

Acute Splenic laceration

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6/24/2021

RAD 4001

Dr. Roland Pomfret, MD

Clinical History

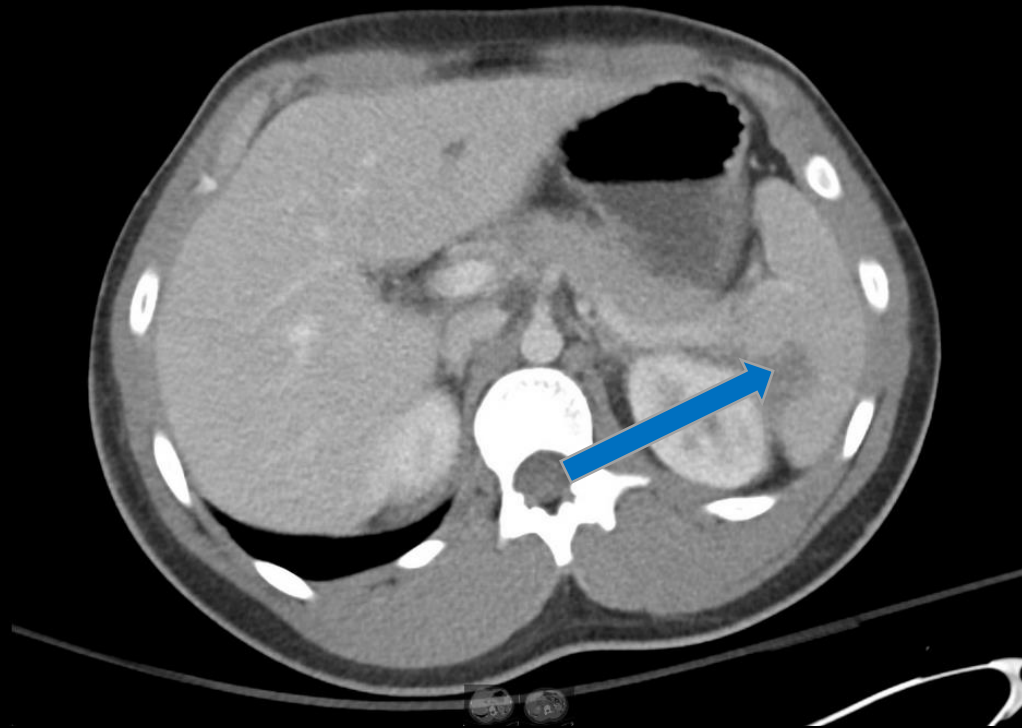
- Pt is a 15 yo M who presents with R ankle pain s/p MVC on 6/18 for which orthopedic surgery was consulted. On presentation, the patient has pain, bruising, swelling and decreased ROM to the R ankle. The pt denies any signs or sx of neurologic deficits, pain elsewhere, or any other associated sx.
- Initial workup:
 - CBC w/ neutrophilia (most likely secondary to stress demargination)
 - Blood gas: WNL
 - BMP: WNL
 - Urinalysis: WNL
 - CXR: No abnormalities
 - Plain film evaluation of the lower extremity for fracture workup: R ankle fracture
 - CT w/o contrast of head and cervical
 - CT w/ contrast of chest
 - CT w/ contrast of abdomen/pelvis

Clinical History cont.

