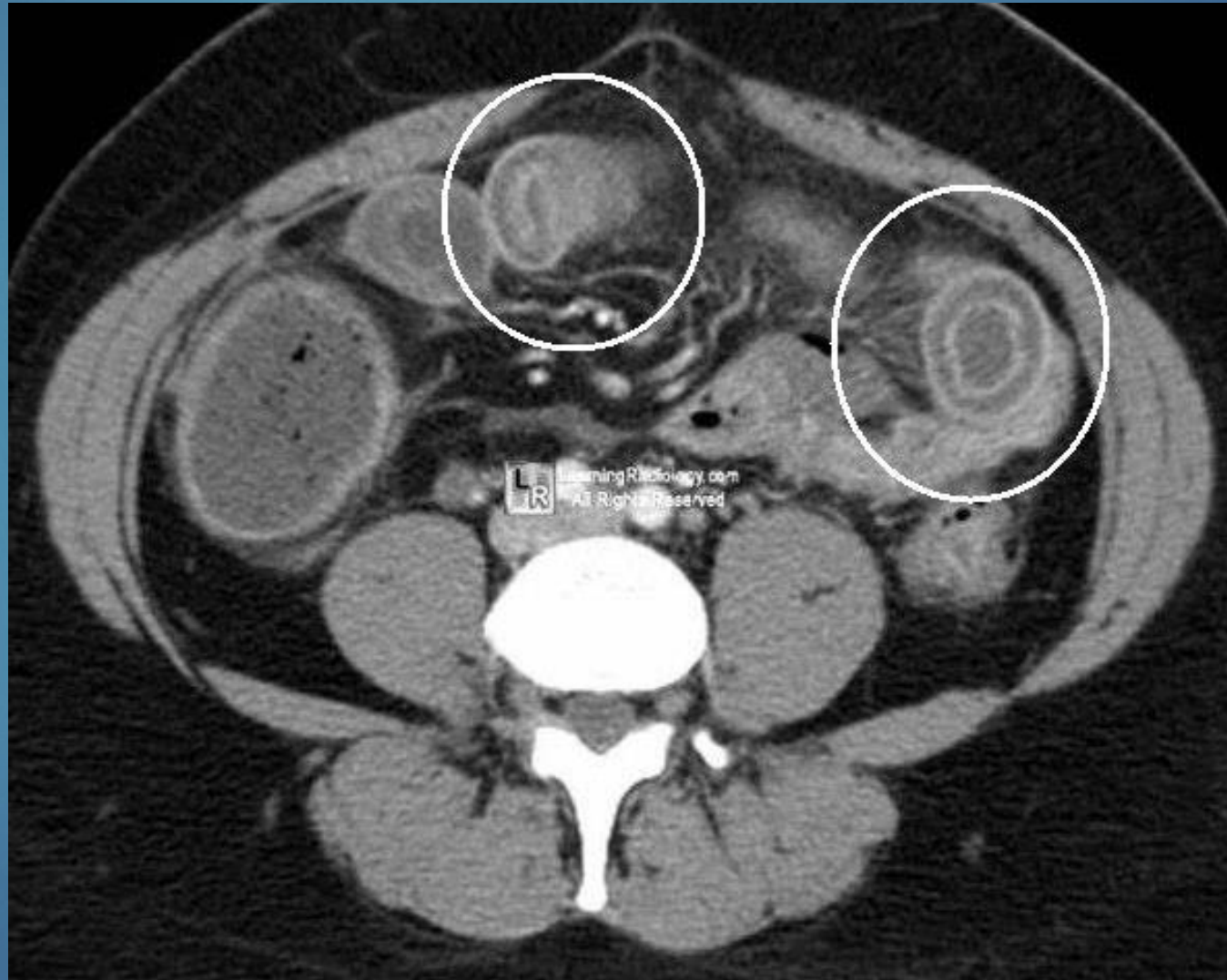
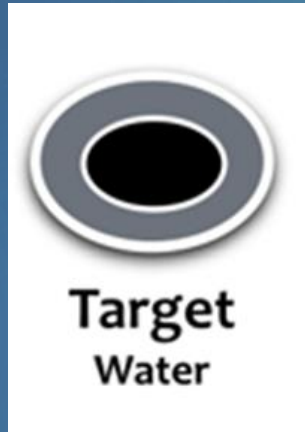
**Gas**

