

EMERGENCY

Hollow Viscus Injury

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Acknowledgement



Thank you,
Claire K Sandstrom, MD
University of Washington, Seattle, USA
For sharing some of your cases!

Hollow Viscus Injury (HVI)

- 3-5% of injuries
- Blunt trauma: crush between spine and seat belt, steering wheel
 - MVC, car vs ped, falls
 - Higher risk for passengers
- Penetrating trauma: direct penetration or blast
 - Knives, GSW



Diagnosis

Identify surgical cases

- Definitive diagnosis: exploratory laparotomy
- ATLS principals apply
- FAST: not sensitive for HVI (PPV 40%)
- Xray: not necessary if CT is done
may help with trajectory mapping (GSW)
- CT: High specificity to rule out surgical injury
- Especially if patient is asymptomatic
- Moderate sensitivity (65%)
- Up to 20% of injury missed on CT



Diagnosis

Avoid delay of diagnosis

- Negative laparotomy should be rare.
- Delayed diagnosis > 24 hrs (EAST)
 - Mortality 16% vs 4%



Non-operative management vs surgery

Types of injury:

- Seromuscular tear
- Full thickness perforation
- Hematoma
 - Mural
 - Mesenteric

Non-operative if:

- No peritonitis/perforation, hemodynamic stability, evaluable
 - Includes GSW
- Negative or equivocal CT findings:
 - Small free low-density fluid only
 - Isolated hematoma



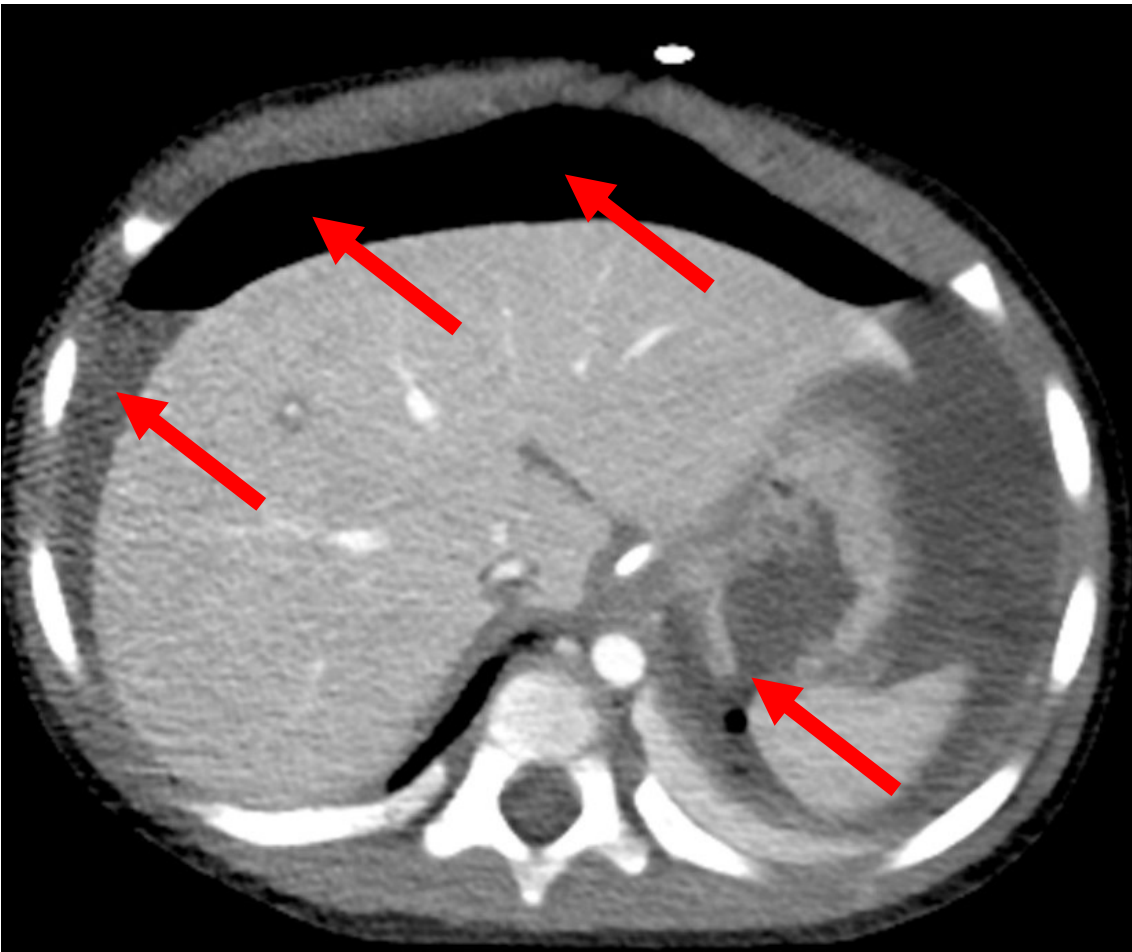
Non-operative management vs surgery

Surgical indications:

- Hemodynamic instability
- Signs of peritonitis on physical exam
- Imaging findings of perforation
 - Pneumoperitoneum
 - Spillage of bowel contents
 - Bowel wall discontinuity



2 yom MVC
Pediatric pan scan



2yom MVC

Stomach perforation

Direct signs:

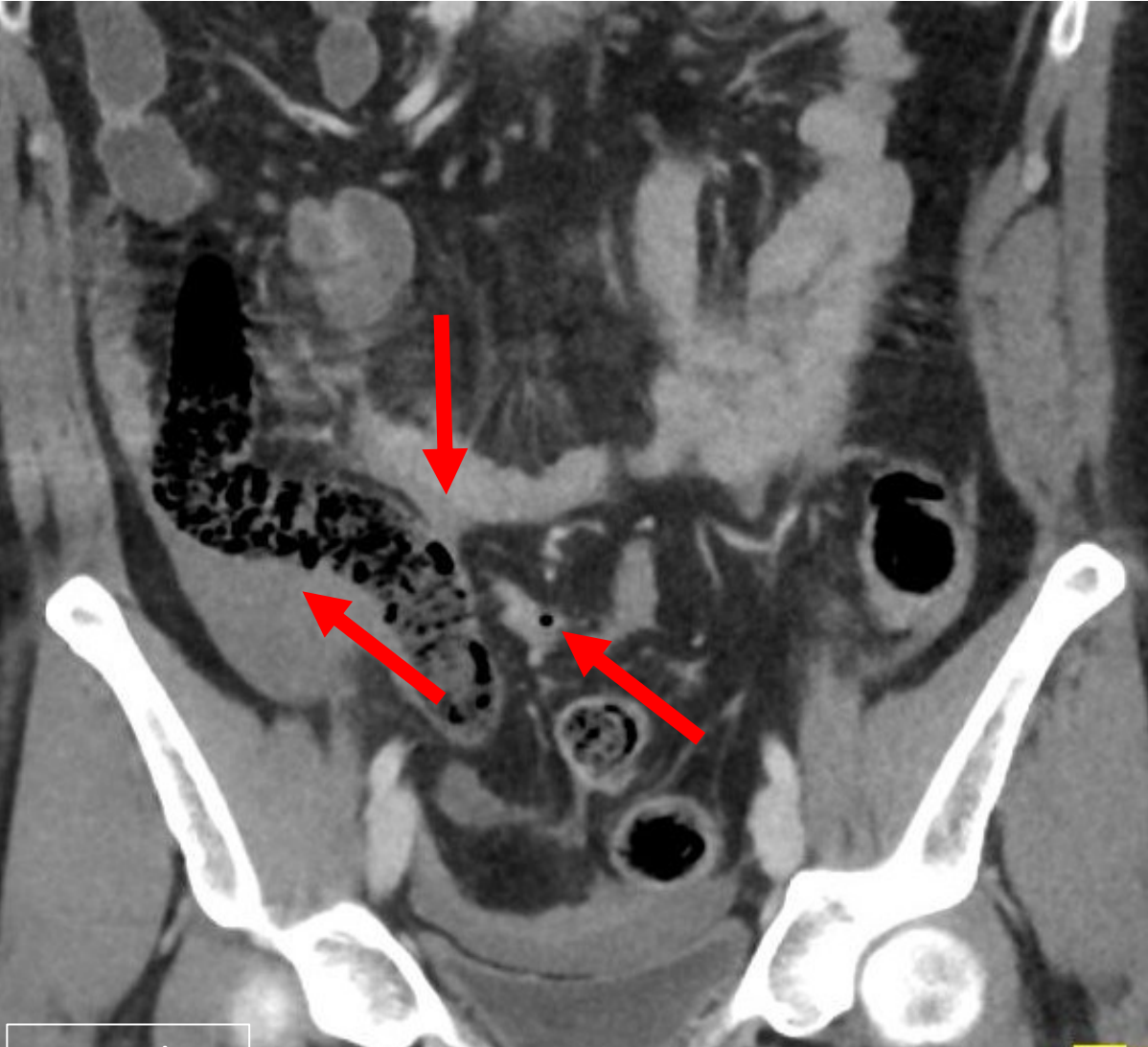
- Discontinuity of stomach wall
- Pneumoperitoneum
- Extraluminal spillage of enteric contents

Gastric injuries:

- Less common than small bowel and colon
- Younger patients: MVC, left-sided impact
- High mortality (28%), associated spleen injury common



