Gallstone Ileus

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9/23/20

RAD 4005 Body Radiology

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Health Science Center at Houston
McGovern
Medical School

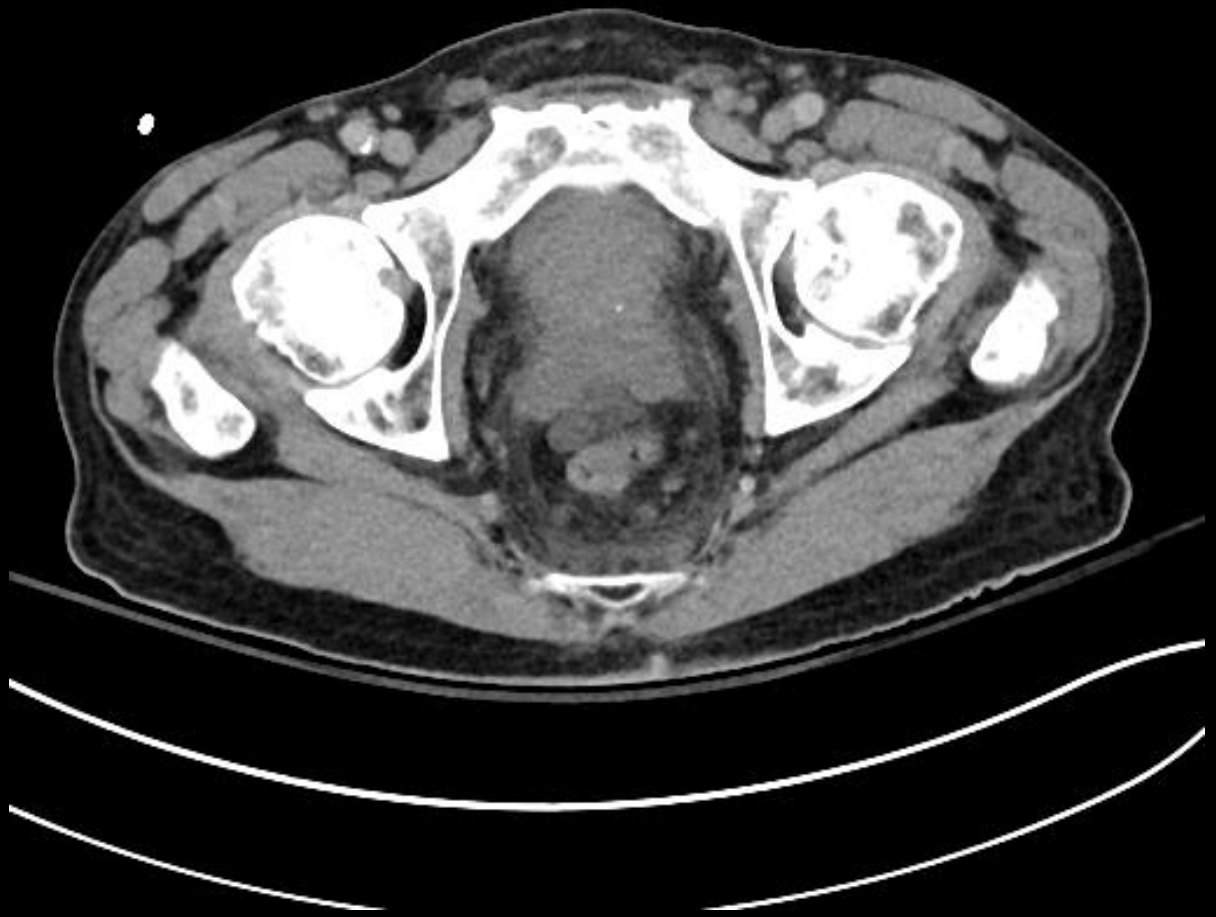
Clinical History

- 60s year old male presenting with LUQ abd pain x3 days assoc w/ N/V (bilious) and constipation
  - PMHx: CLL, CHF, LVAD, and HTN
  - PSHx: LVAD 2015, AICD 2014, Jejunostomy 2016, Tracheostomy
- Pain not modified by meals, improved by rest, mild radiation to back
- Physical Exam:
  - CV – LVAD w/ pump
  - GI – soft, nontender, non-distended, scarring from previous G tube, CABG, LVAD port

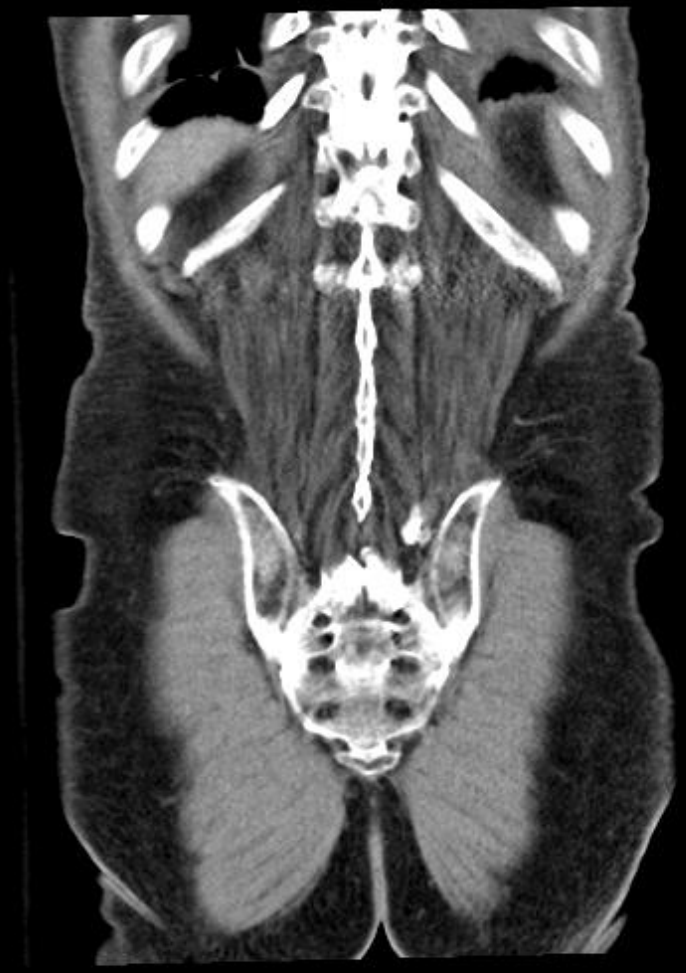
Differential Diagnosis

- Bowel obstruction
- Bowel perforation
- Biliary colic
- Peptic ulcer disease
- Gastritis
- Ischemic bowel
- Diverticulitis