**Gas within  
the bowel  
wall  
Pneumatosis**

Non viable wall dose not enhance with iv contrast

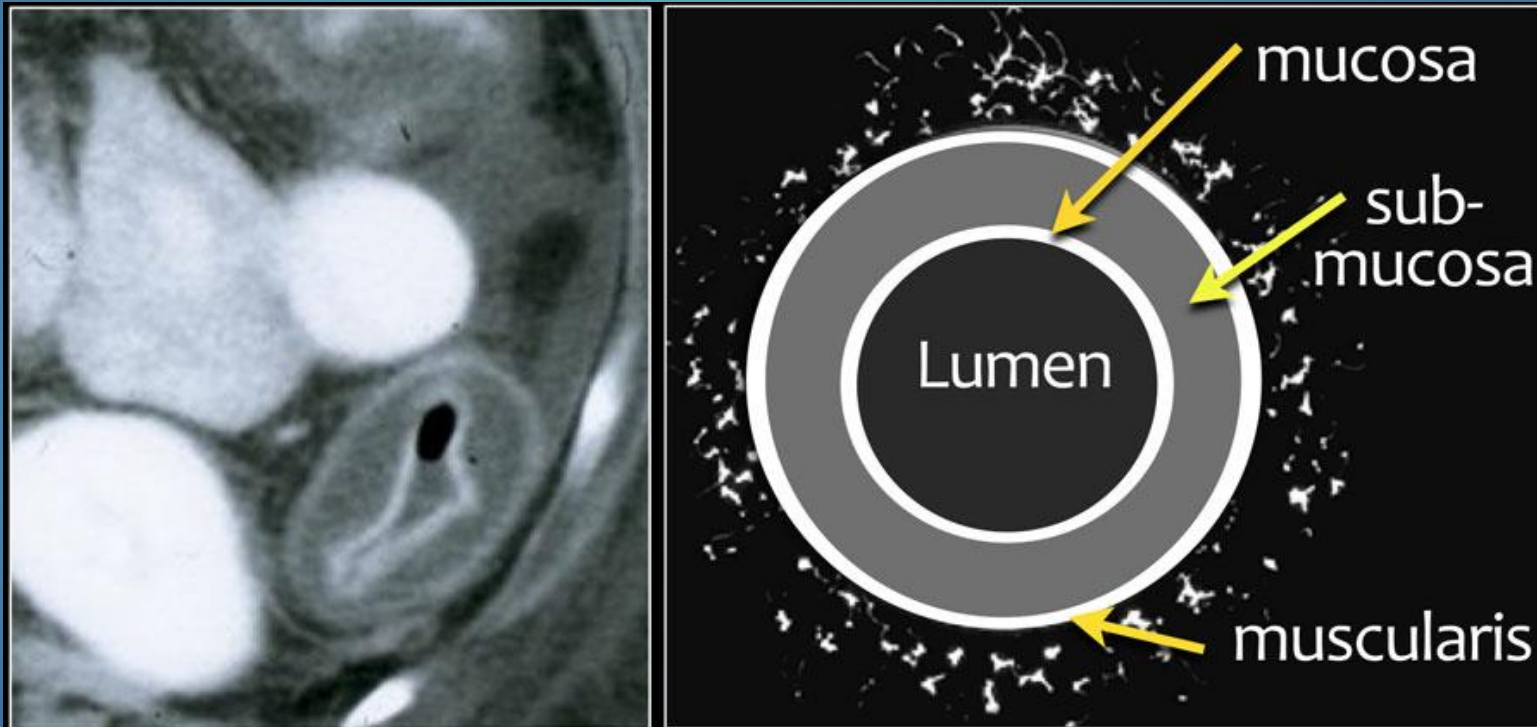


# Target sign

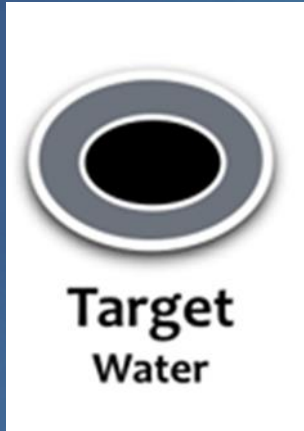


# Target sign

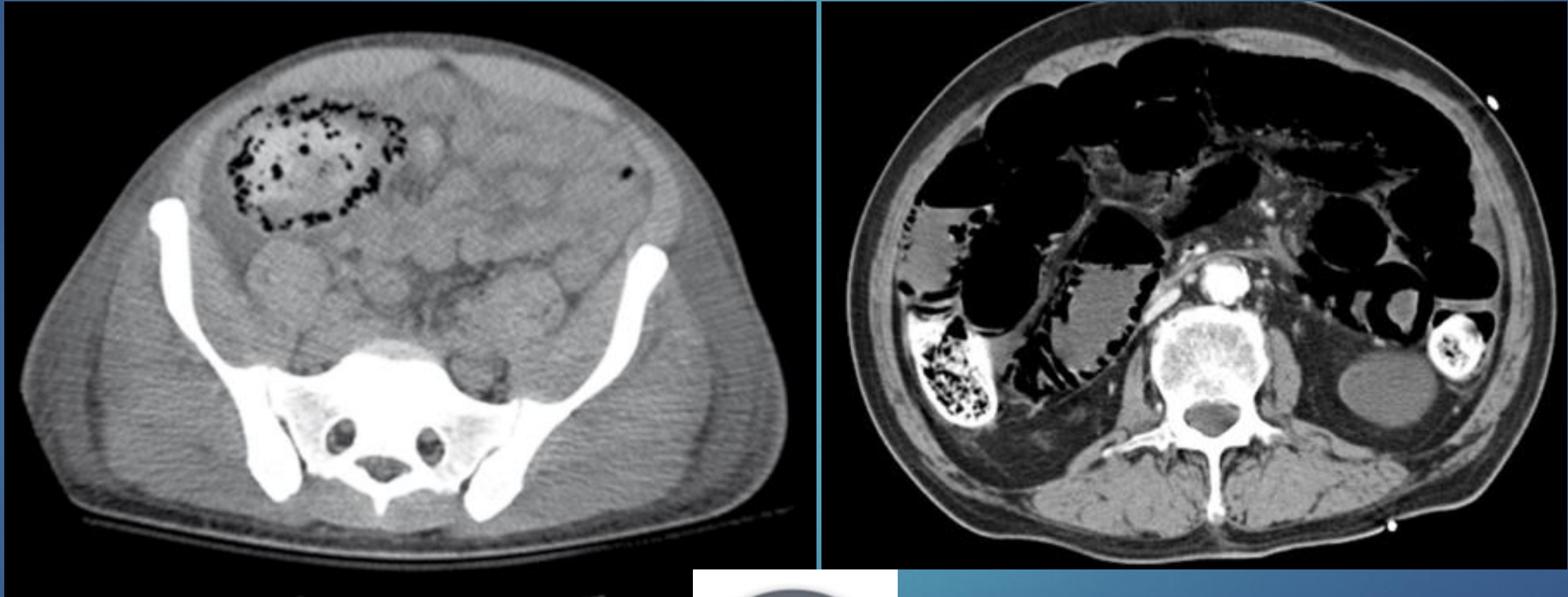
Enhanced mucosa and muscularis propria with edematous submucosa in between