32 yom MVC



Coronal CT

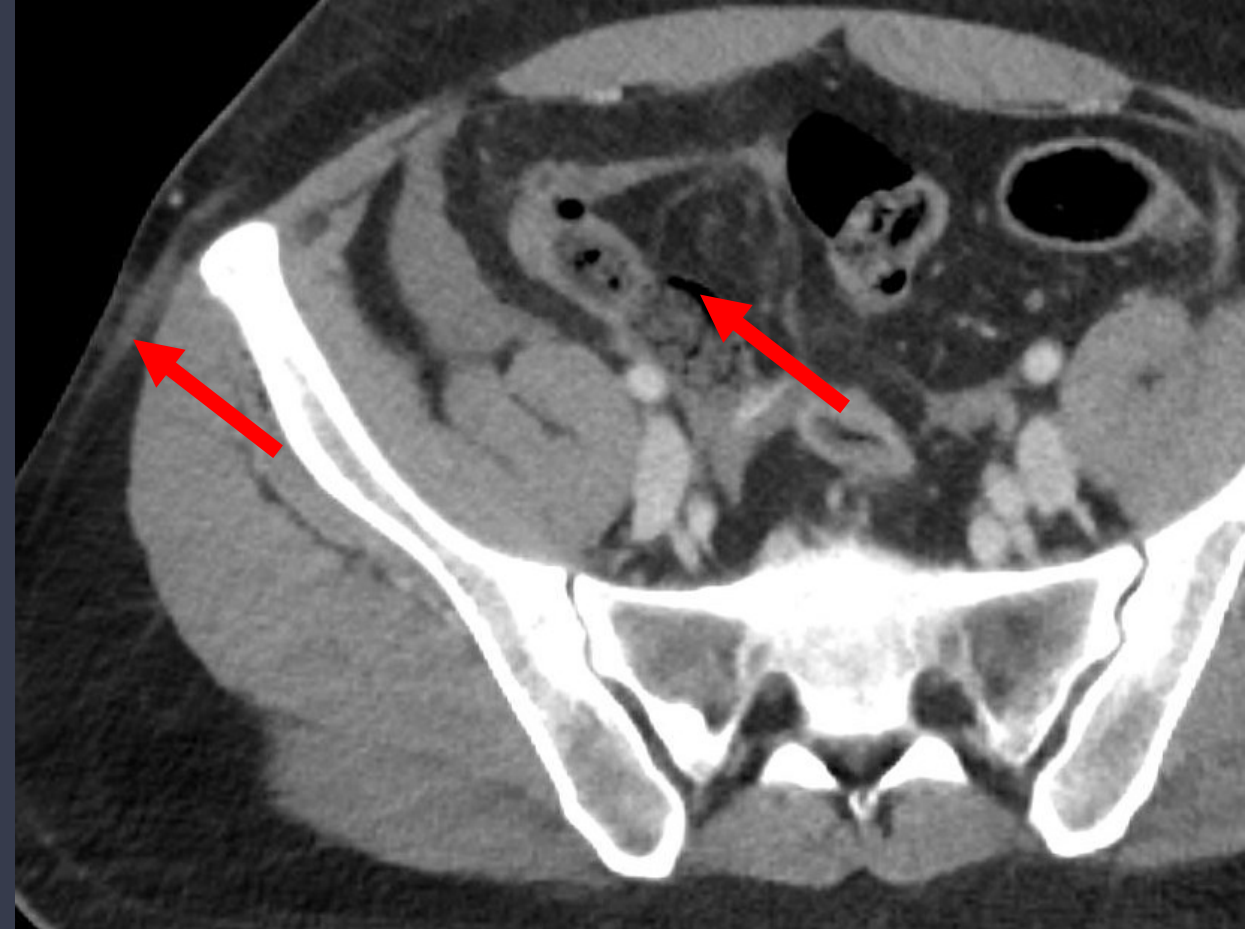


Axial CT

32yom MVC

Small bowel injury

- Ileum and jejunum: injury near fixation point
 - Ileocecal valve
 - Ligament of Treitz
- Frequently deep to seatbelt sign
- Association with flexion distraction spine injury
- Peritonitis develops slowly if perforation:
 - Neutral pH, low in bacteria, enzymatic activity low



32yom MVC

Indirect signs of bowel injury: more sensitive

Inter loop free fluid:

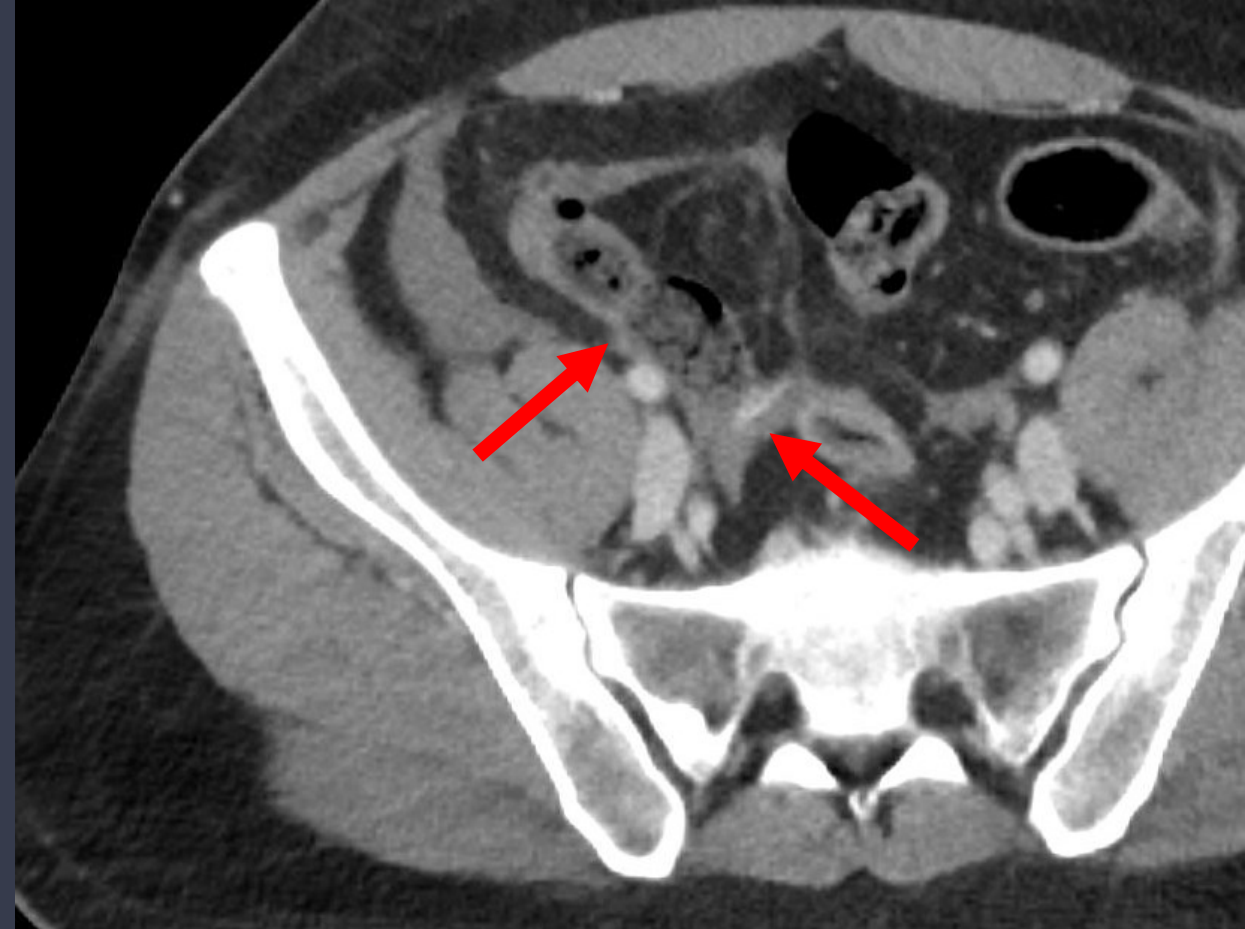
- Polygonal
- Adjacent to bowel loops
- Often intermediate or high density

Bowel wall thickening

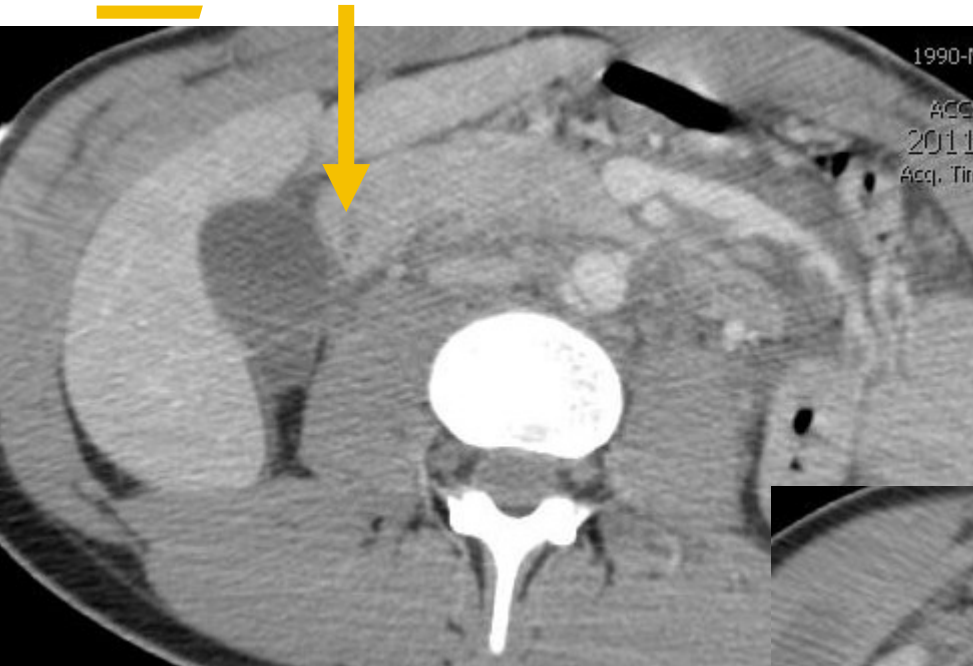
Bowel wall hematoma

Abnormal bowel wall enhancement

Mesenteric edema, hematoma

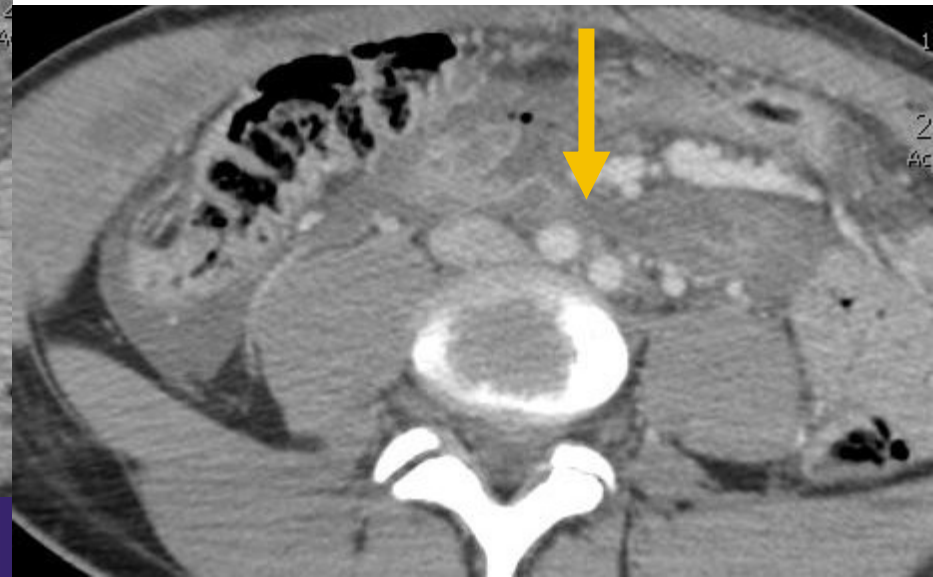
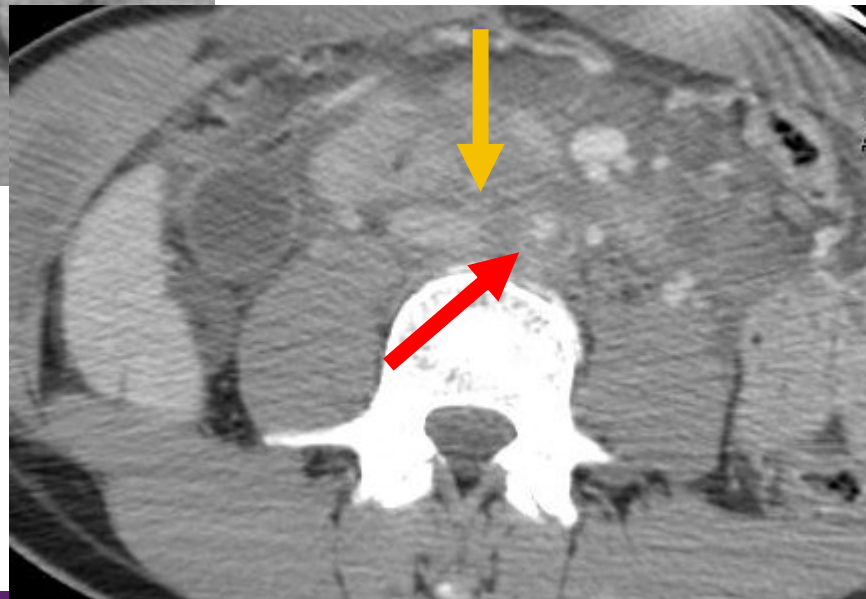