ED Abd/Pelvis w Contrast CT 9/8/20 – Axial

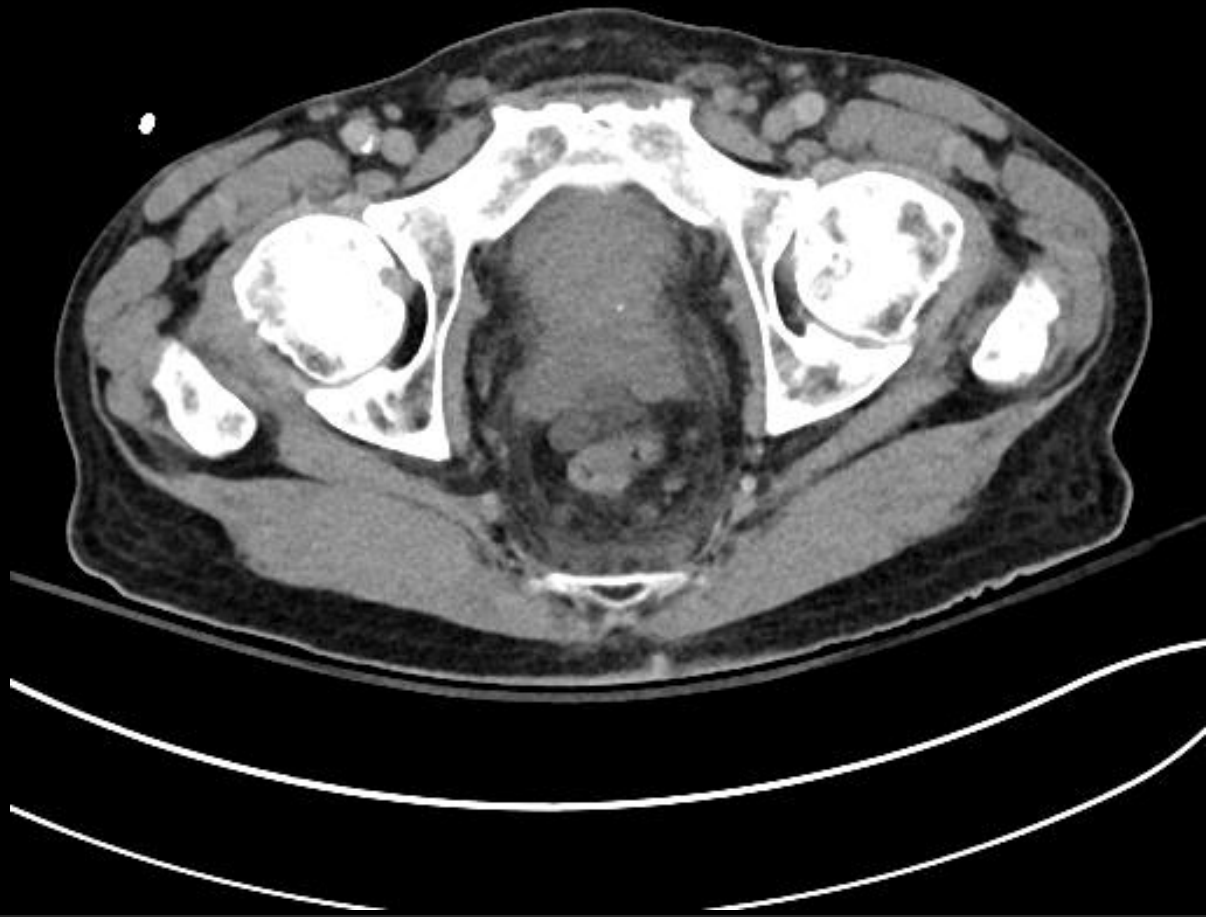


ED Abd/Pelvis w Contrast CT 9/8/20 – Coronal



ED Abd/Pelvis w Contrast CT 9/8/20 – Axial

- Multiple dilated loops of proximal small bowel, measuring up to 3.2 cm
- Transition point in the jejunum with 2.6 cm round lesion with peripheral curvilinear calcifications



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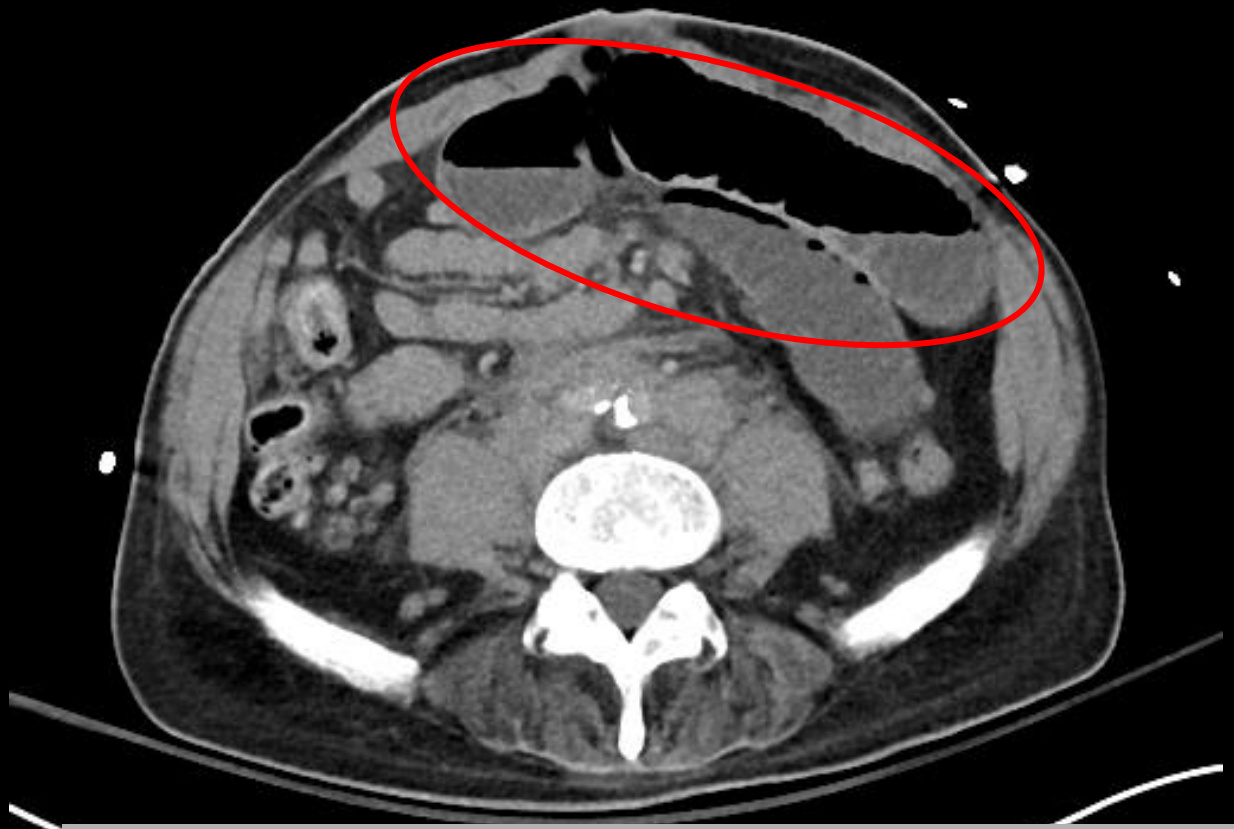

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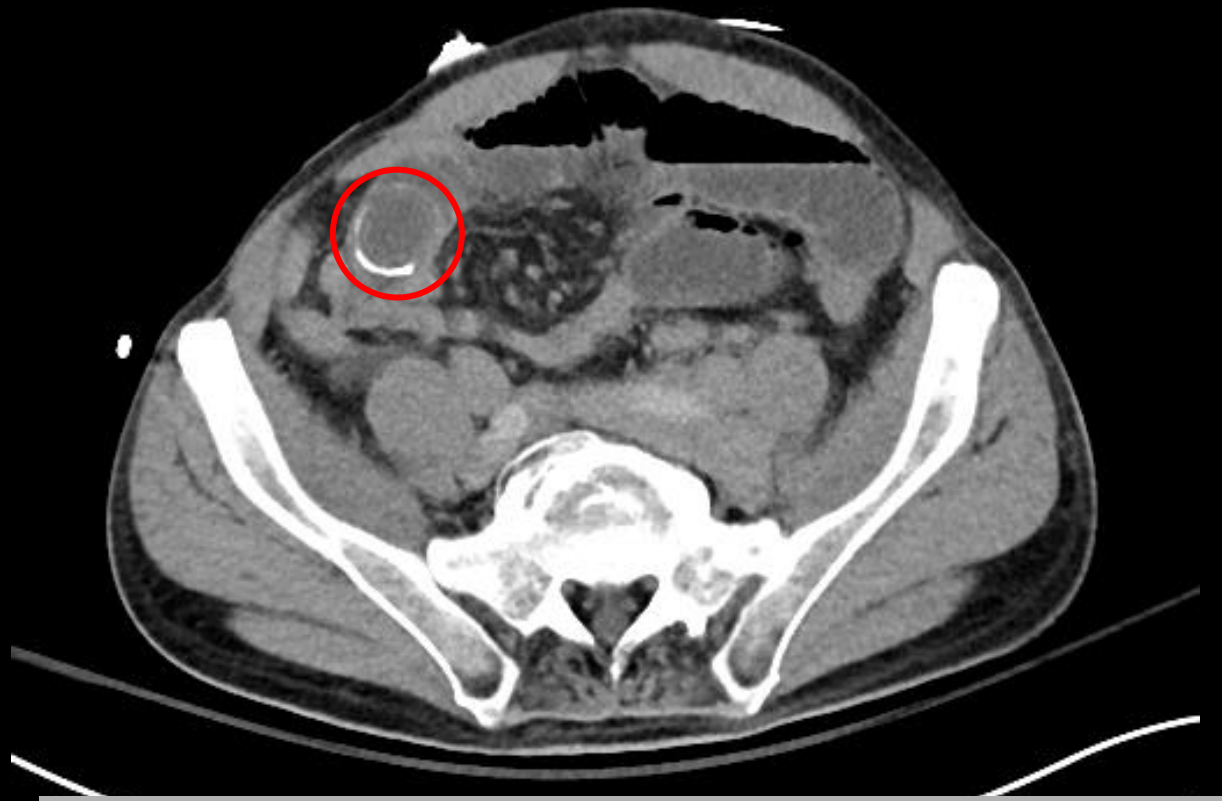