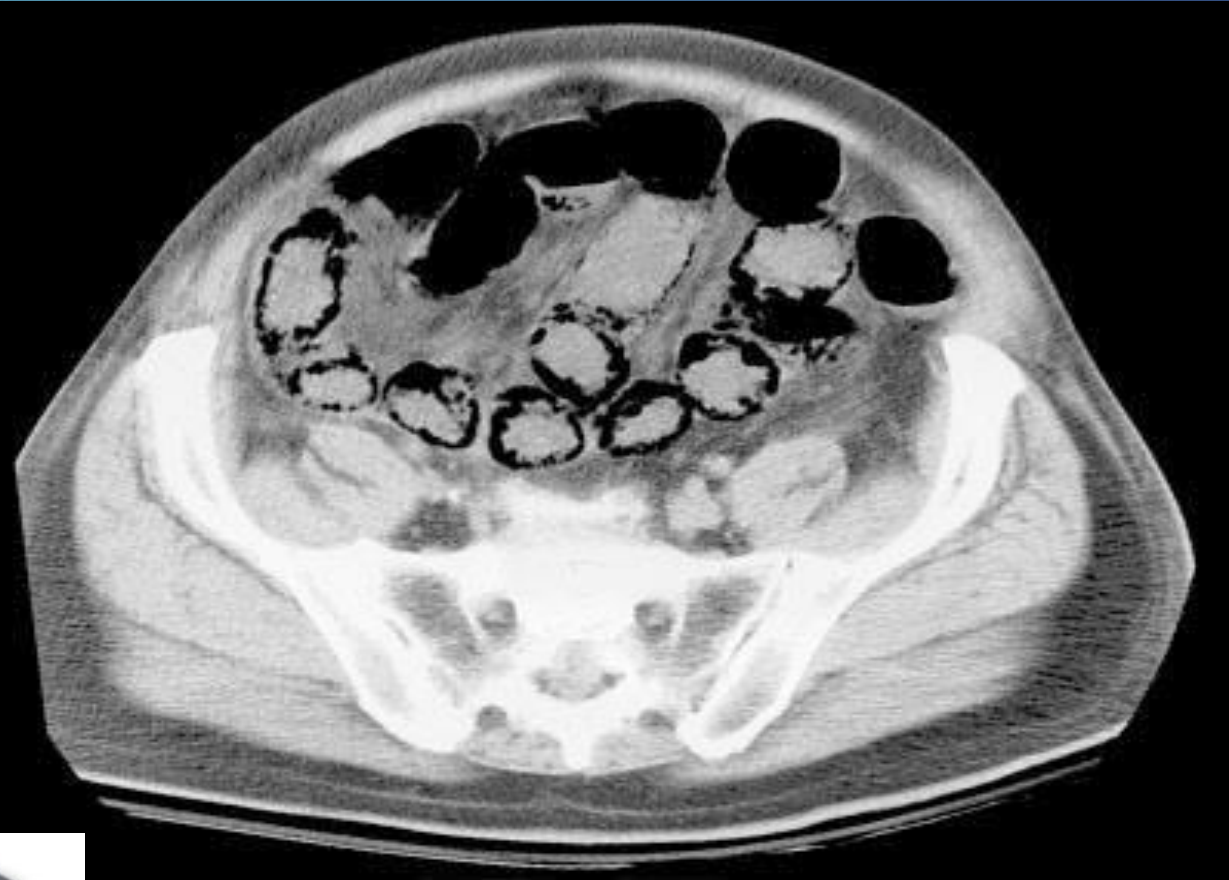
# Target sign



# Pneumatosis Intestinalis

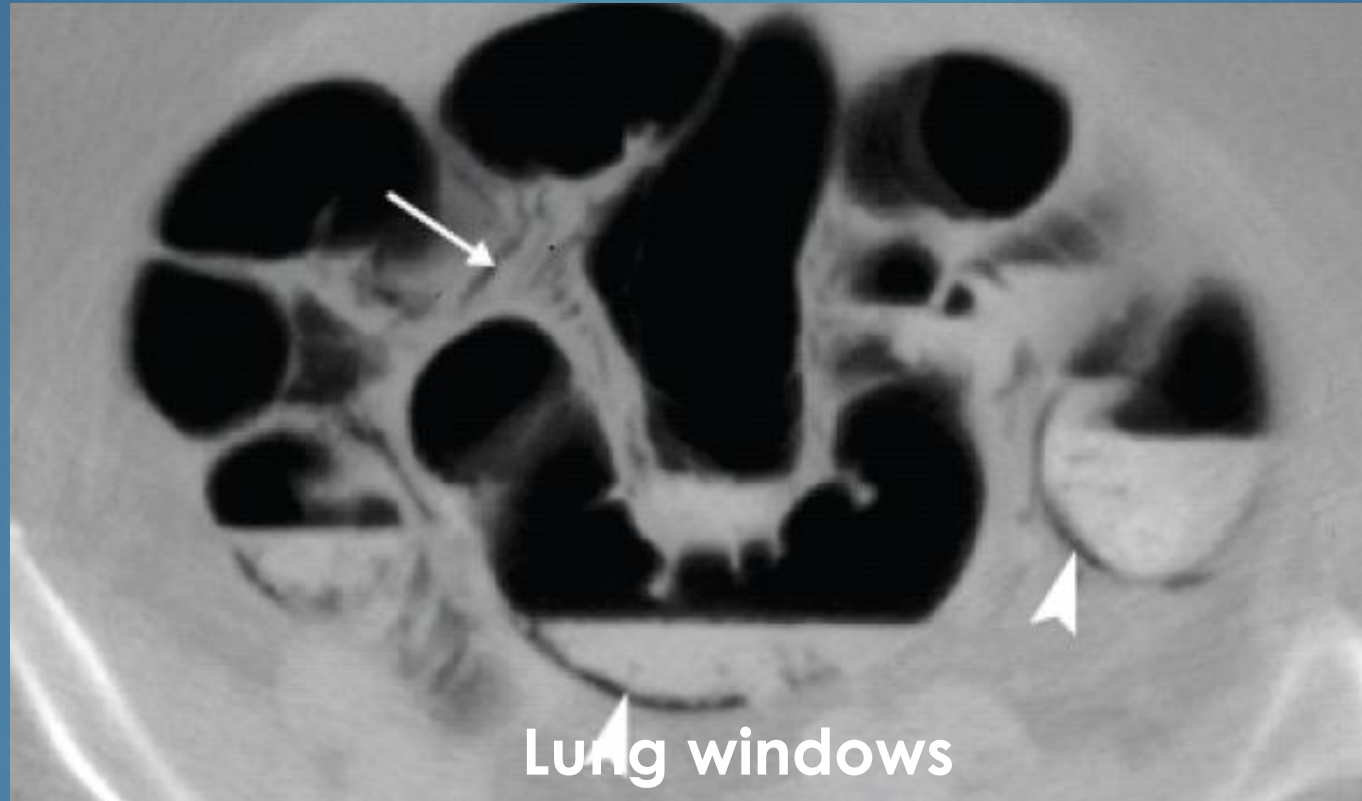


# Pneumatosis Intestinalis





# Pneumatosis Intestinalis



air in the dependent wall (arrowheads) of the colon and air within mesenteric veins (arrow).

This patient had a total infarction of the colon.

# Note

On CT air bubbles within the lumen may mimic pneumatosis but should always be seen adjacent to the nondependent bowel wall.

Turning the patient and rescanning may clarify the diagnosis.



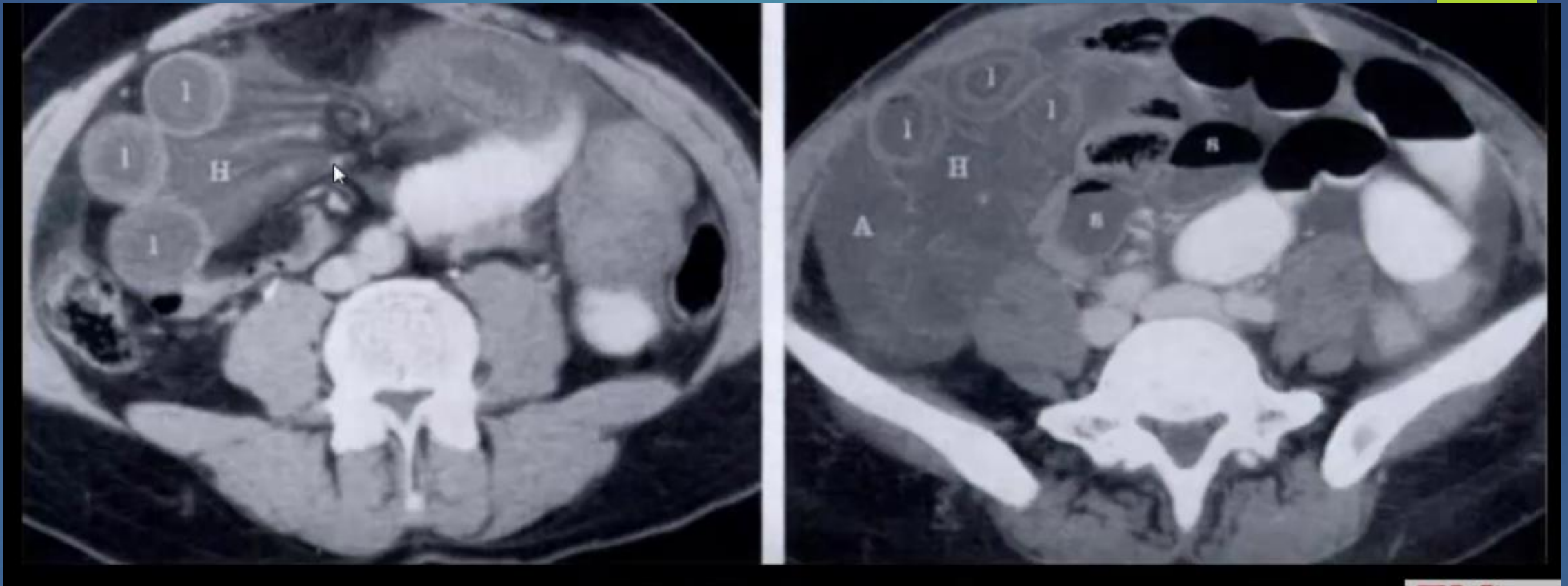
# Danger

Closed loop obstruction

Strangulation

# Strangulation

- ▶ Circumferential wall thickening (>3 mm)
- ▶ Edema of the bowel wall (target sign )
- ▶ lack of enhancement of the bowel wall (most specific sign)
- ▶ Haziness of mesenteric vessels
- ▶ Infiltration of the mesentery with fluid or hemorrhage