20yof MVC



Duodenal hematoma D2
Duodenal transection D3

Abdominal Aortic Injury
L4 Ant Comp Fx

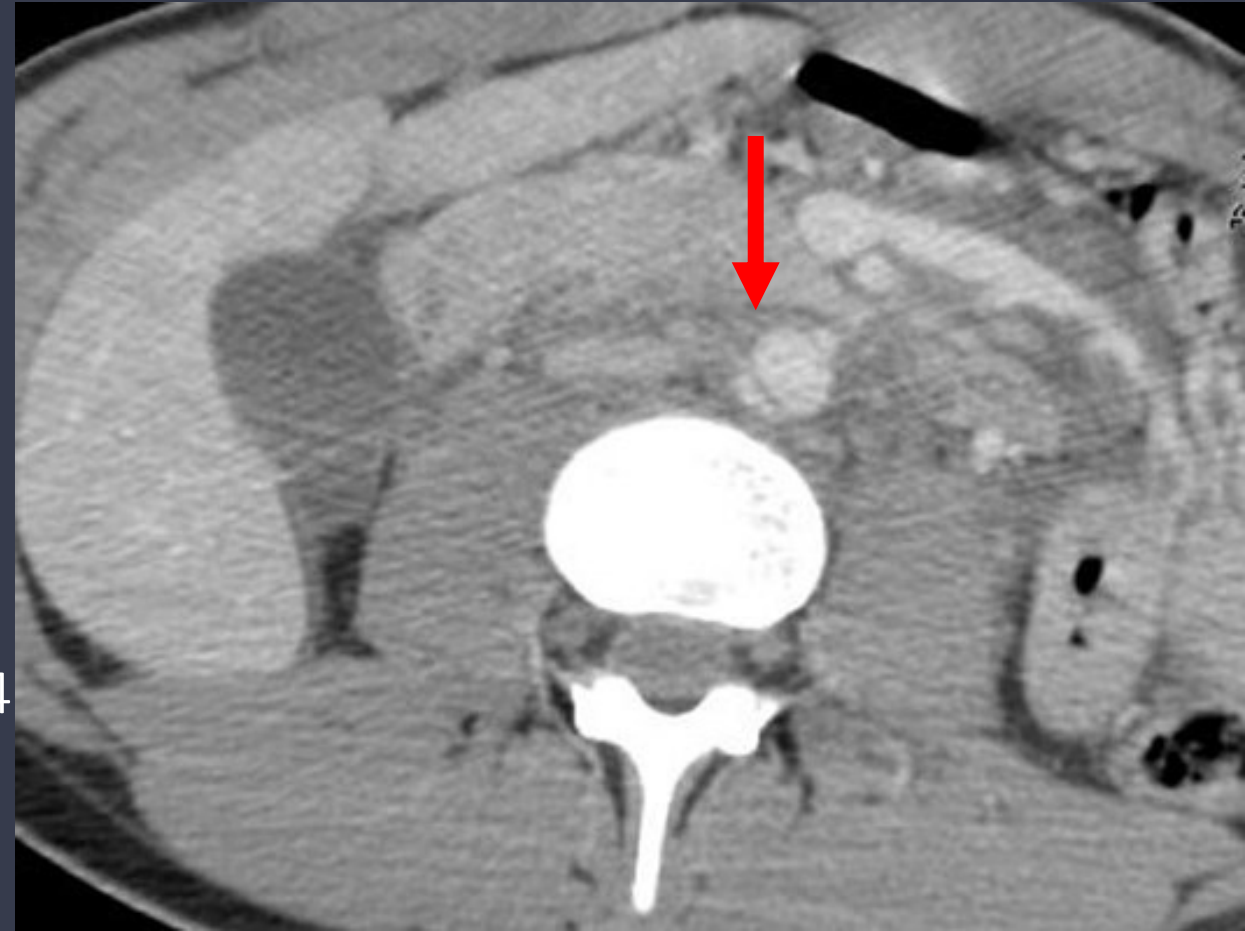


20yof MVC

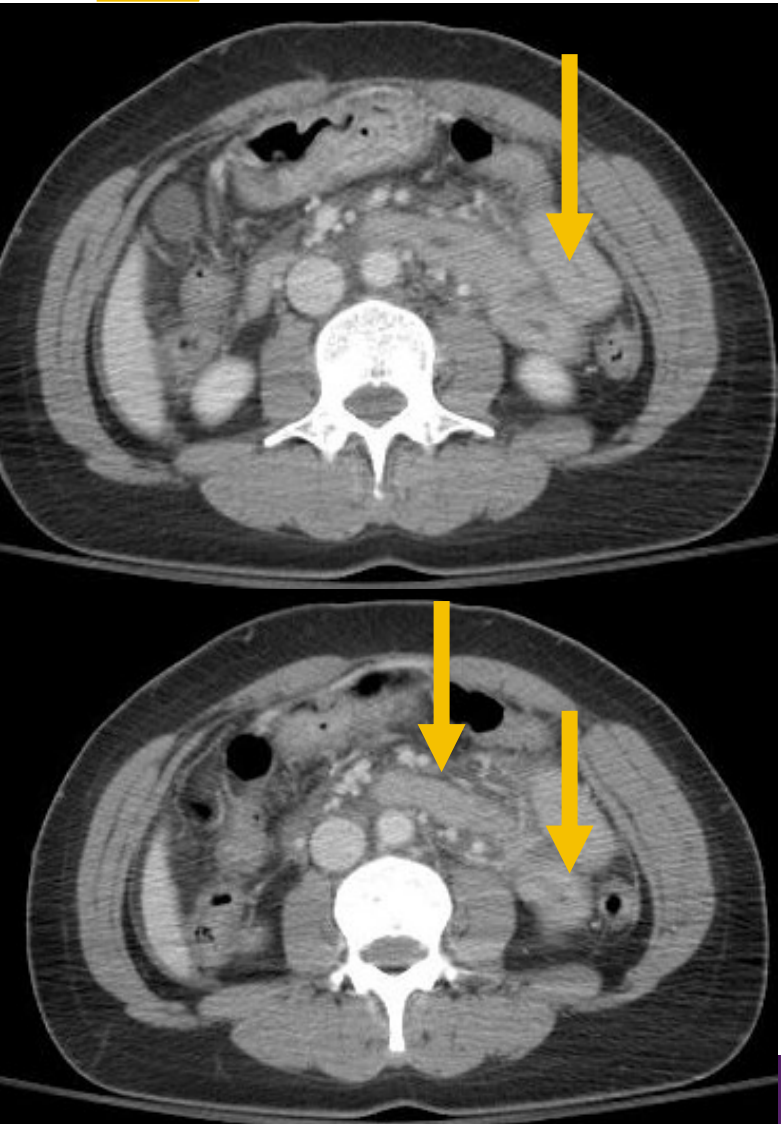
Duodenal injury

Uncommon to be isolated injury

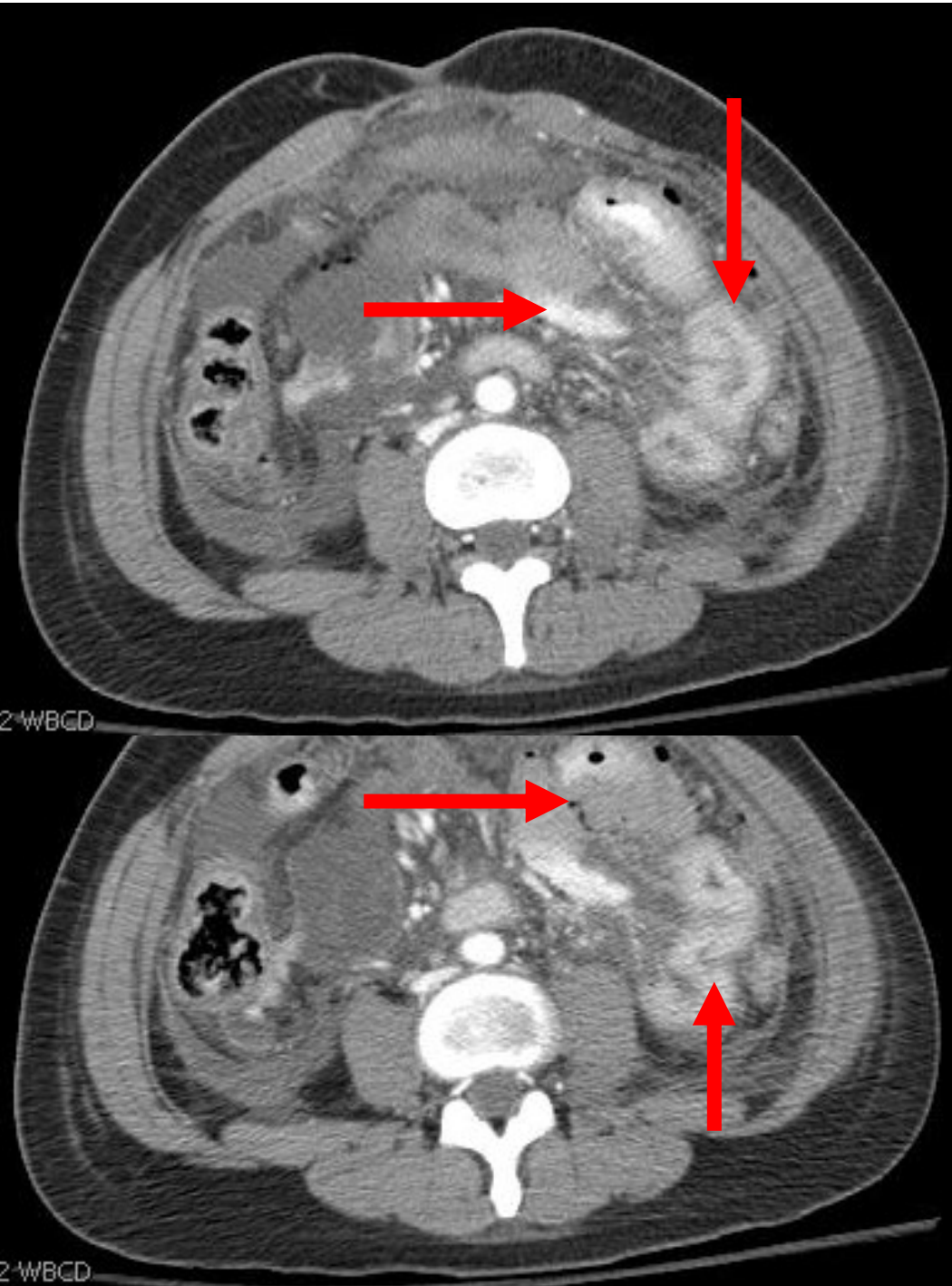
- Most frequent in descending or horizontal portion
- Pancreatic head and duct may be involved
- Hematoma can lead to gastric outlet obstruction
- Non-operative if isolated wall hematoma (> 4 mm wall thickness)
- Surgical if perforation or pancreatic duct or vessel involvement