- **Transition point in the jejunum with 2.6 cm round lesion with peripheral curvilinear calcifications**

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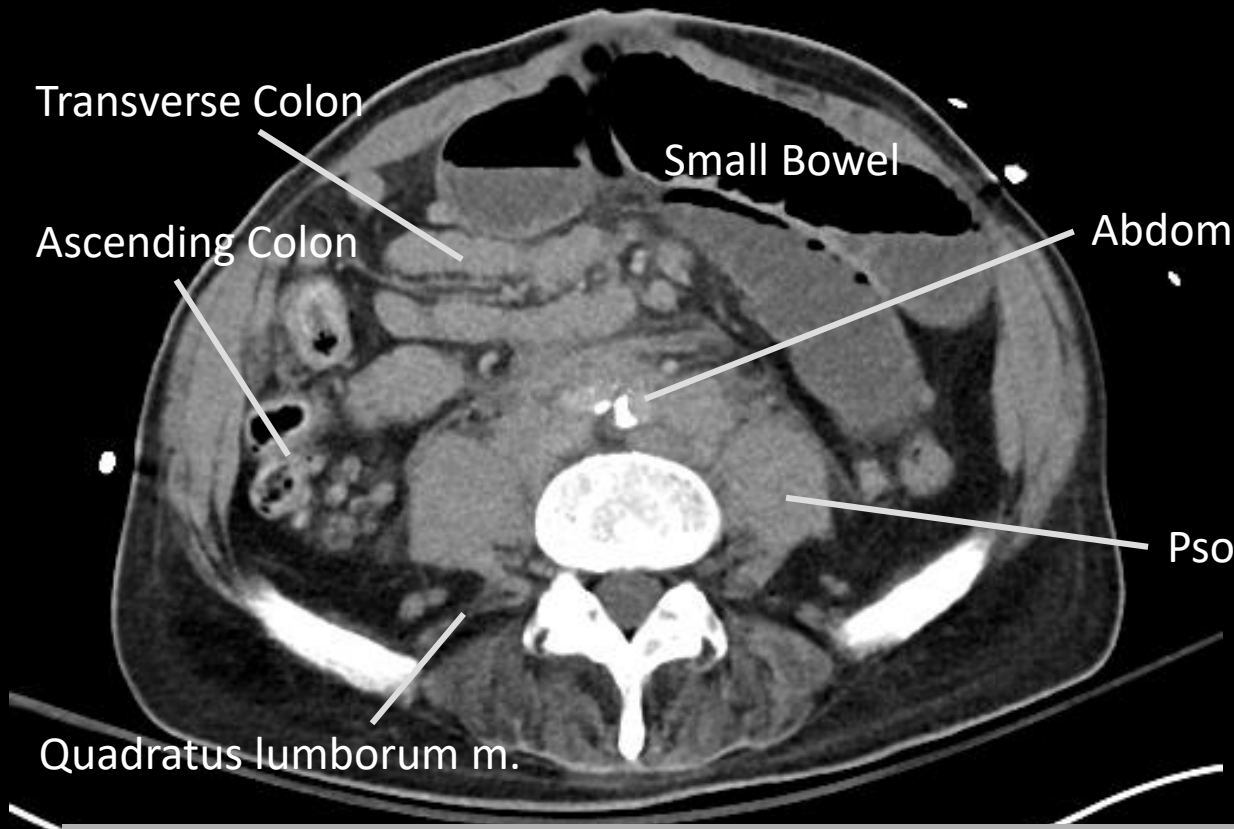