Infiltration of the mesentery with fluid or hemorrhage

# Closed loop obstruction

In large bowel → volvulus

In small bowel → small bowel closed loop obstruction



hernia

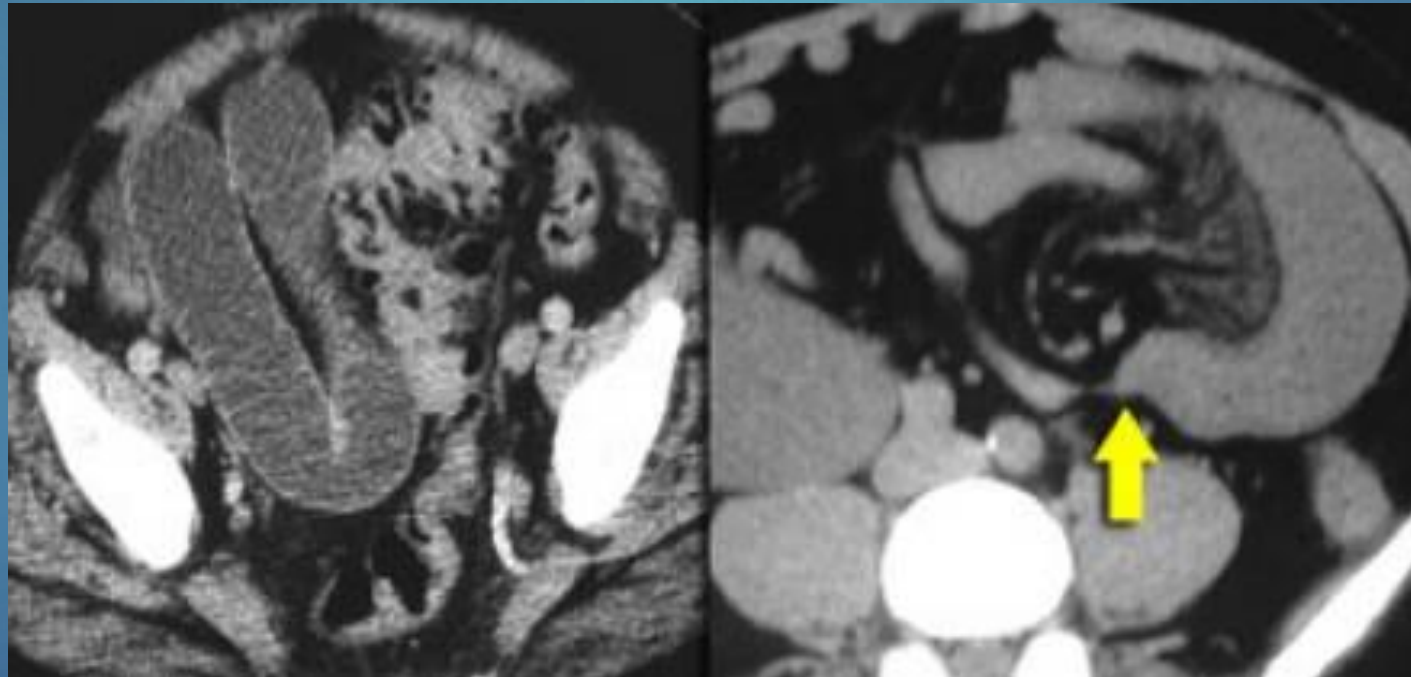
twisted

# Closed loop obstruction

C sign

U sign

Clump of bowel



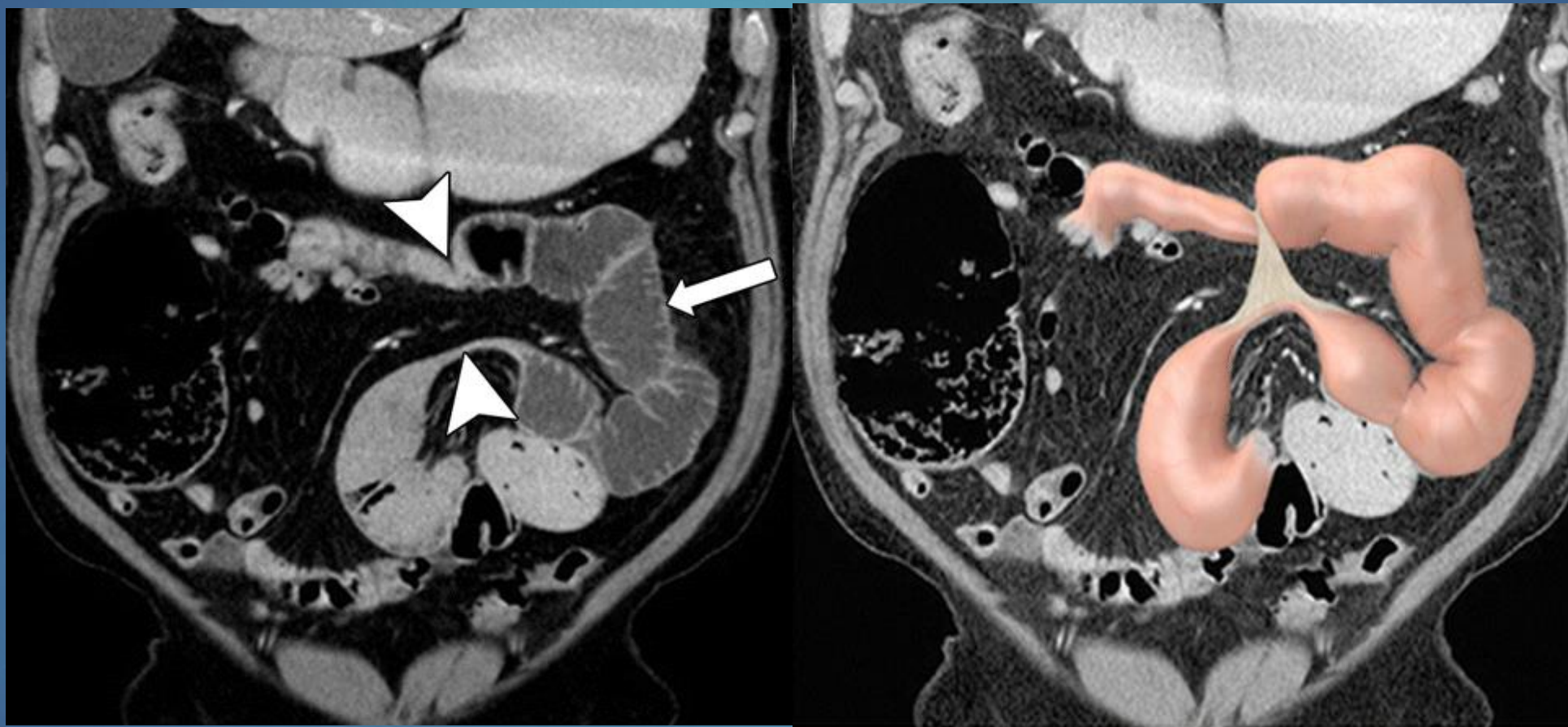
*Point of obstruction has a beak-like appearance*



# CT features

1. **Radial distribution** of dilated small bowel with mesenteric vessels converging toward a focus of torsion
2. **U- or C-shaped**
3. **Beak sign**
4. **whirl sign** of tightly twisted mesentery seen with volvulus