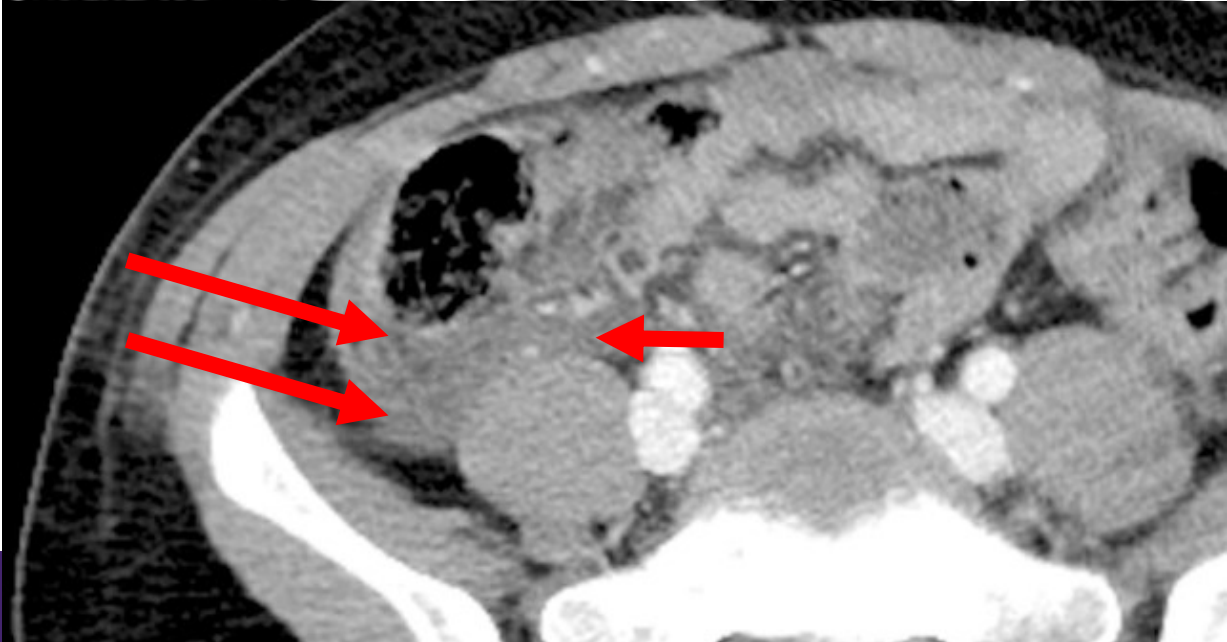
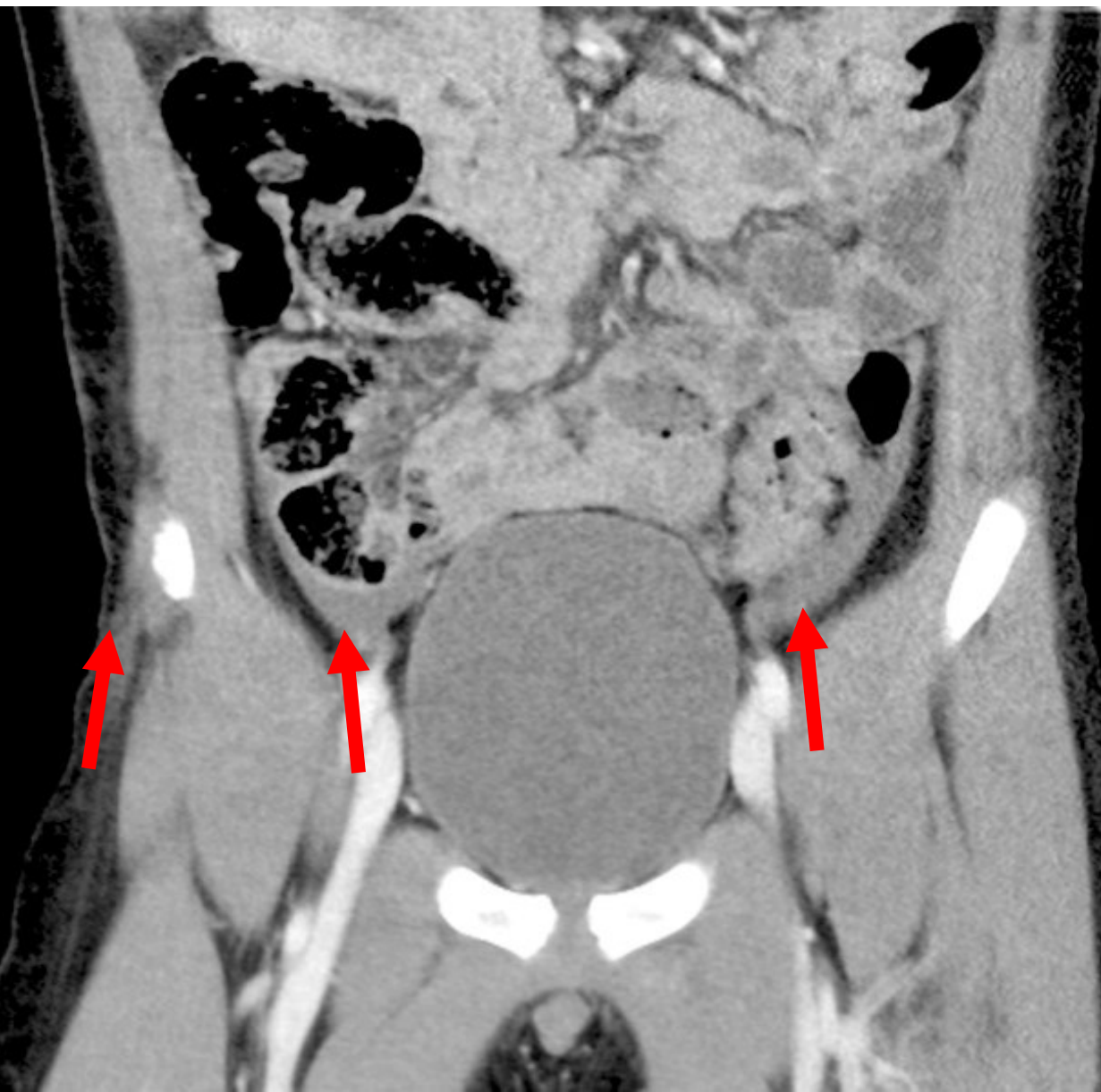
40 yof MVC



Jejunal injury with perforation proven by oral contrast use and subsequent surgery