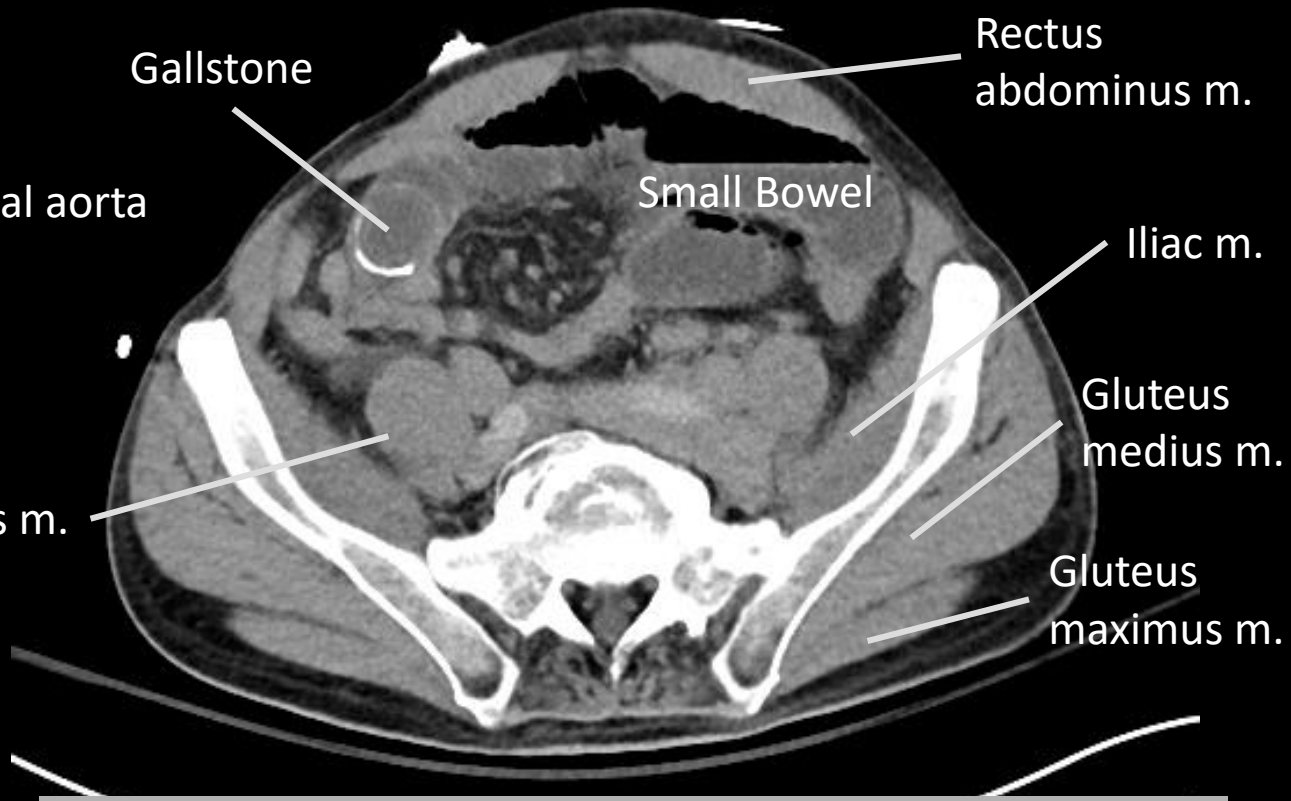

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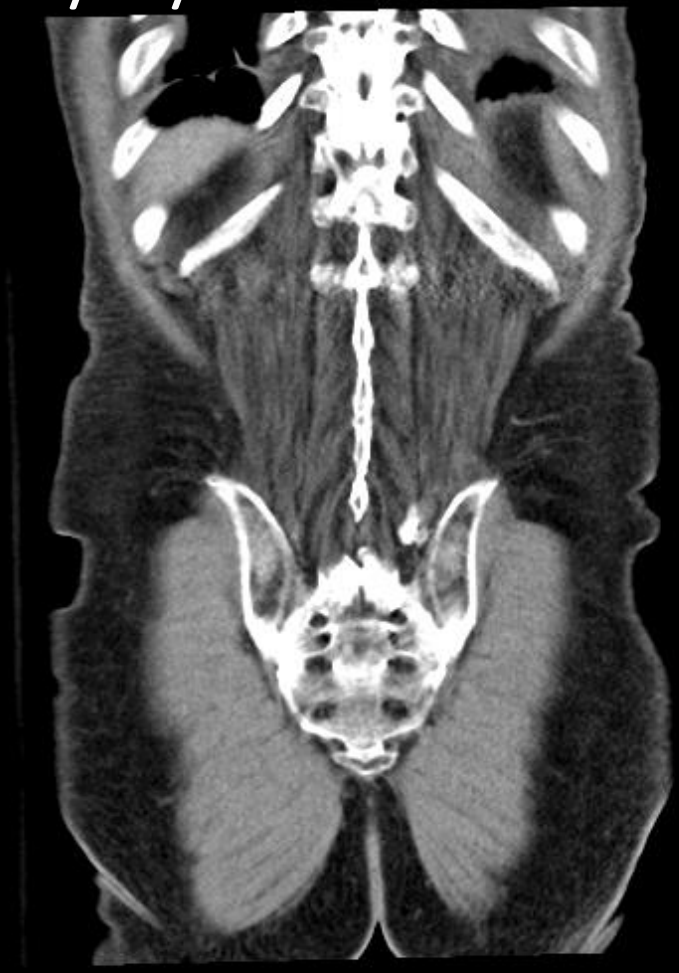

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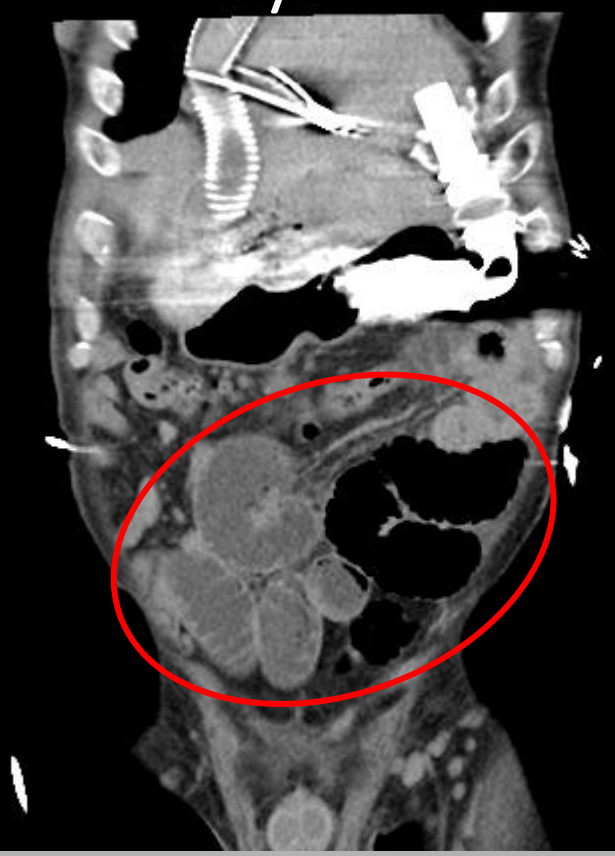