# Closed loop obstruction

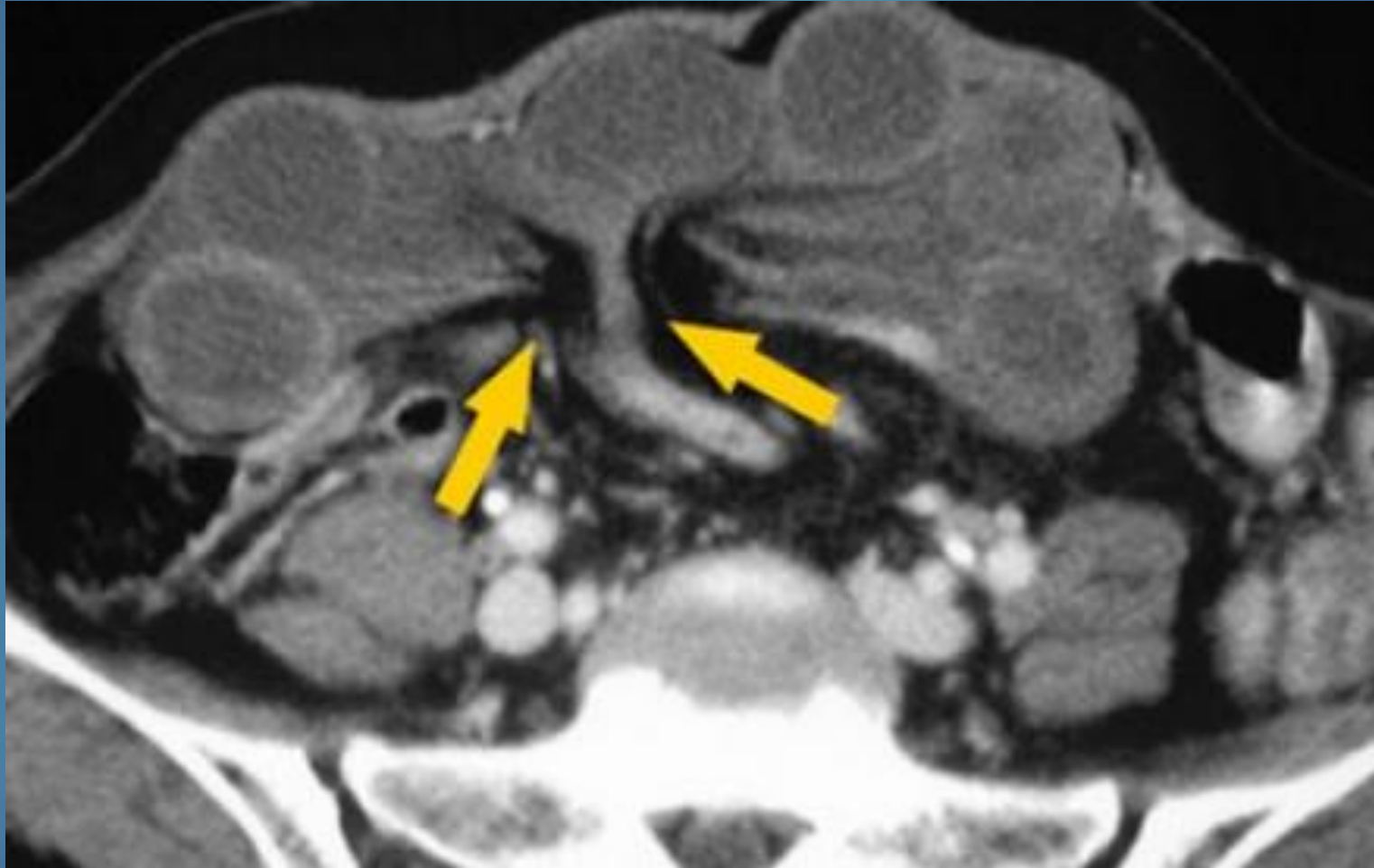


C sign

# Closed-Loop Obstruction

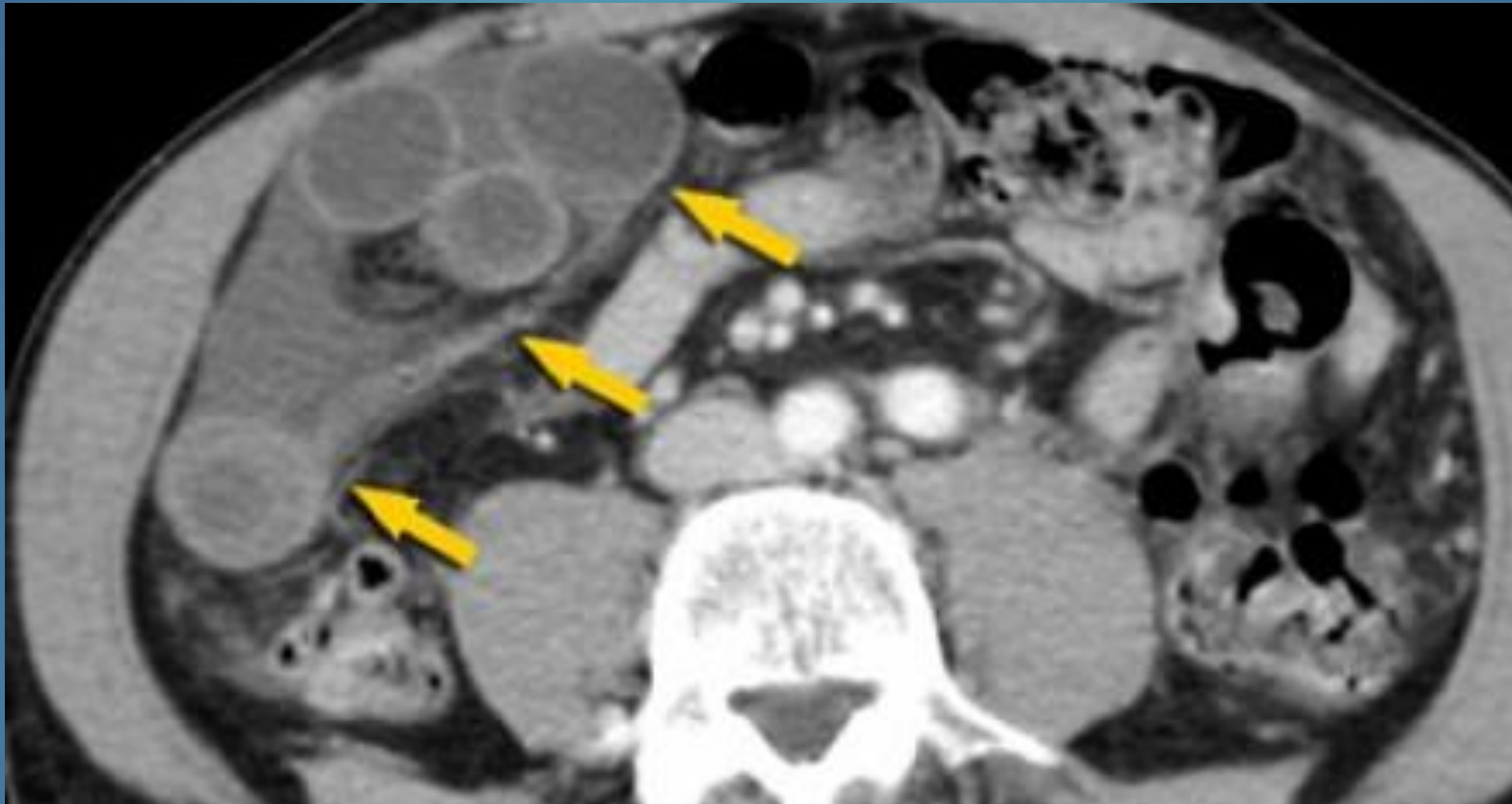


# Closed-Loop Obstruction



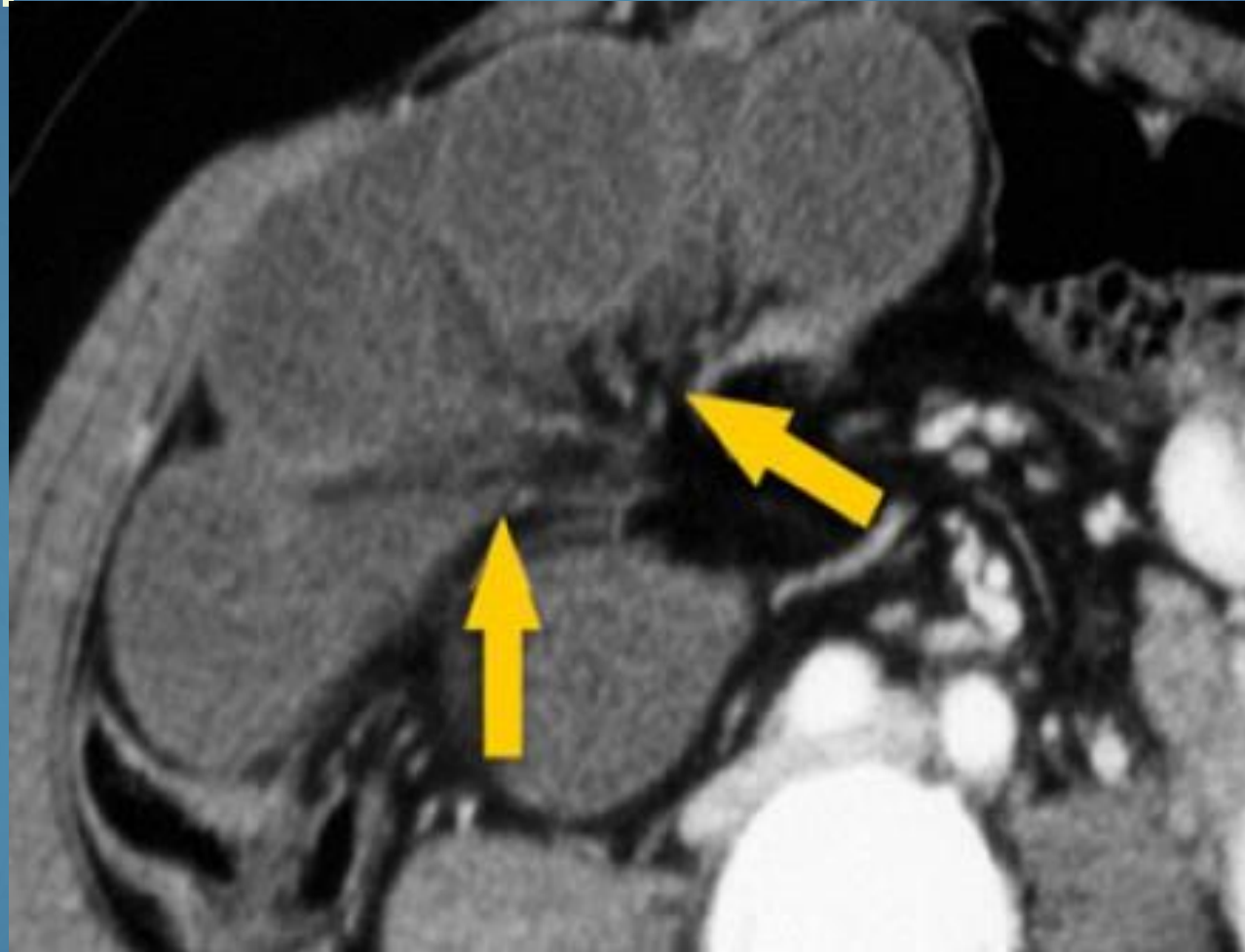
*Mesenteric edema indicating ischemia*

# Closed-Loop Obstruction



clump of bowel loops