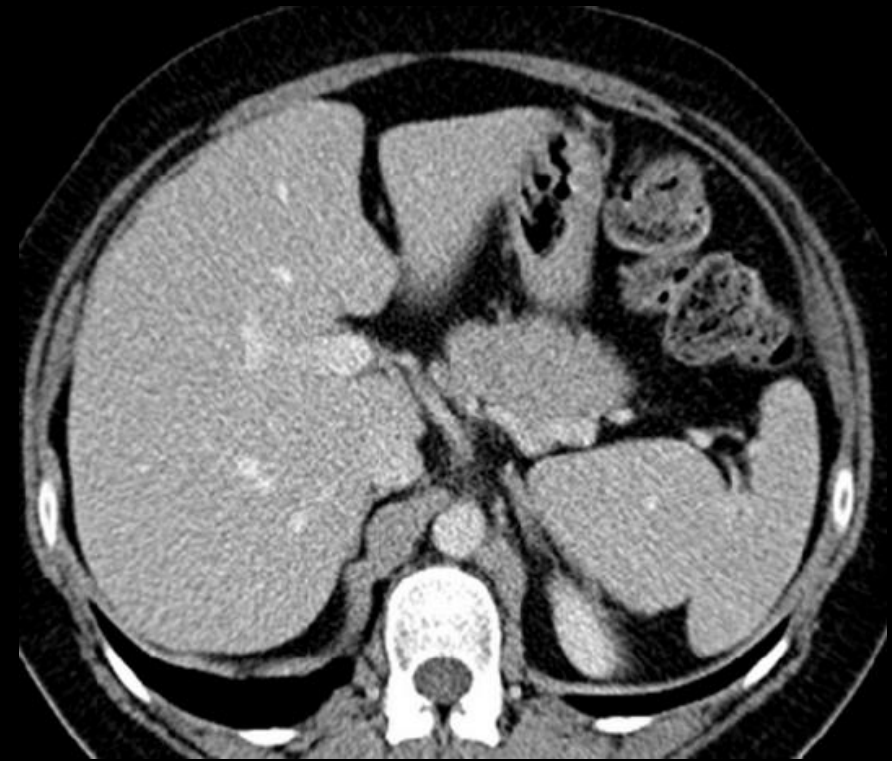
- Vitals: WNL
- Physical Exam:
 - General: WD/WN in NAD; Awake and alert; Interactive and cooperative with exam
 - Head/Face: NC; Abrasions to L forehead and L cheek
 - Eyes: PERRLA, EOM Intact, Conjunctiva WNL
 - Ears: No visible trauma
 - Neck: Supple w/ FROM, Trachea midline
 - Respiratory: CTAB w/ good air movement
 - CV: RRR, pulses 2+ bilaterally
 - Abd: Soft, NT/ND, Bowel sounds x 4 quadrants
 - MSK: RLE pain, 4/5 strength
 - Neuro: AAO, CN II-XII grossly intact, Speech clear, GCS 15