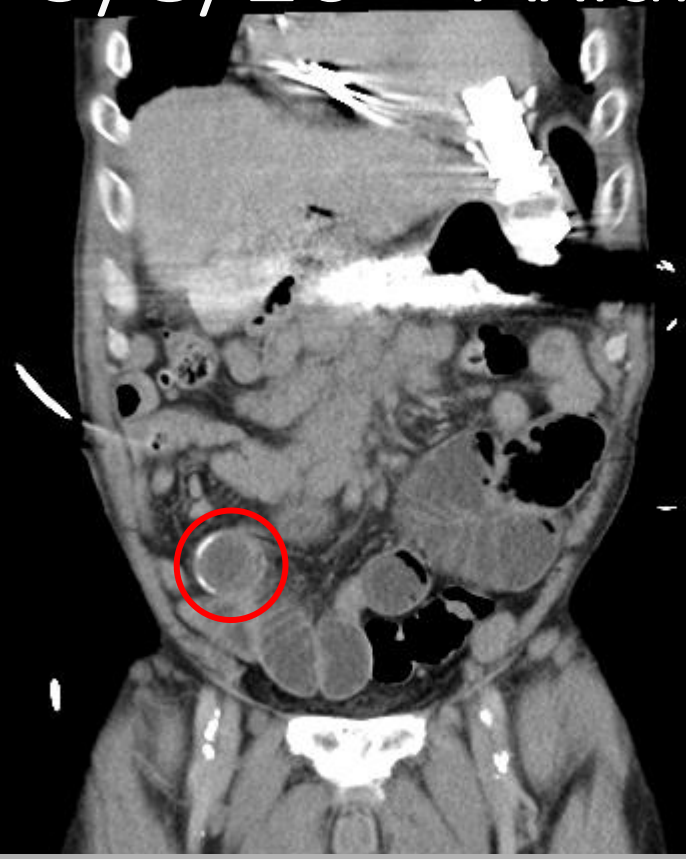

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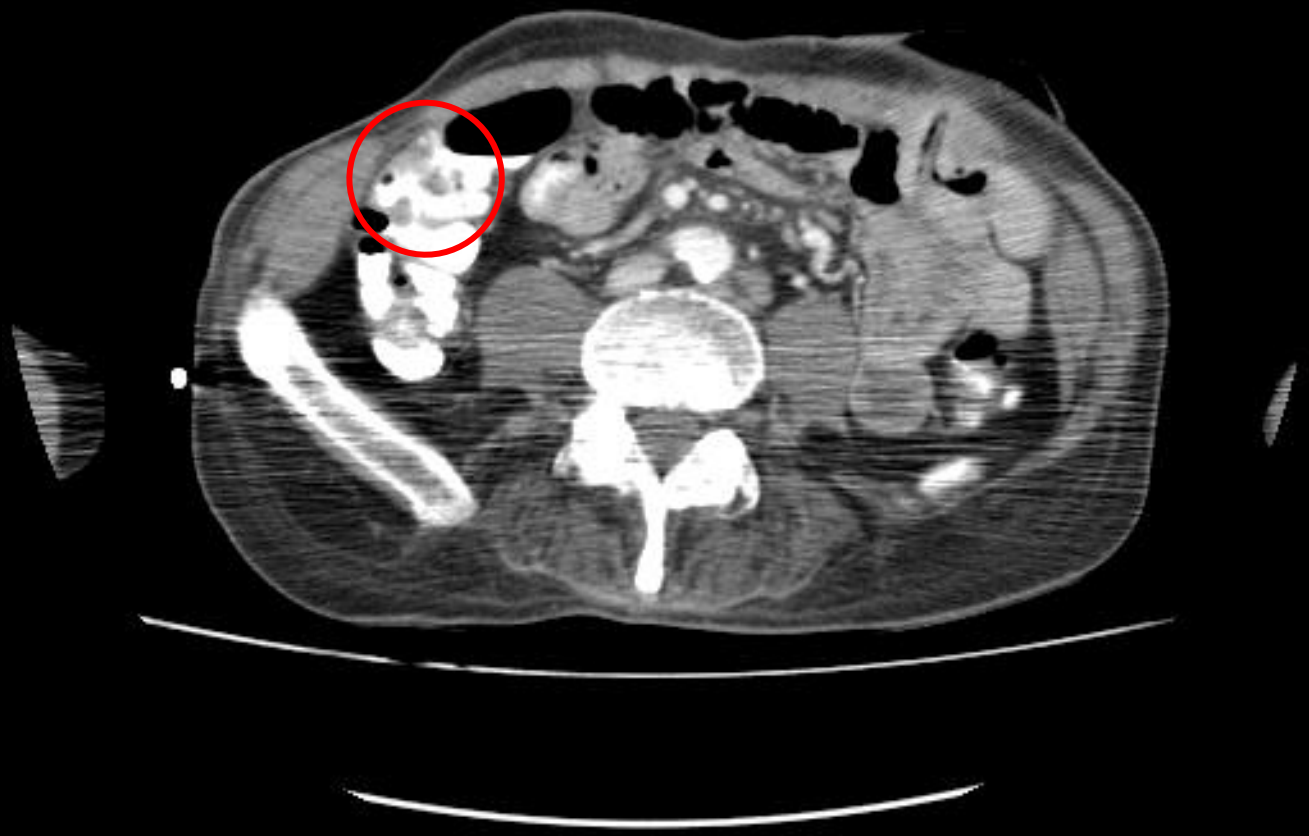
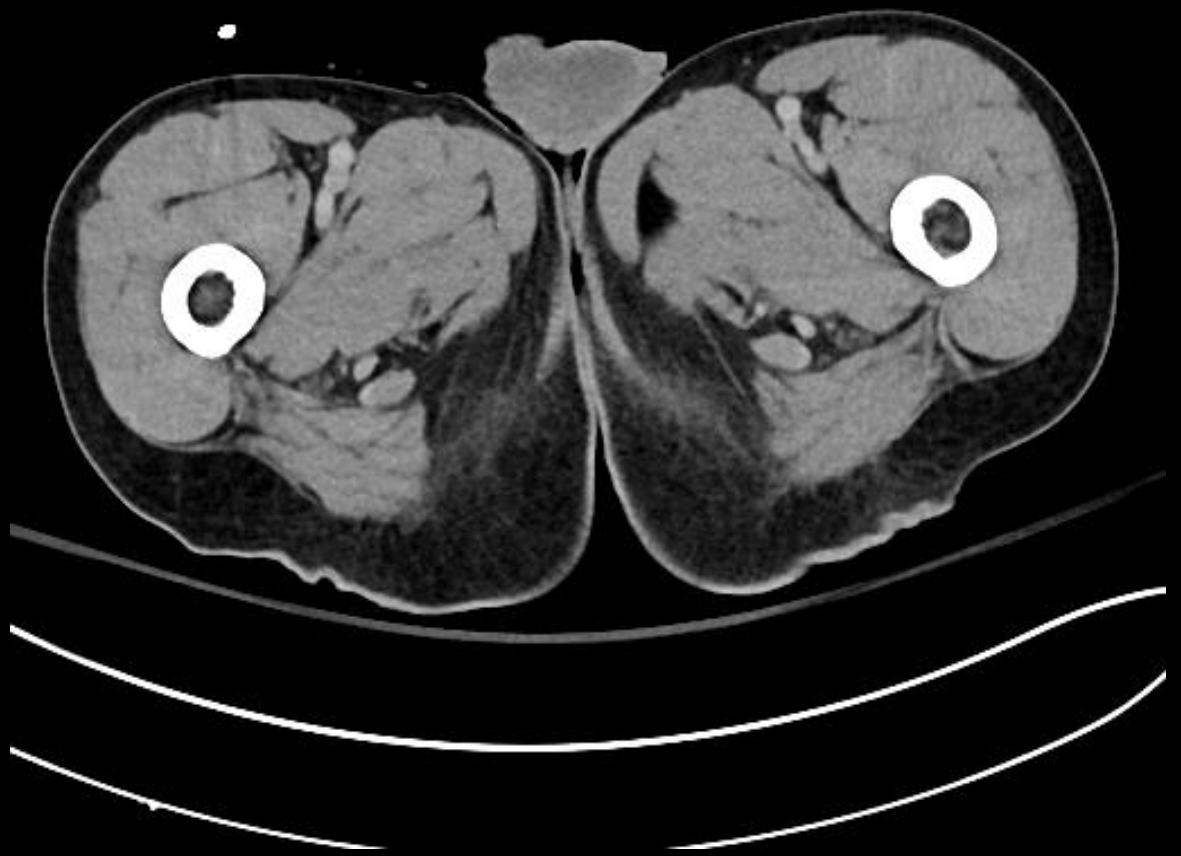
Comparison:
CT Abd/Pelvis w Contrast 8/3/16 – Axial

- Peripherally calcified stone in gallbladder



ED Abd/Pelvis w Contrast CT 9/8/20 – Axial

- LVAD in similar positioning
- Increased size of large periaortic, mesenteric, peritoneal, pelvic sidewall, and bilateral inguinal lymph nodes