# Closed-Loop Obstruction

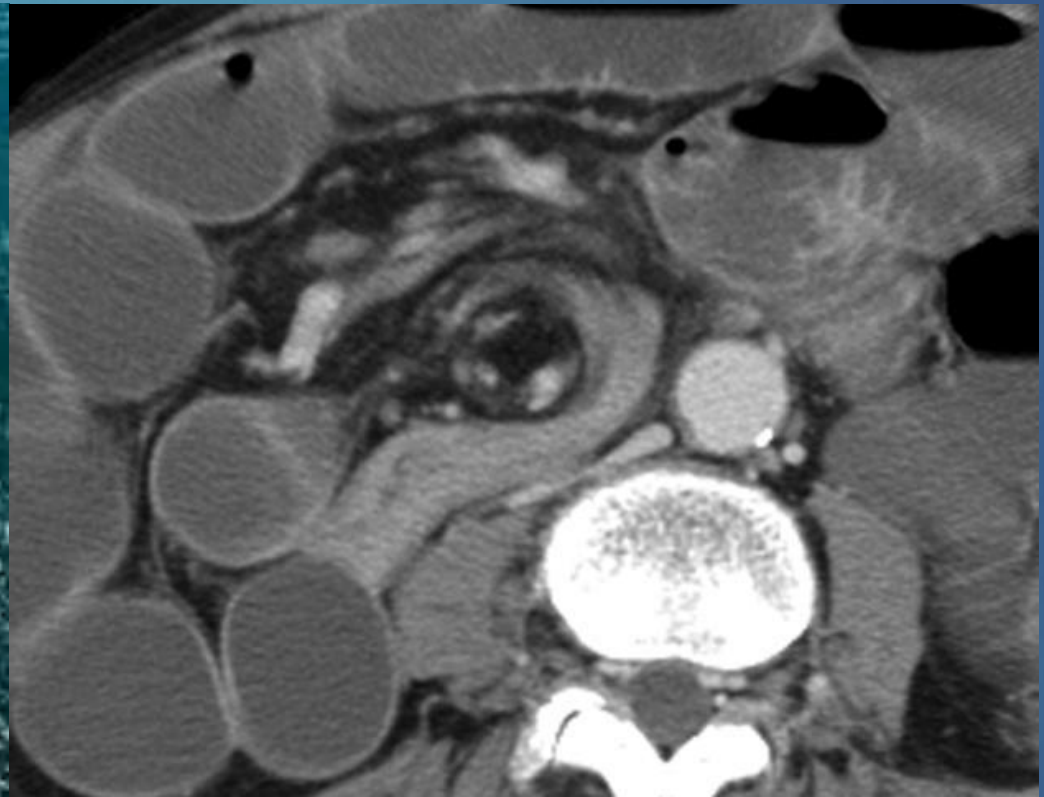


lack of enhancement of the bowel wall.  
mesenteric edema and bowel wall  
thickening.

# Whirlpool sign

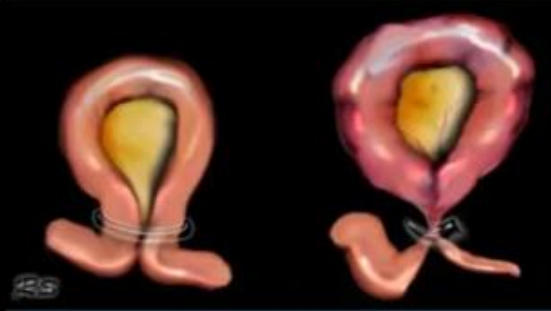
bowel rotates around its mesentery leading to whirls of the mesenteric vessels