CT w/ contrast of abdomen

Abnormal-6/18/21

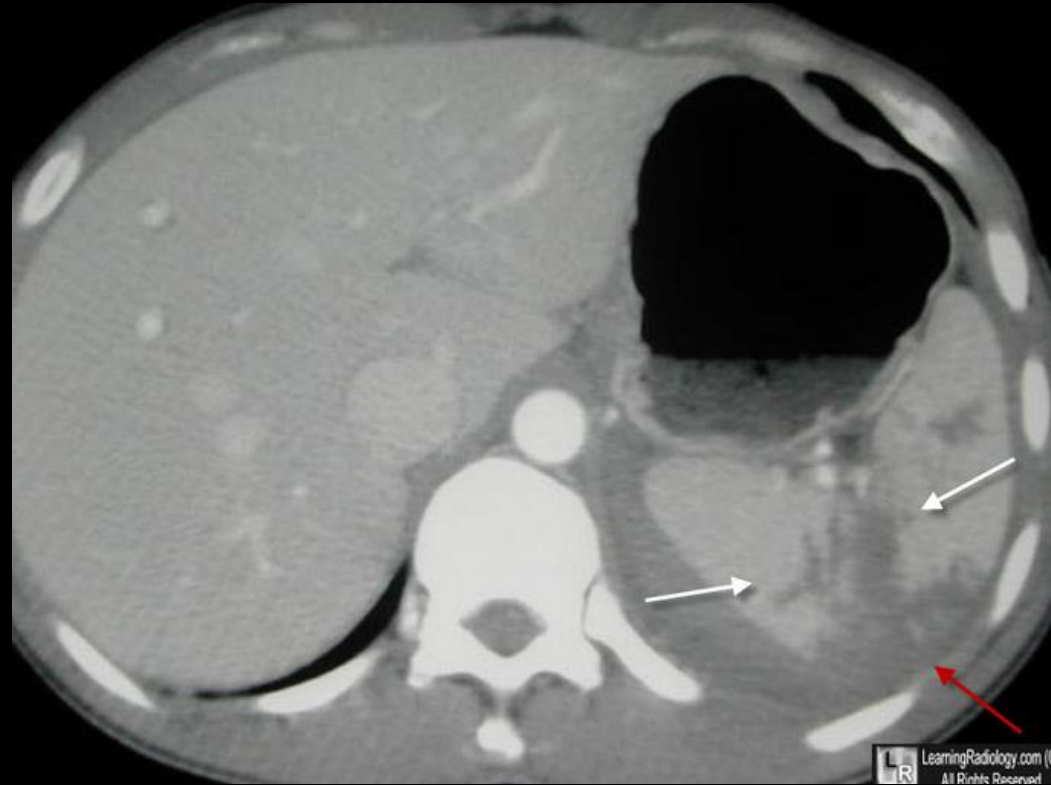


Normal



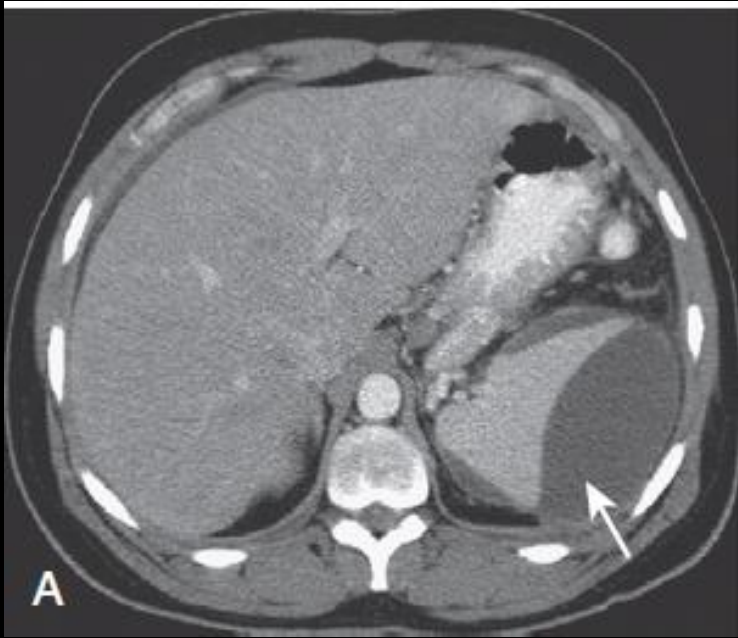
<https://www.hindawi.com/journals/tswj/2013/321810/>

CT w/ contrast of abdomen



<http://learningradiology.com/archives03/COW%20068-Splenic%20laceration/spleniclaccorrect.htm>

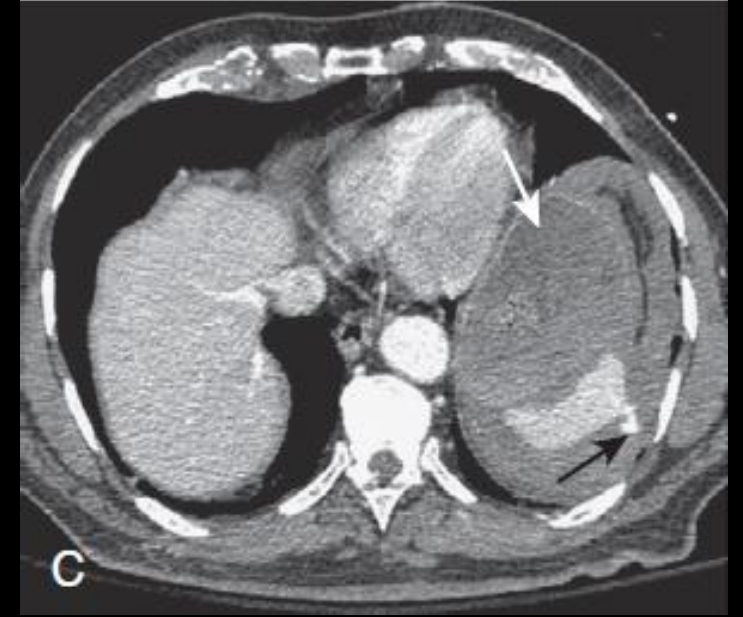
Relevant CT imaging of other types of splenic trauma