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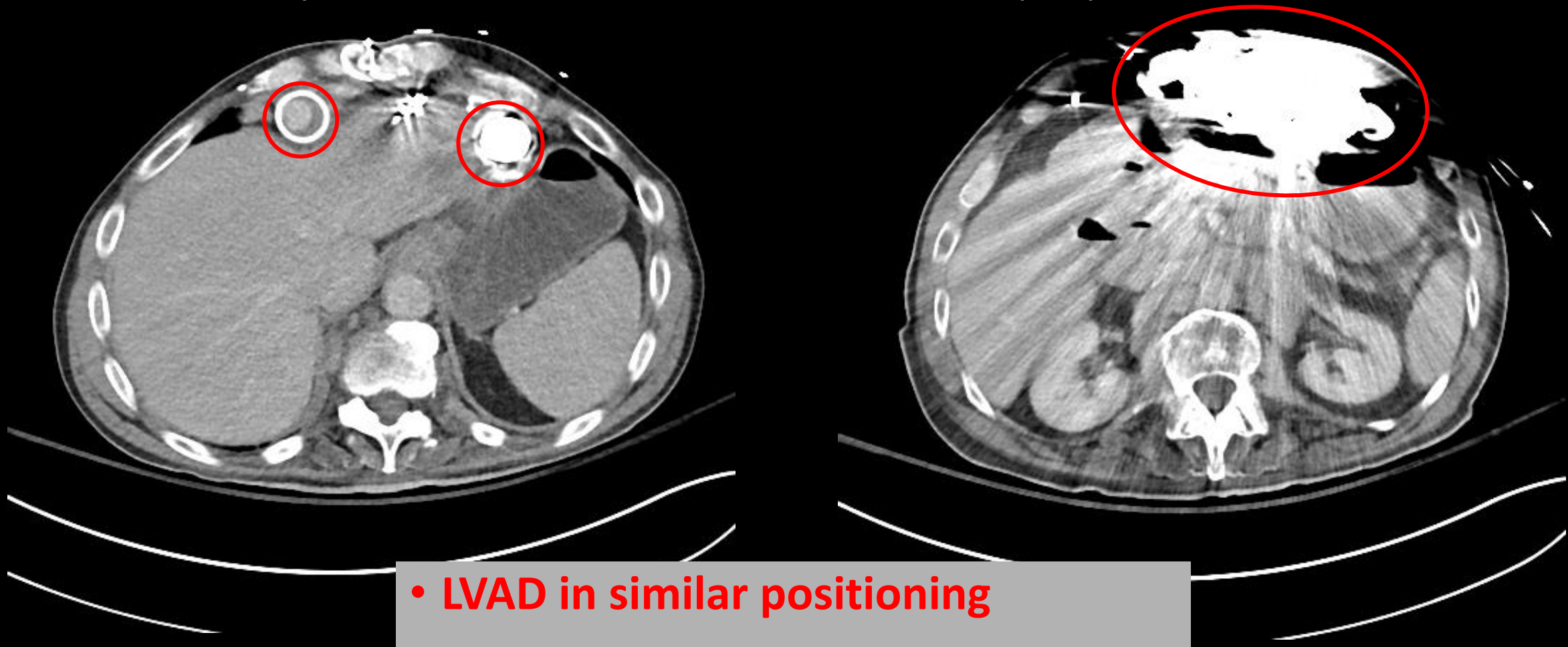
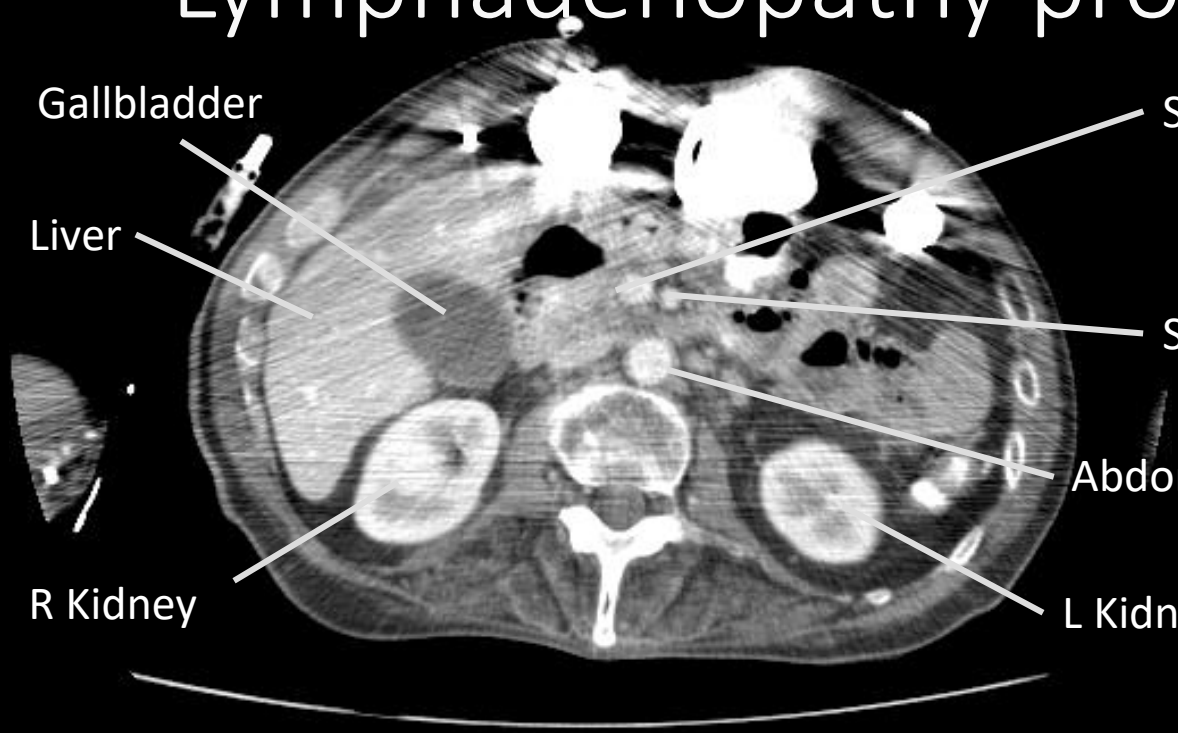
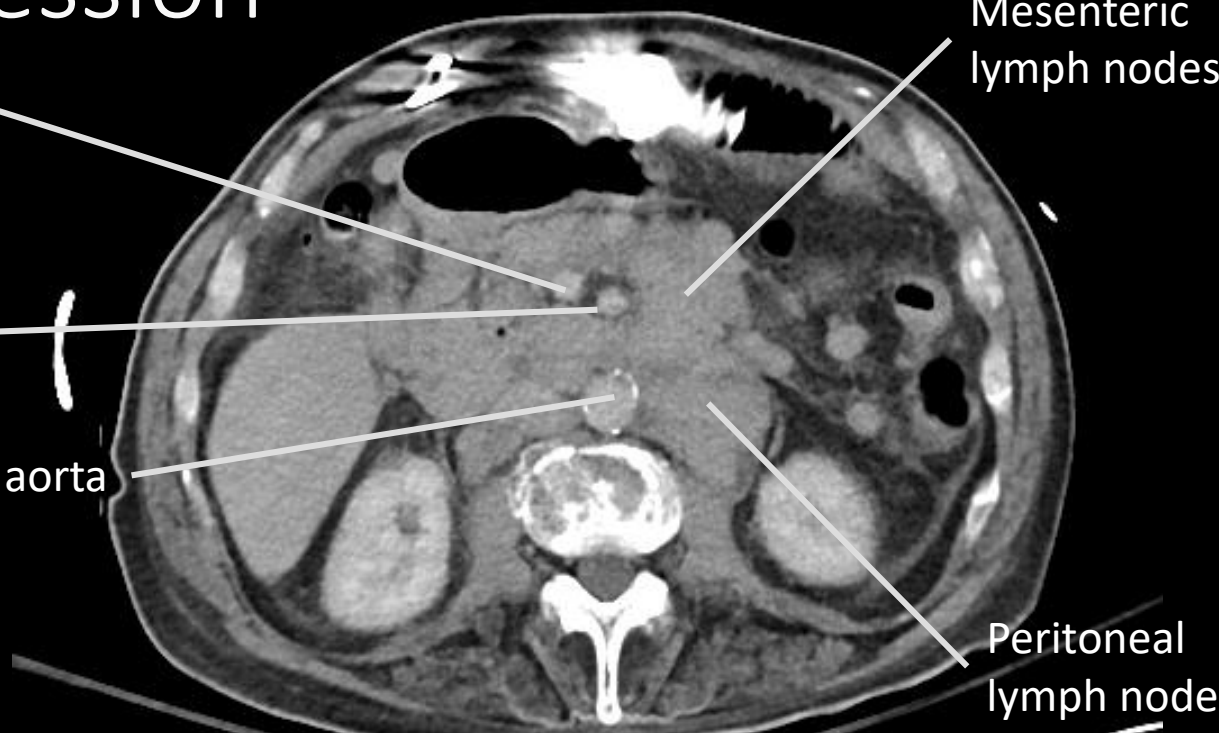


- **LVAD in similar positioning**

ED Abd/Pelvis w Contrast CT– Axial Lymphadenopathy progression





August 2016

- **Enlarged peritoneal lymph nodes but can still see individual nodes**

September 2020

- **Increased side of large periaortic, mesenteric, peritoneal, pelvic sidewall, and bilateral inguinal lymph nodes**