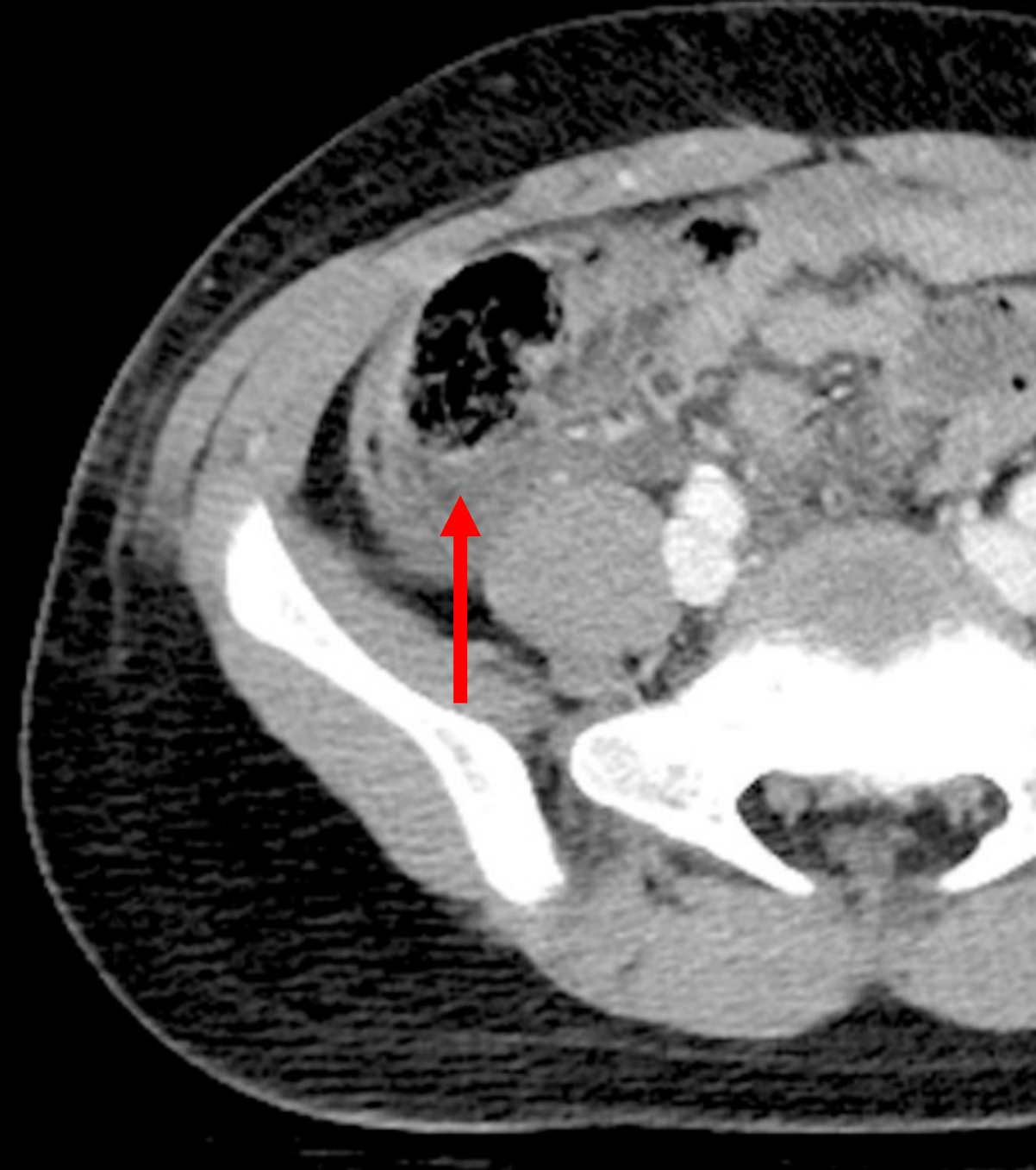


7yom mvc

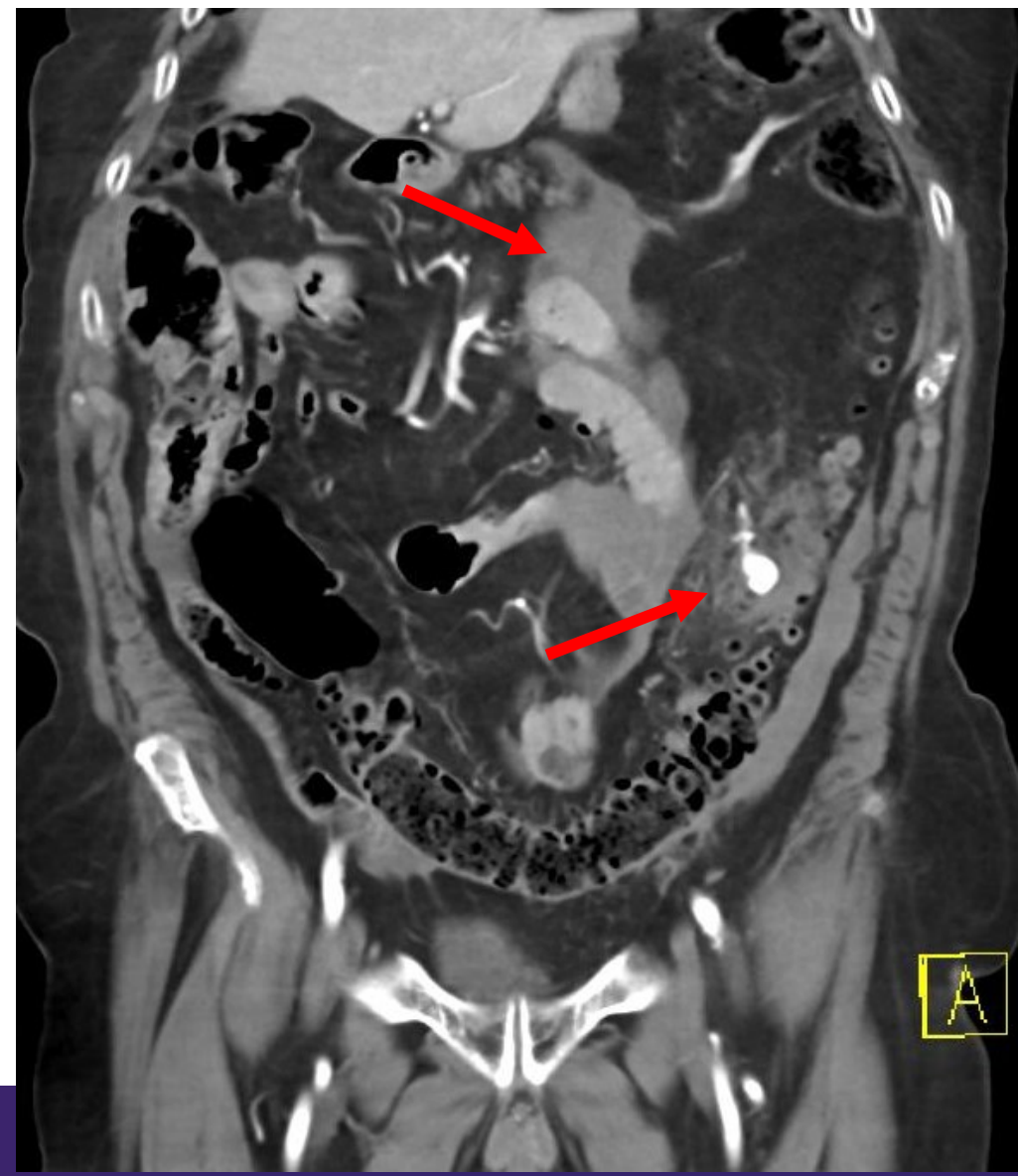
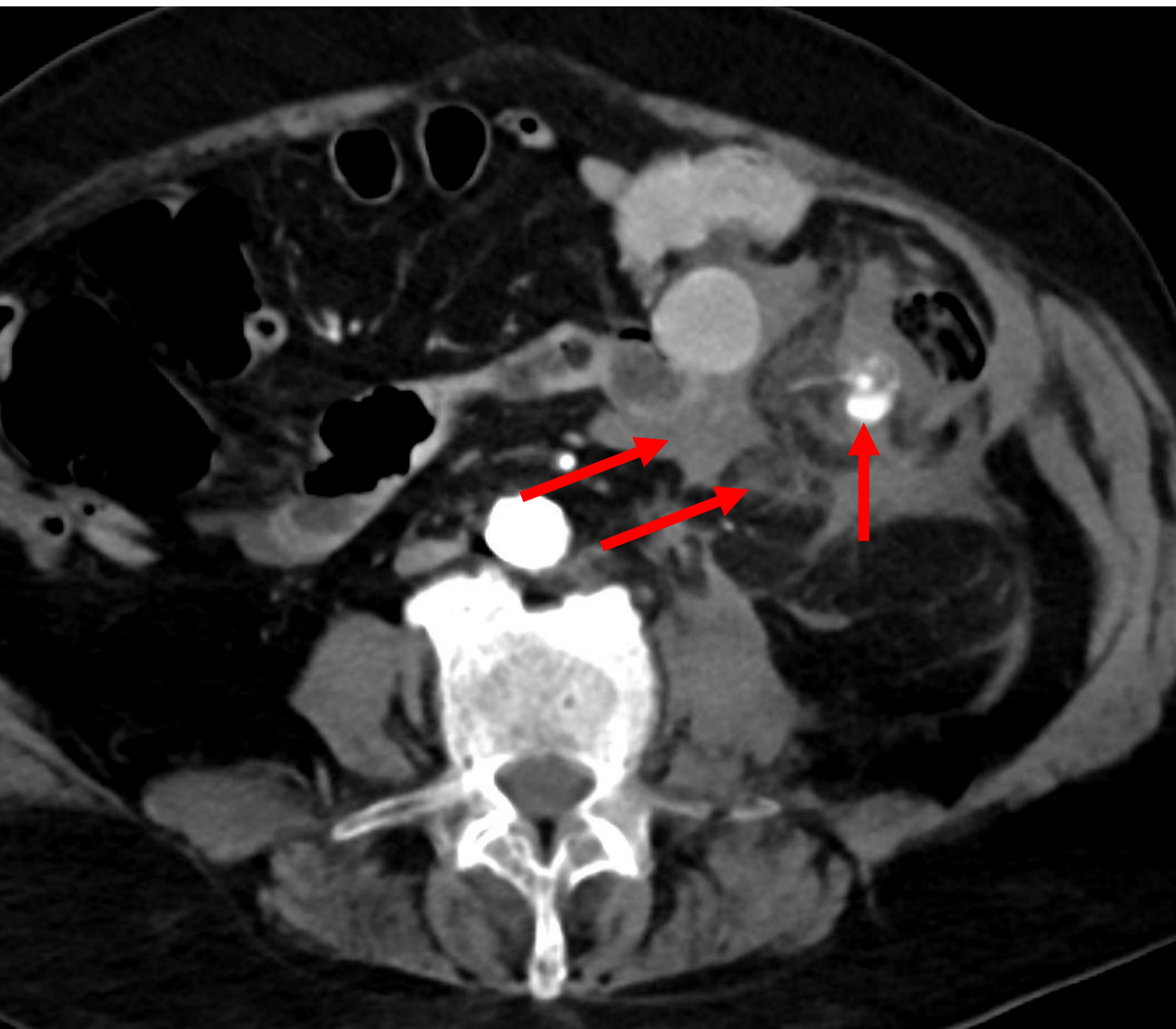


7yom MVC Colon injury

- Colon usually shear and crush injury
- Transverse colon often serosal only
- Full thickness severe injuries more common in ascending and descending
- Prompt surgery to prevent peritonitis
 - Delayed laparotomy worsens outcomes

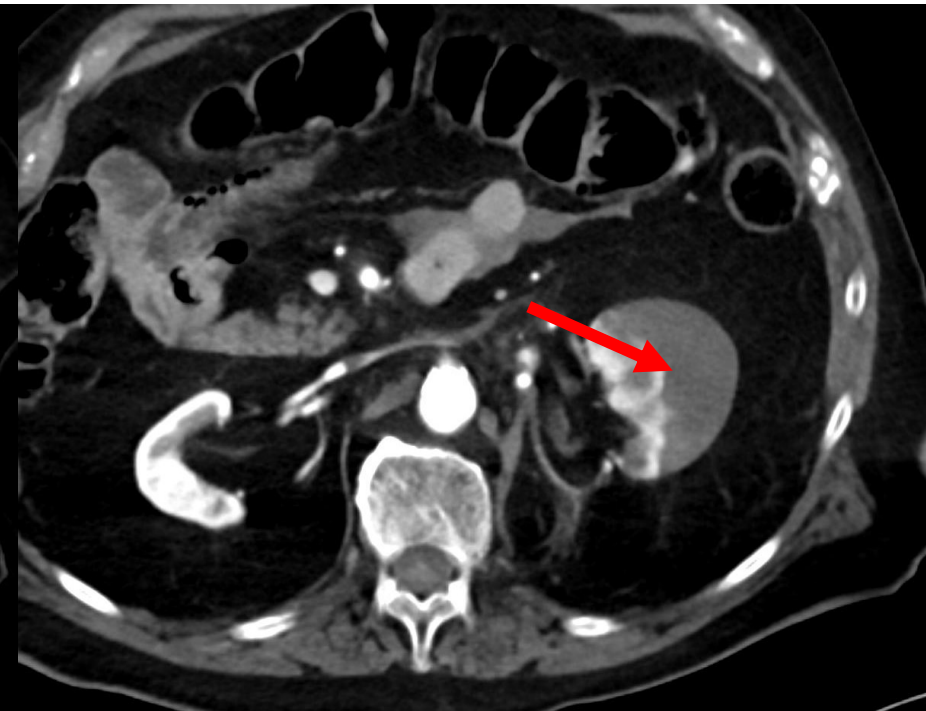
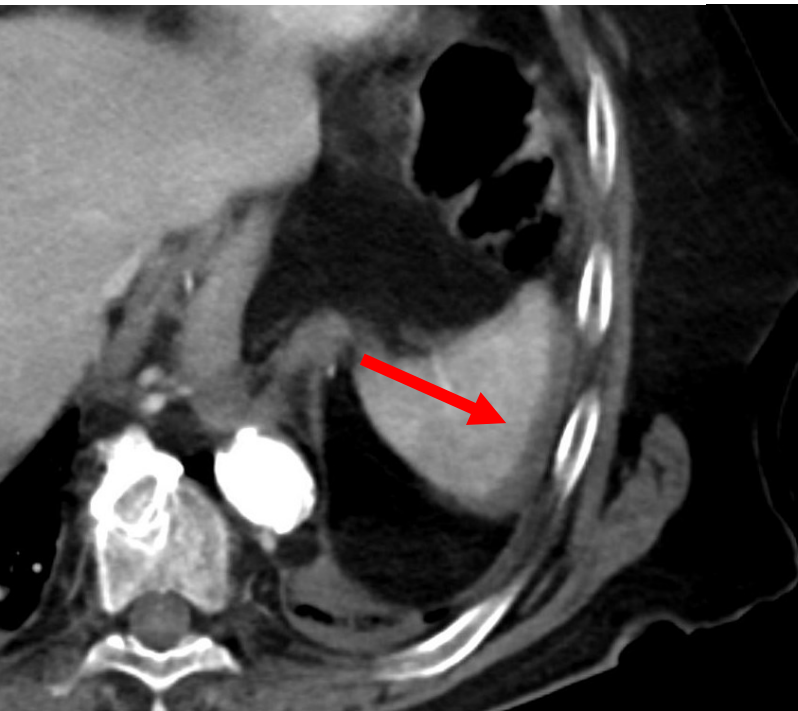