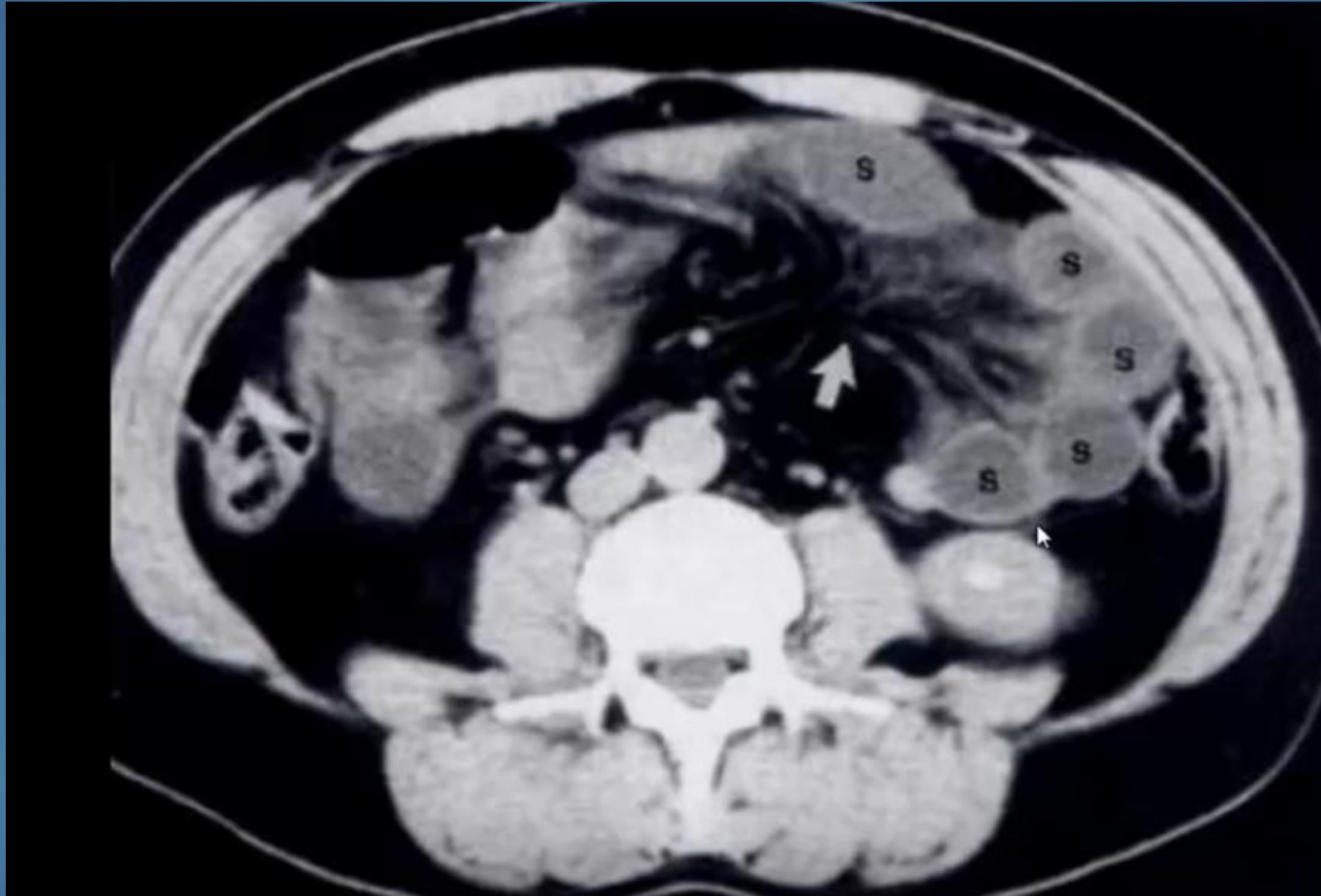
# Whirlpool sign





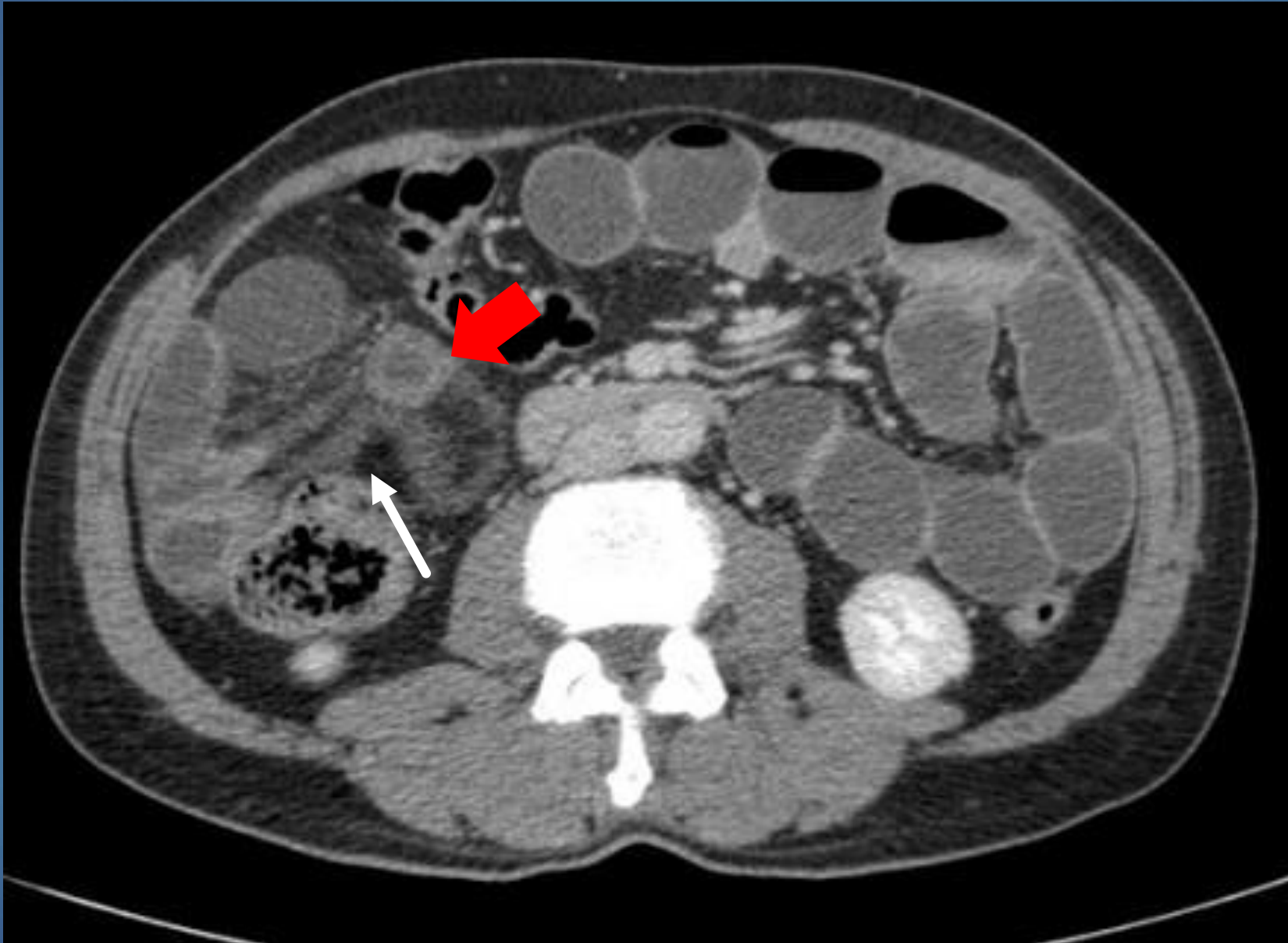
# whirl sign









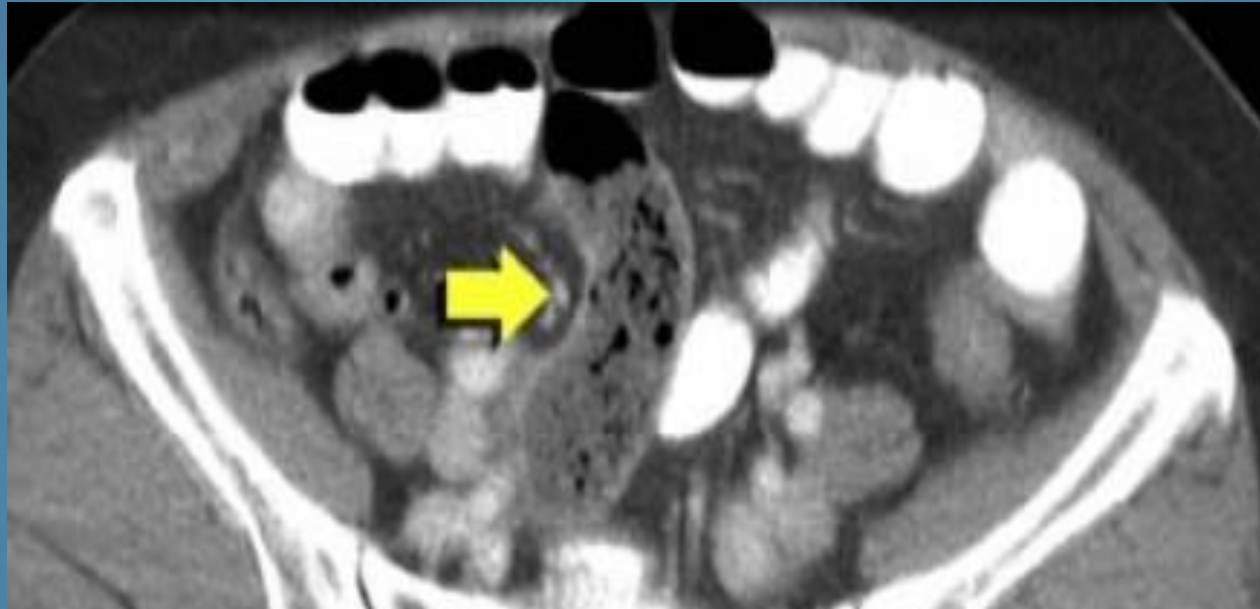


Mesenteric edema



Bowel wall thickening

# Small bowel feces sign



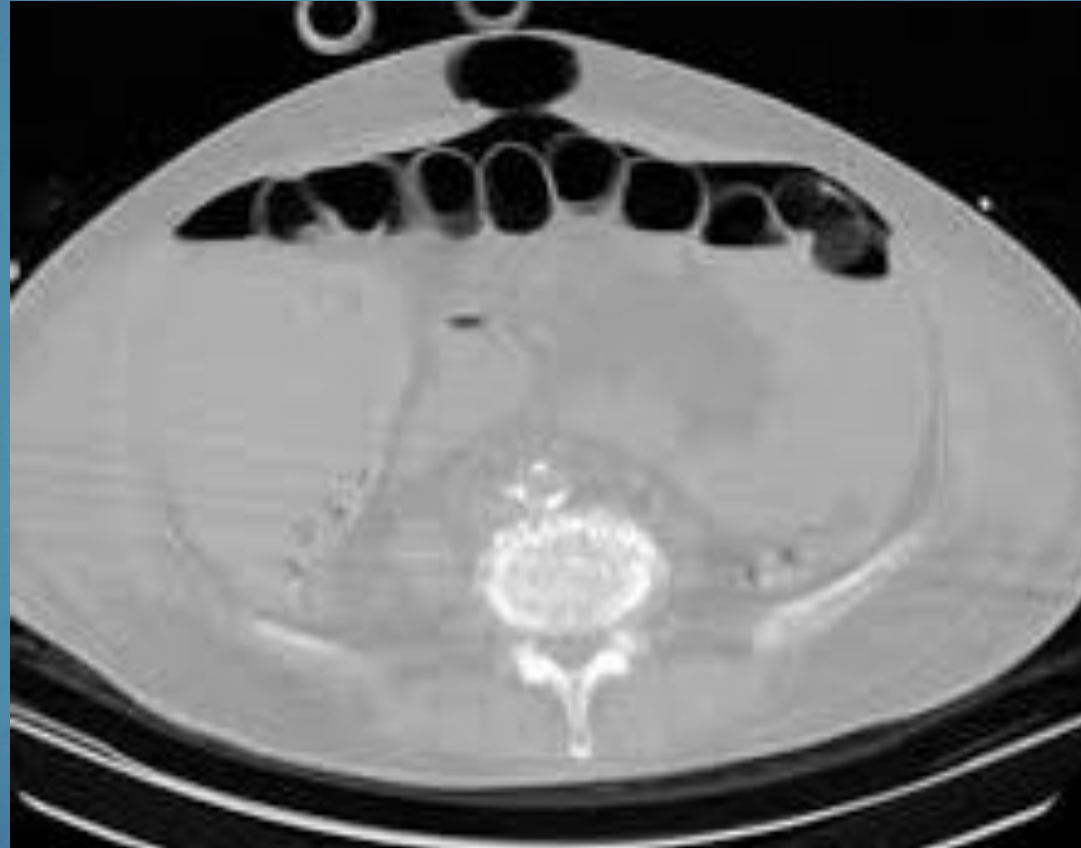