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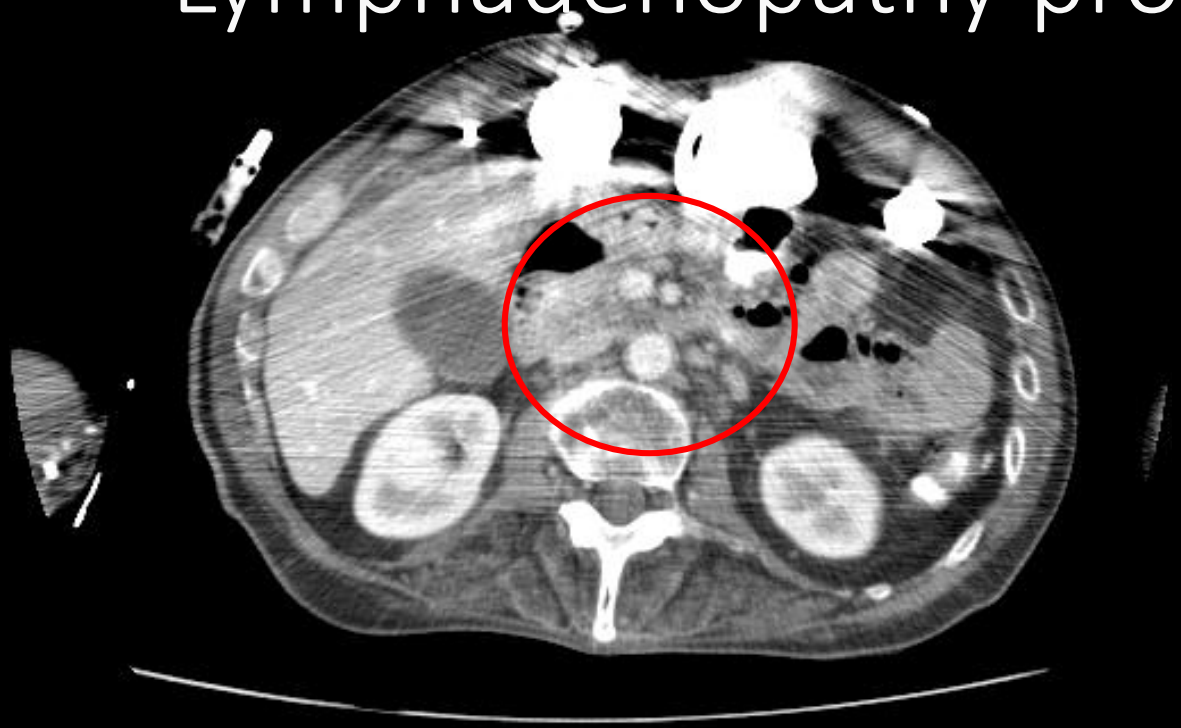

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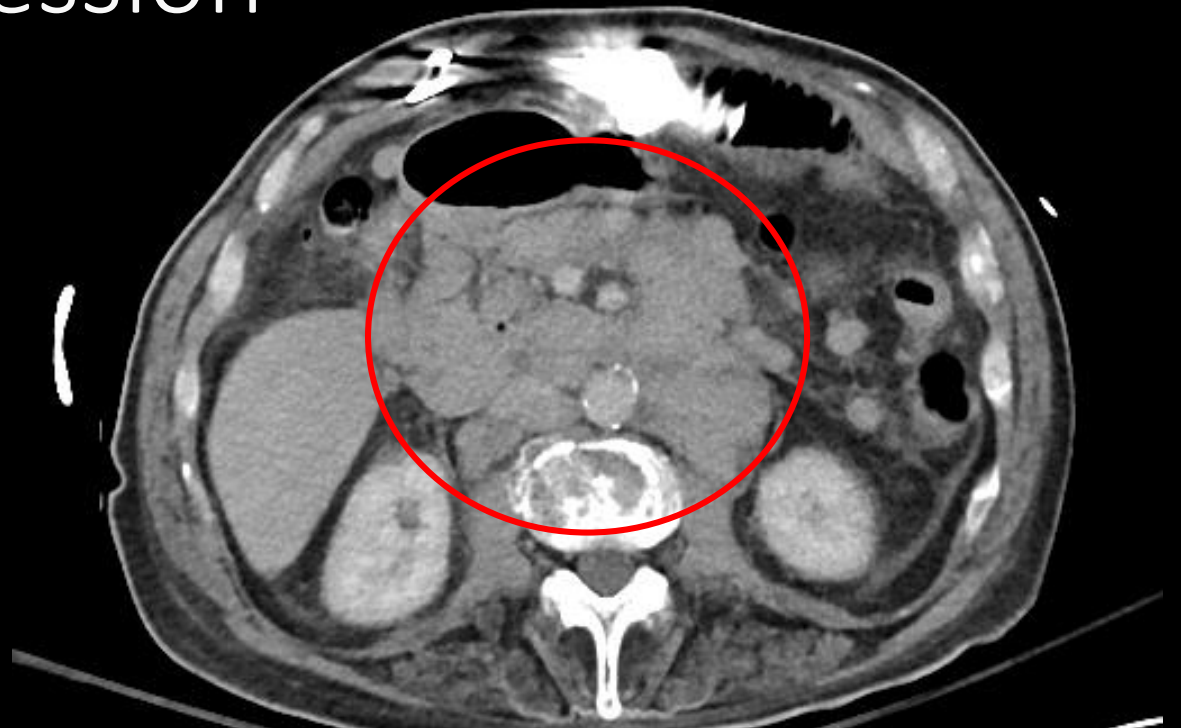

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ED Abd/Pelvis w Contrast CT 9/8/20

- Findings consistent with gallstone ileus resulting in mild proximal small bowel obstruction with associated pneumobilia with an air filled decompressed gallbladder. No pneumatosis or portal venous gas.
- Increased diffuse periaortic, mesenteric, retroperitoneal, and bilateral inguinal lymphadenopathy compared to April 2018, this is concerning for underlying malignancy such as lymphoma.
- Calcified aortic atherosclerotic disease.
- Stable appearance of left ventricular assist device.

3-6-9 Rule (bowel)

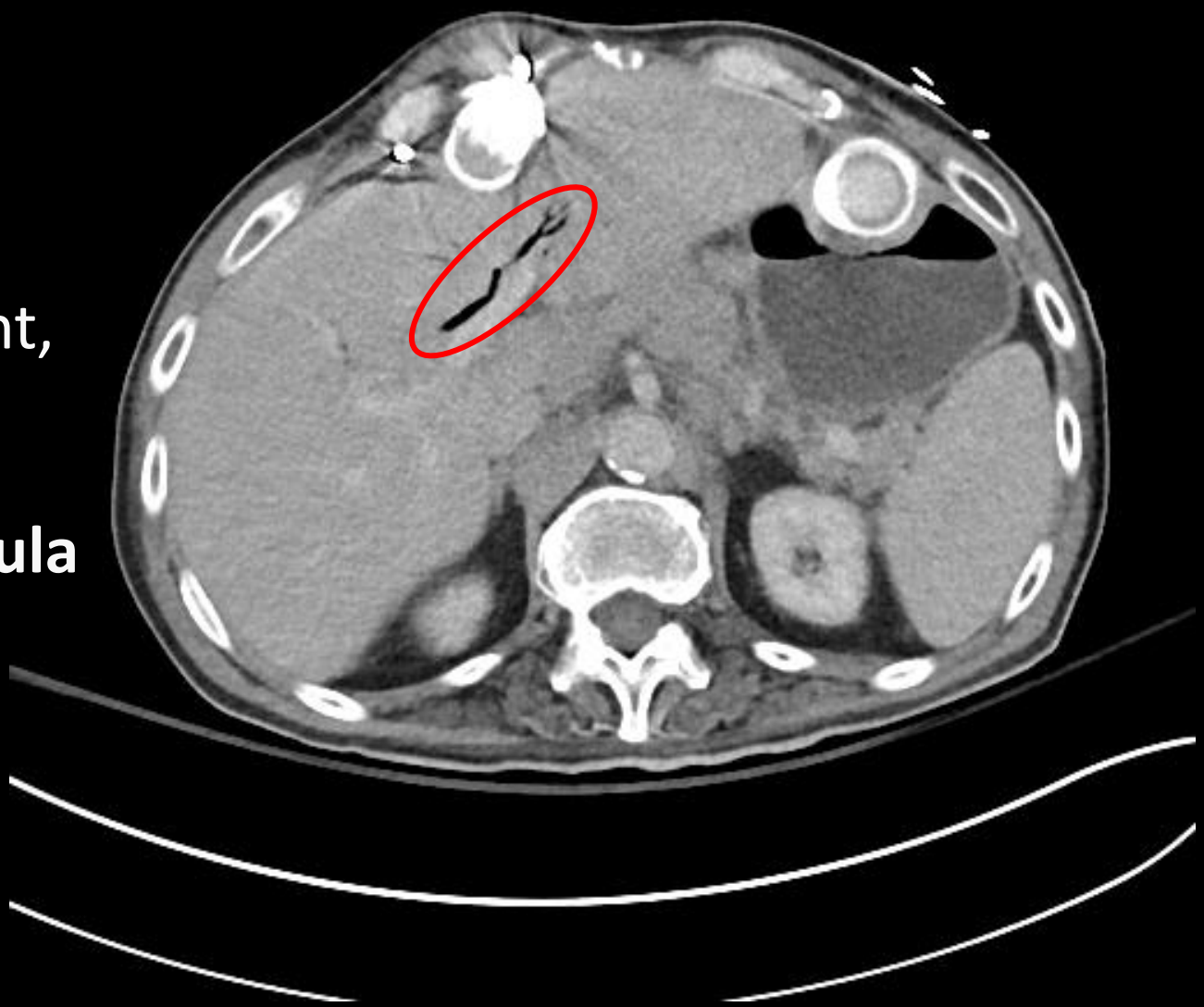
- Describes normal bowel caliber
- <3 cm: small bowel
- <6 cm: large bowel
- <9 cm: cecum
- (<6 mm: appendix)
- Above these, bowel is considered dilated. Obstruction or adynamic ileus should be considered