98yom MVC (rear seat): Mild Left Pain



98yom MVC (rear seat): Near-side lateral impact injury

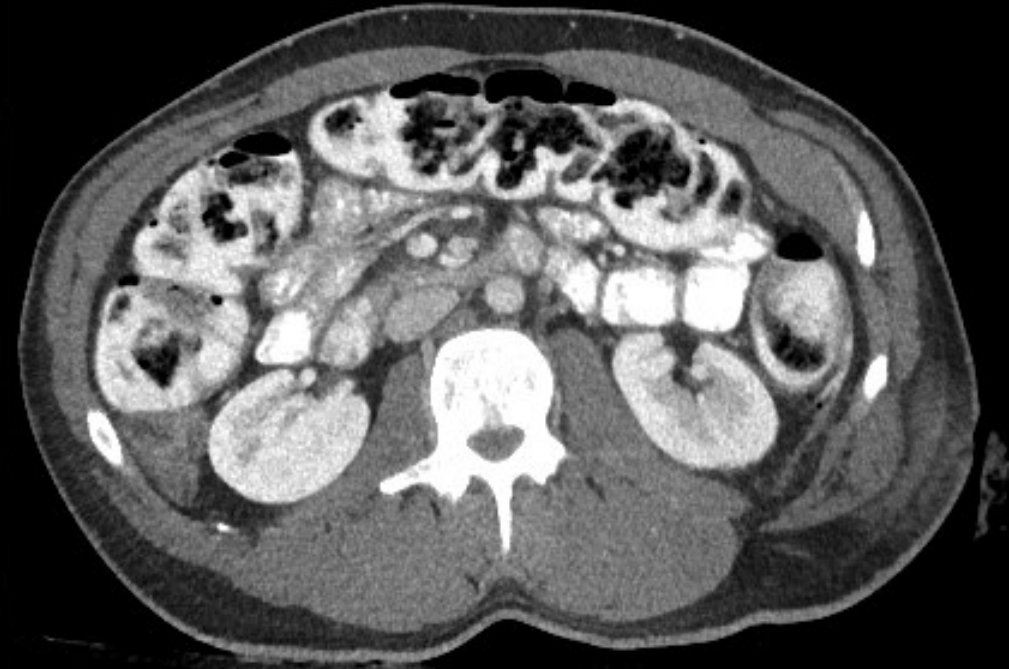
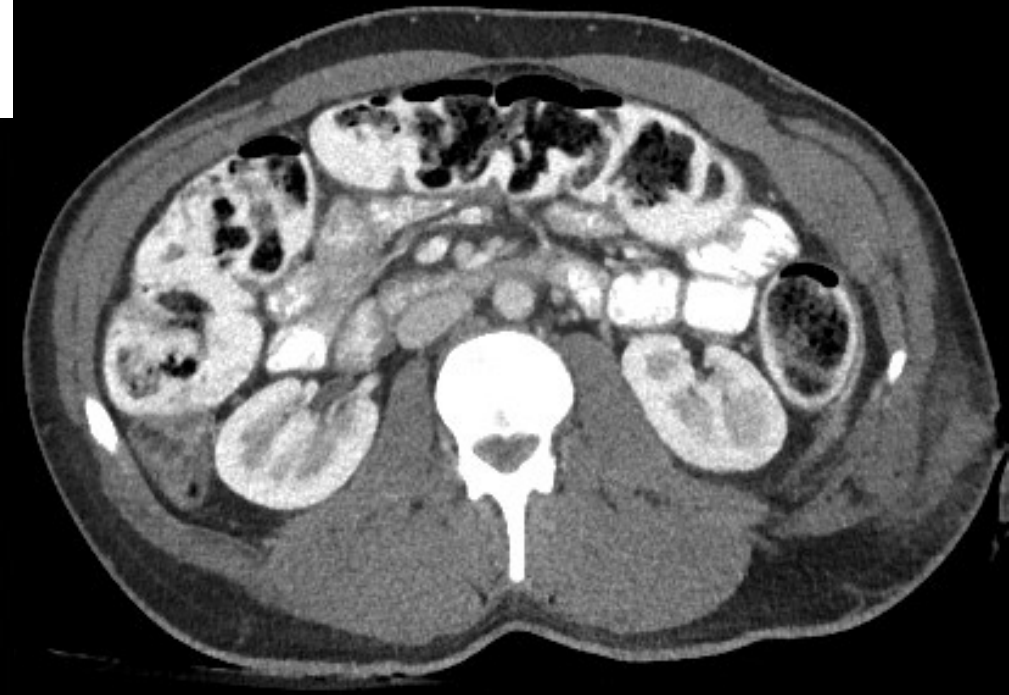
- Not related to restraints
- Side airbags decrease mortality
- Intrusion into vehicle is associated with injury
- Diaphragmatic injuries may be associated
- Consider Lateral compression pelvic fracture



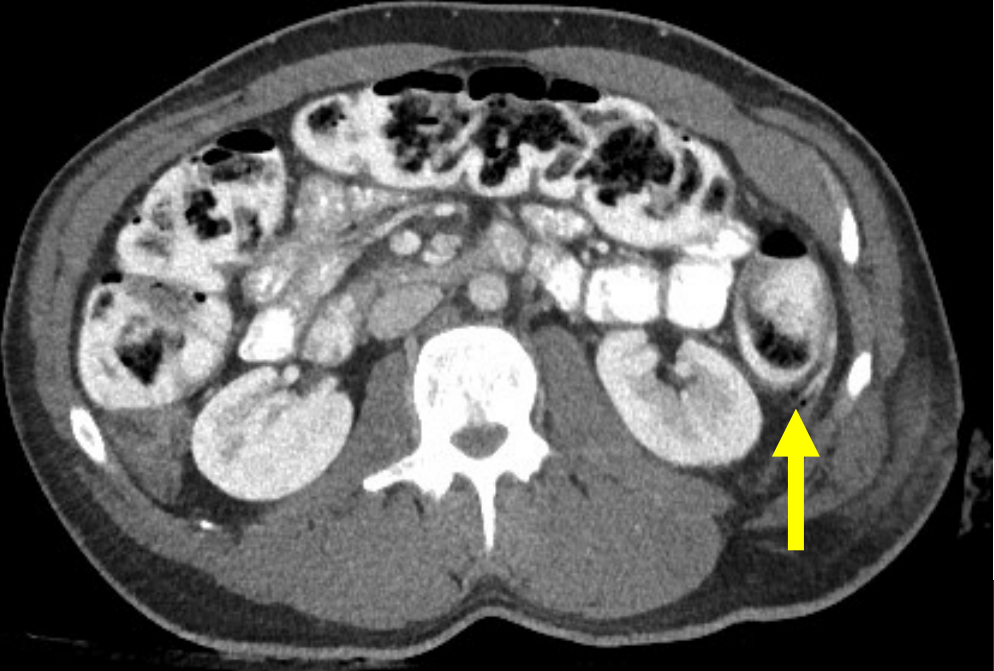
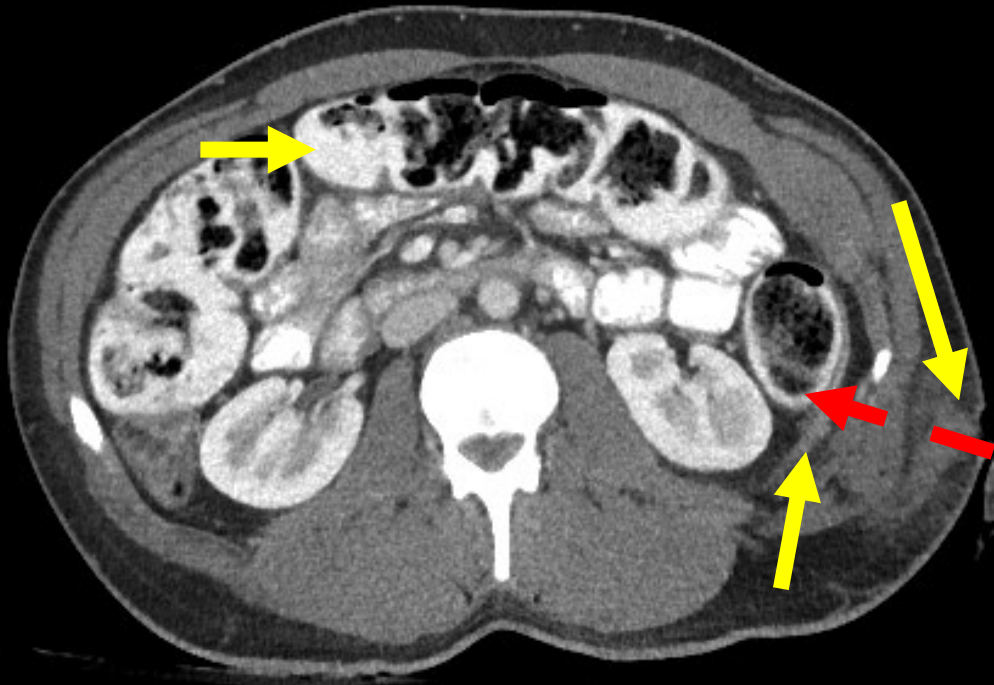
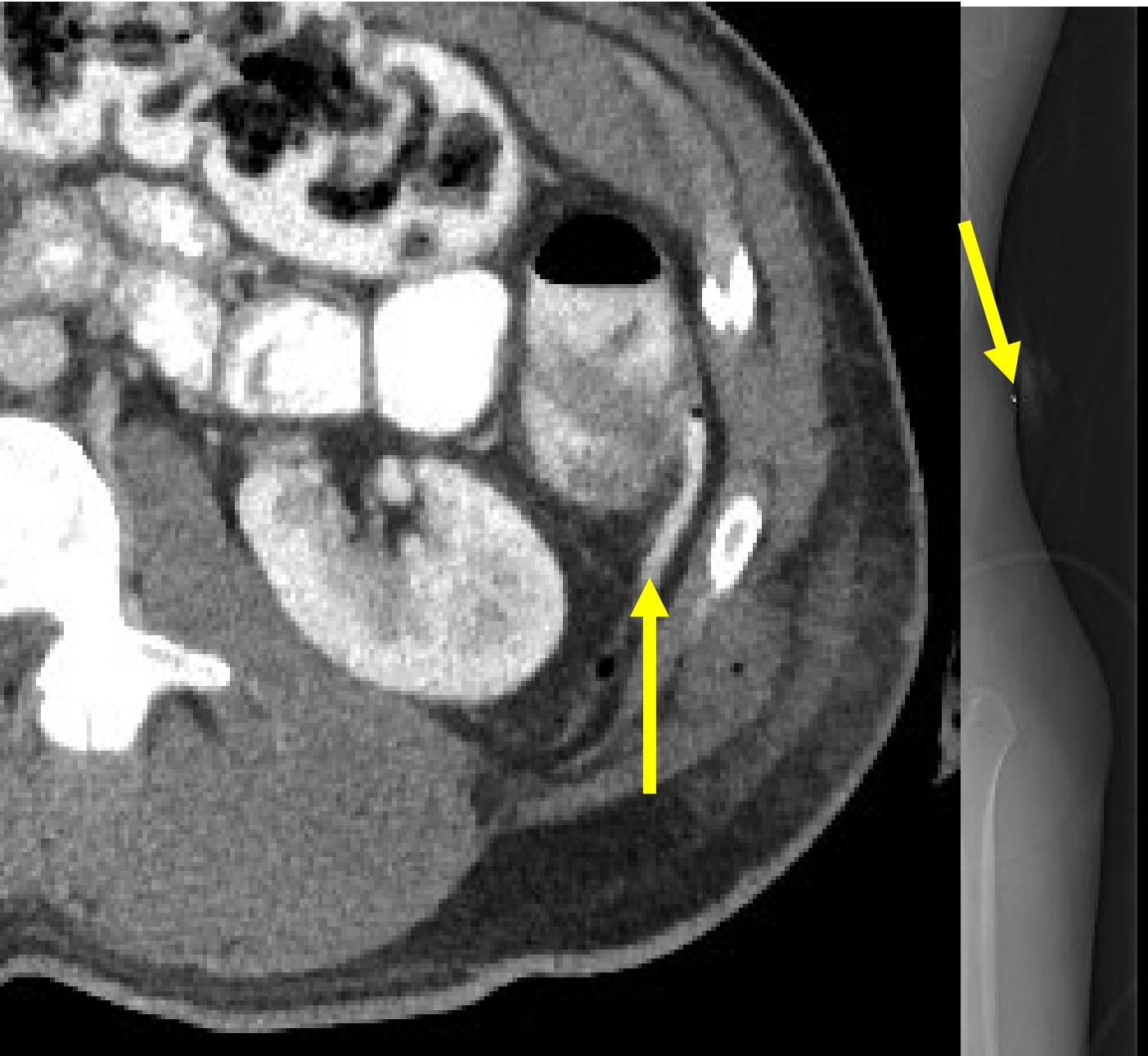
27 yom stab wound left flank