# Complications

# Complications

1. ischemia
2. free intra-peritoneal fluid
3. pneumoperitoneum



# pneumoperitoneum

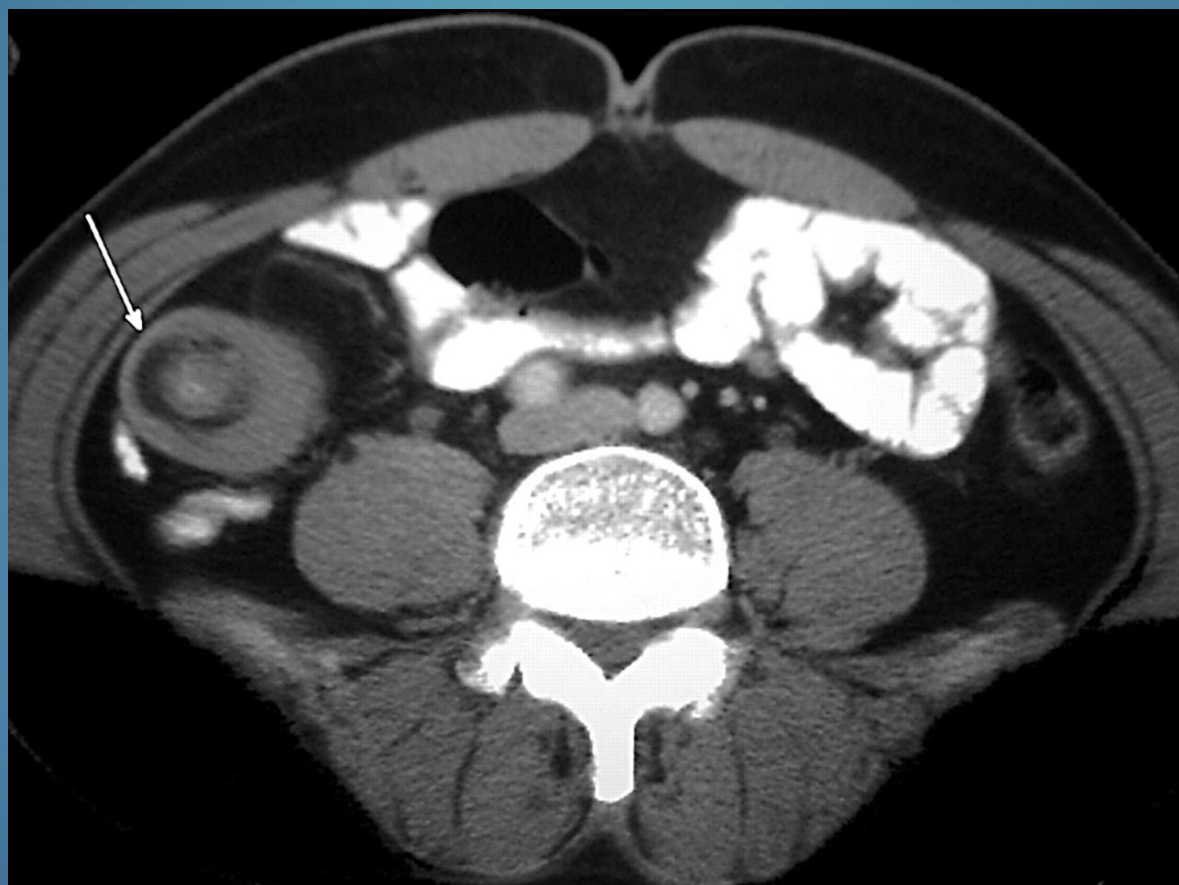


# pneumoperitoneum



# Pneumoperitoneum With Small Bowel Obstruction





**Thank you for your attention**