Gallstone Ileus

- Uncommon cause of a mechanical small bowel obstruction (1-4% in general adult population)
- Typically impacted at ileocecal valve
- Rigler Triad
  - Pneumobilia
  - Small bowel obstruction
  - Ectopic gallstone

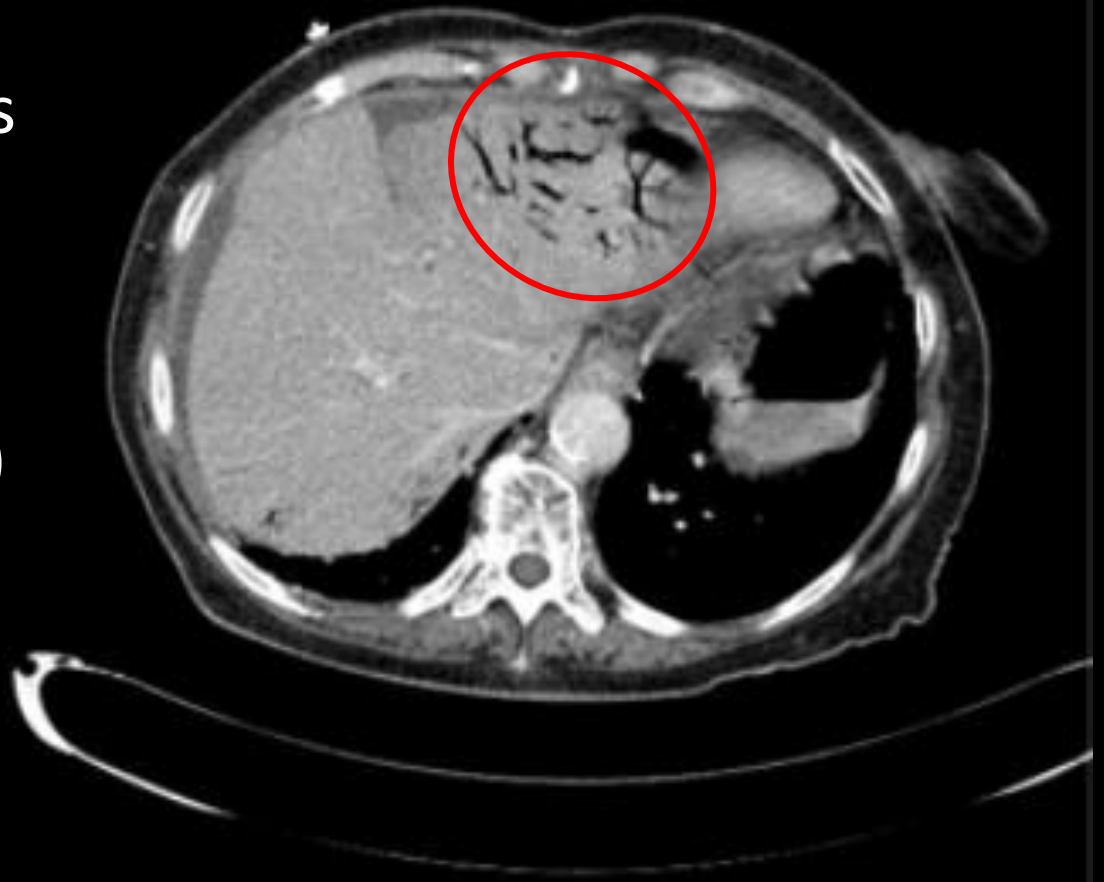
Pneumobilia

- Gas in the biliary tree
- Common causes: ERCP, CBD stent, incompetent sphincter of Oddi, biliary-enteric surgical anastomosis, **biliary-enteric fistula**
- Linear branching gas within the liver, central large caliber ducts



Pneumobilia vs Portal Venous Gas

- Portal venous gas is accumulation of gas in the portal vein and branches, concerning for ischemic bowel
- Gas is found more peripherally in portal venous gas (vs centrally in pneumobilia) because the gas is carried along by the blood



https://radiopaedia.org/articles/portal-venous-gas?lang=us

Treatment

- Patient underwent exploratory laparotomy for removal of the calcified stone found on imaging. Also removed second gallstone not seen on imaging (artifact from LVAD).

Final Diagnosis

- Gallstone ileus without bowel necrosis

Cost

- CT Pelvis/Abdomen w/ con– $7,998
- Chest 1 view = $683
- TOTAL: $8,681

ACR appropriateness Criteria

Variant 1: **Acute nonlocalized abdominal pain and fever. No recent surgery. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
MRI abdomen and pelvis without and with IV contrast	May Be Appropriate	O
US abdomen	May Be Appropriate	O
CT abdomen and pelvis without IV contrast	May Be Appropriate	☢☢☢
MRI abdomen and pelvis without IV contrast	May Be Appropriate	O
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☢☢☢☢
Radiography abdomen	May Be Appropriate	☢☢
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢
WBC scan abdomen and pelvis	Usually Not Appropriate	☢☢☢☢
Nuclear medicine scan gallbladder	Usually Not Appropriate	☢☢
Fluoroscopy contrast enema	Usually Not Appropriate	☢☢☢
Fluoroscopy upper GI series with small bowel follow-through	Usually Not Appropriate	☢☢☢

Take Home Points / Teaching points

- Distinction between pneumobilia and portal venous gas is important for presence of ischemia
- Patients with preexisting cardiac conditions must be handled with care but still are candidates for surgical management of emergent diagnoses
- Do not allow a dramatic finding to distract from other significant findings

References

- https://radiopaedia.org/articles/3-6-9-rule-bowel?lang=us
- https://radiopaedia.org/articles/gallstone-ileus?lang=us
- https://radiopaedia.org/articles/portal-venous-gas?lang=us
- https://acsearch.acr.org/docs/69467/Narrative/
- https://www.memorialhermann.org/patients-caregivers/memorial-hermann-charge-master/