What do you tell the surgeons?

- A. CT is inadequate
- B. Send patient home
- C. Consider OR for laparotomy
- D. Have your attending talk to mine
- E. Consider Vascular consult

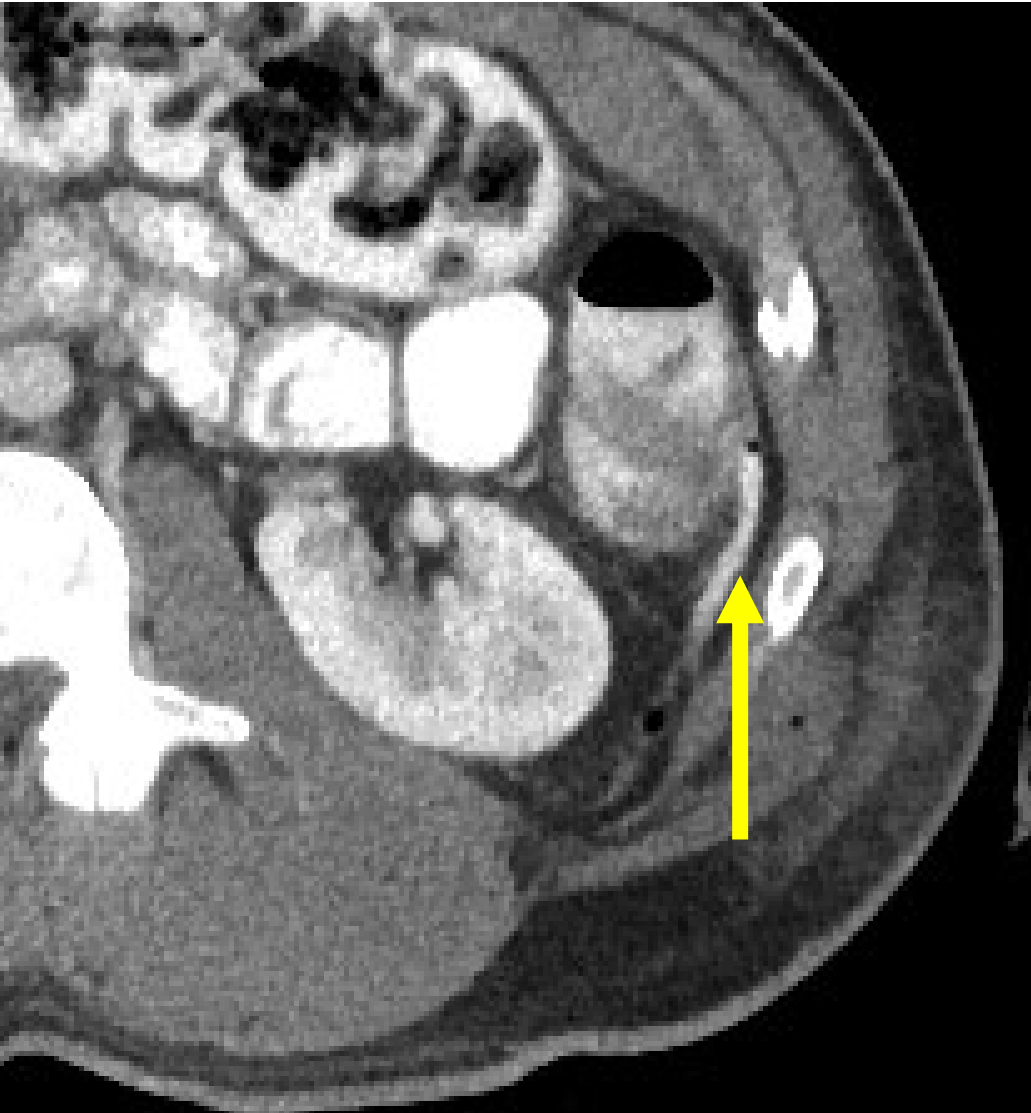


Case: 27 yom stab wound left flank



Triple Contrast CT in Penetrating Trauma

Evaluation of Peritoneal Violation in 200 Patients

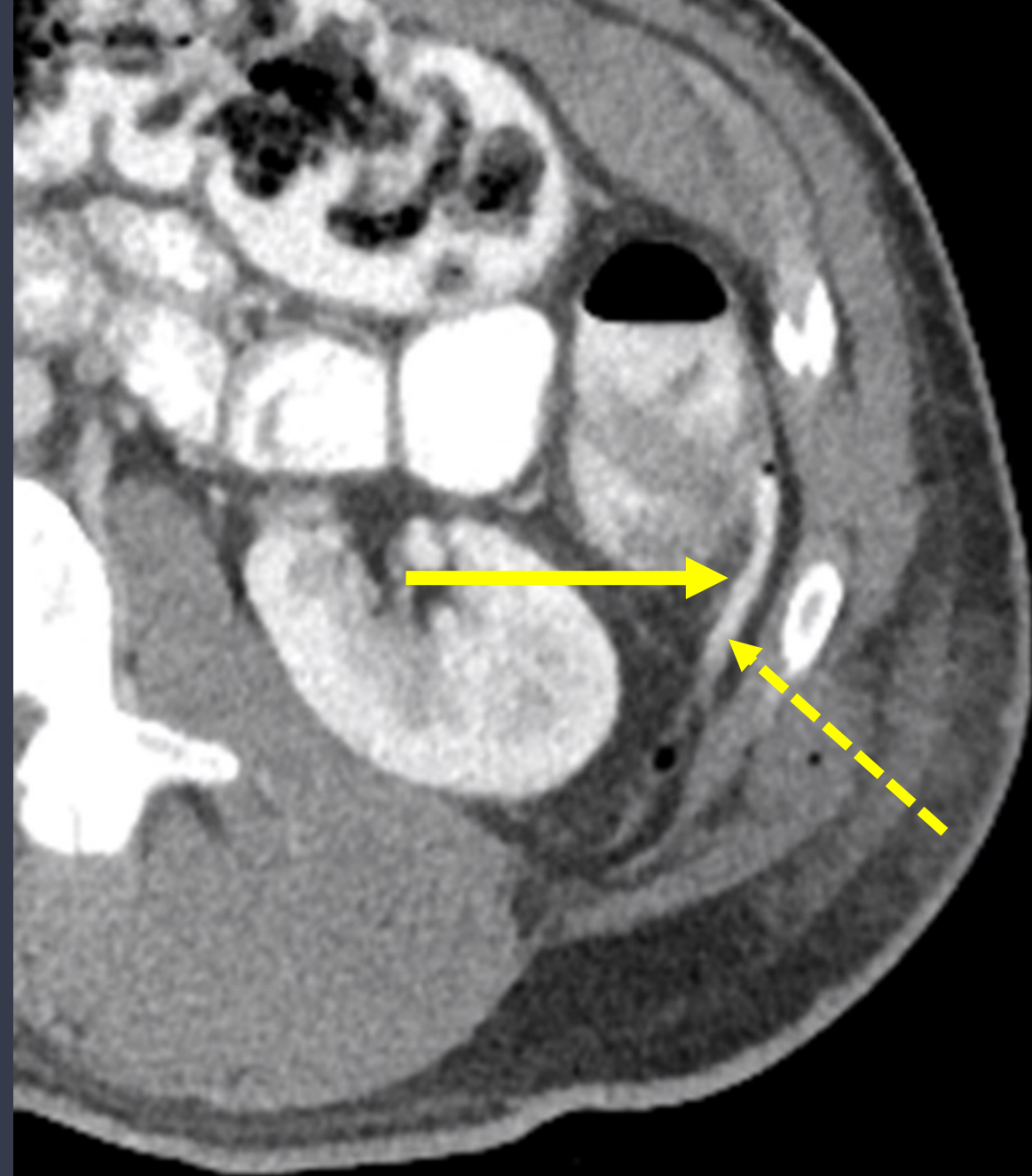


- Sensitivity 97 %
- Specificity 98 %
- Negative PV 98 %
- Positive PV 97 %
- Accuracy 98%

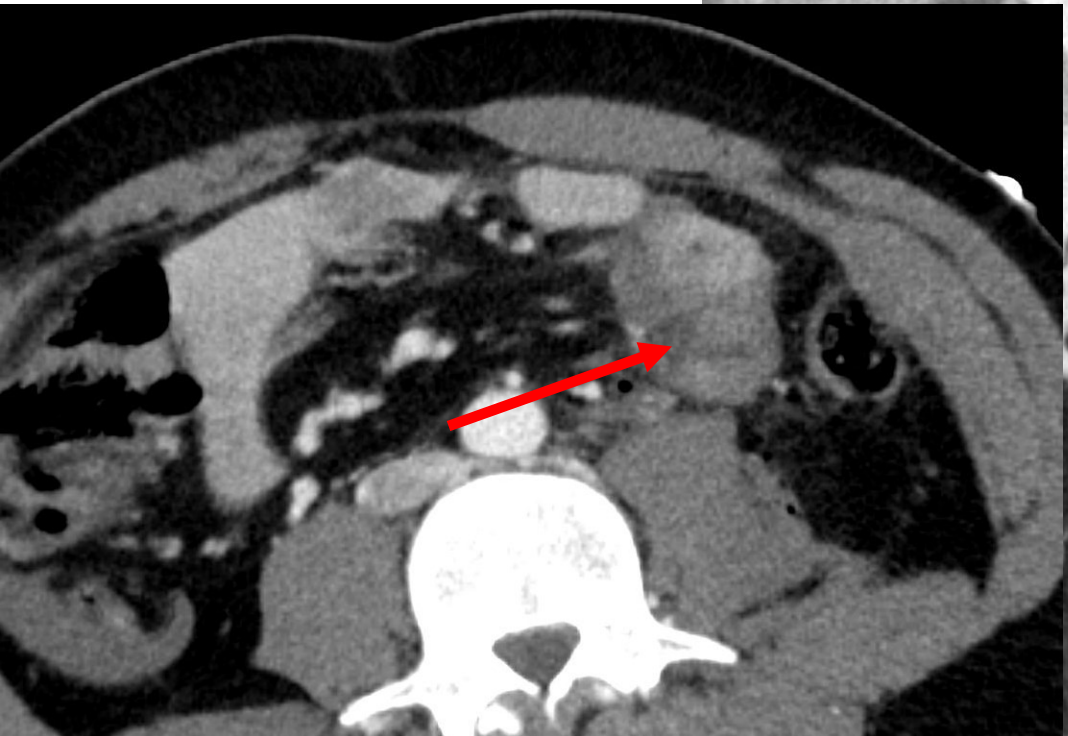
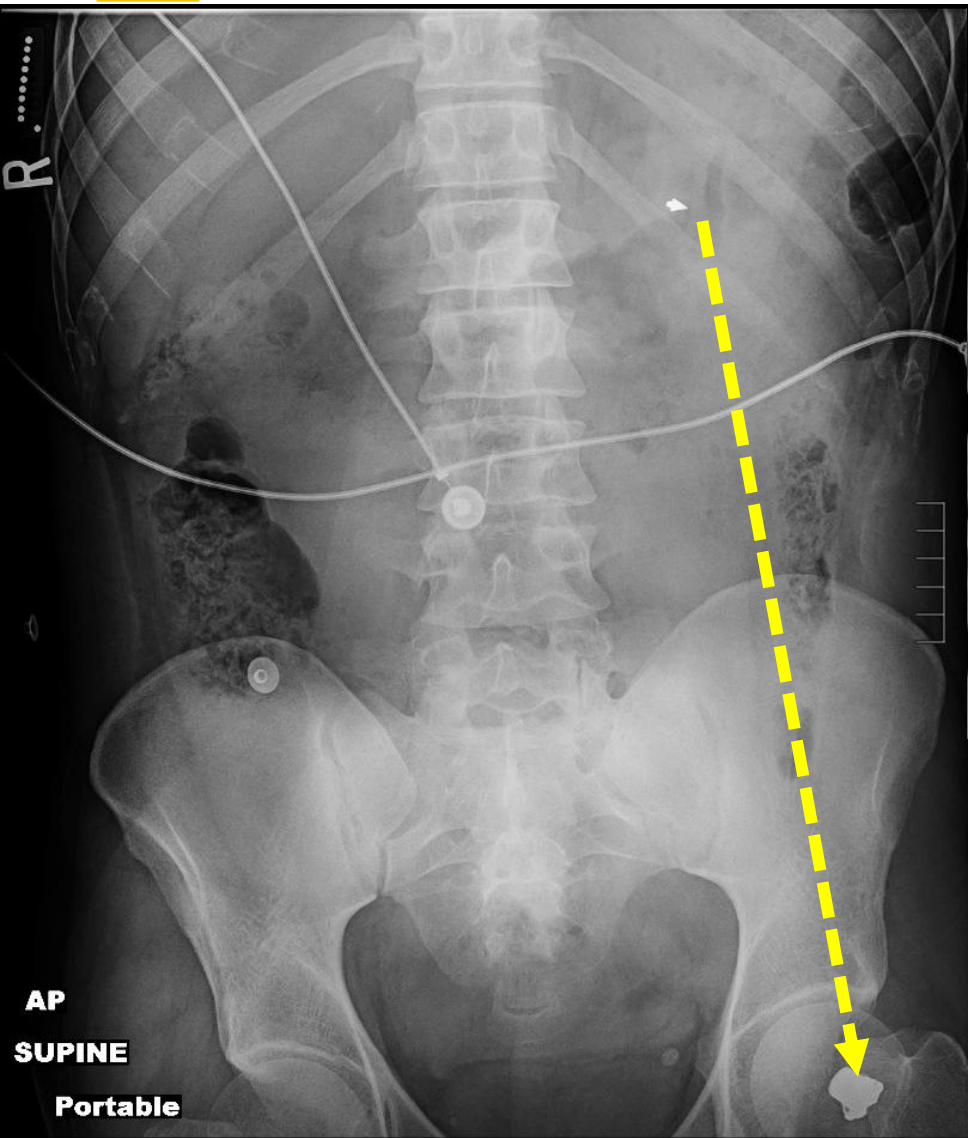
Penetrating Hollow Viscus Injury

Apply same principles as for blunt trauma

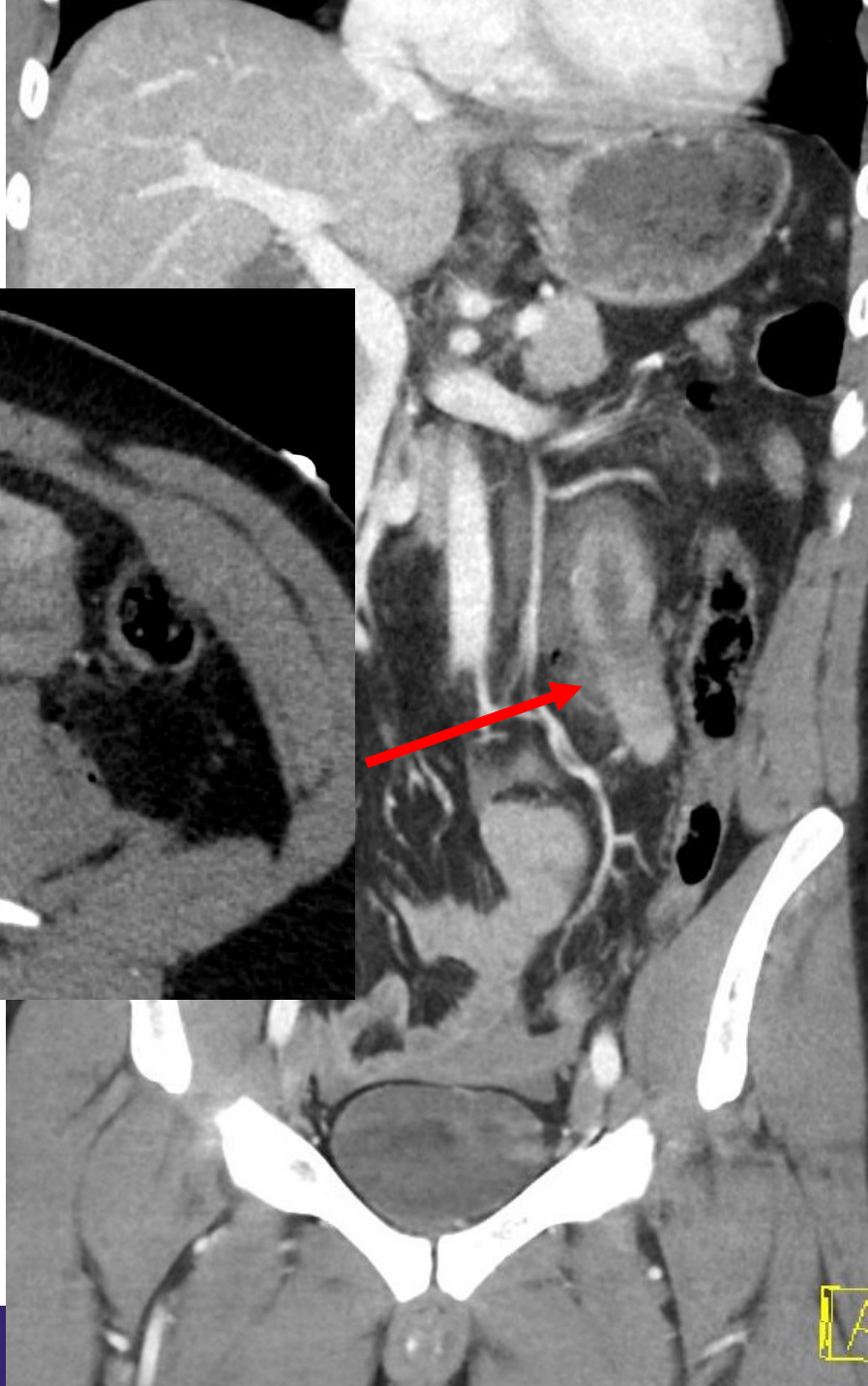
- Missile trajectory!
- CT evaluation if stable
- Can consider rectal contrast



27 yom single GSW LUQ



Jejunal perforation from GSW



Summary – Hollow Viscus Injury

- Contrast enhanced CT best bet, but imperfect
 - High index of suspicion to avoid delay
- Direct signs are specific
- Indirect signs are more sensitive
- Low density free fluid only finding or isolated hematoma:
 - Consider non-operative
- Consider repeat scan with oral contrast if pain.
- Penetrating trauma:
 - Consider rectal contrast