Subcapsular hematoma

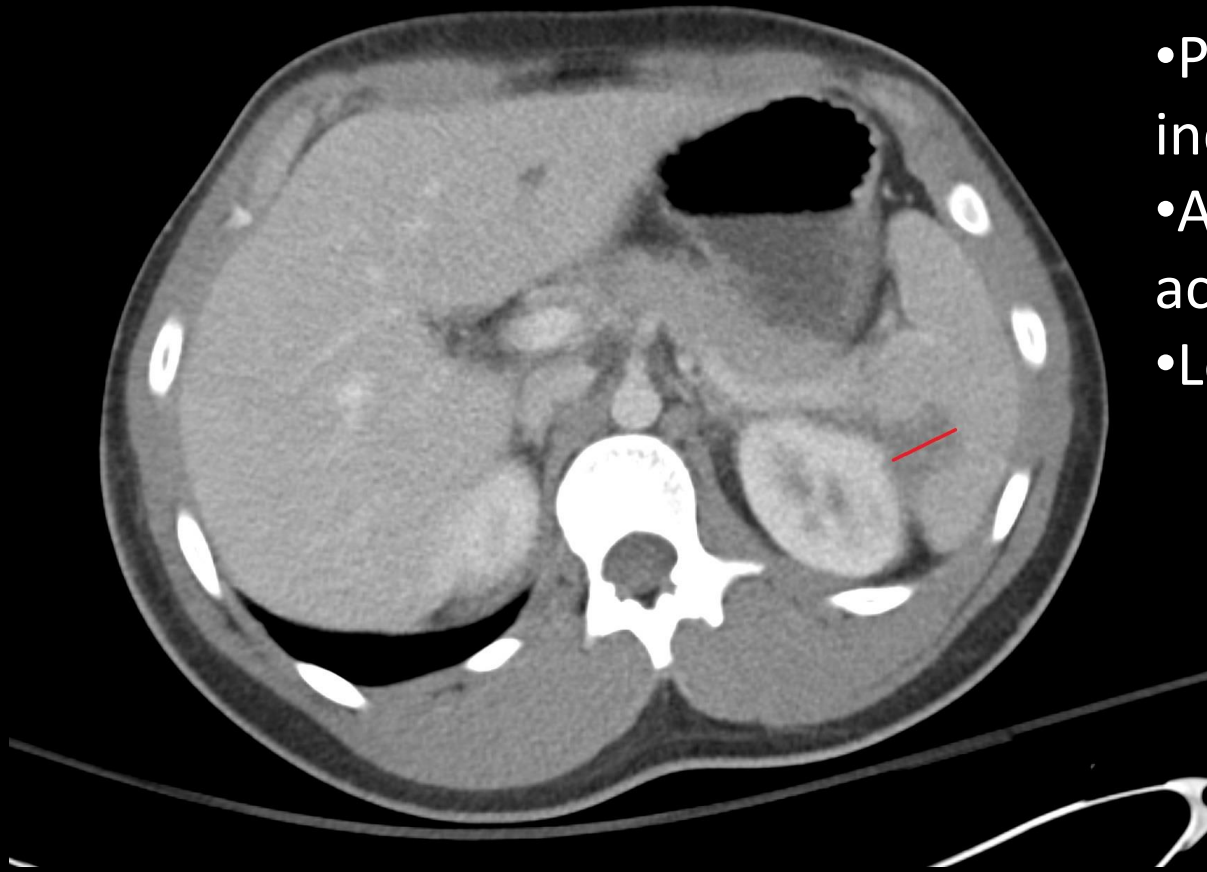


Splenic and hepatic laceration and large hepatic contusion



Intrasplenic hematoma with active extravasation of blood

Key Imaging Findings



- Parenchymal laceration 2 cm in depth indicated by red line
- AAST Grade II laceration of the spleen with no active extravasation of blood
- Low attenuation defect transecting the spleen

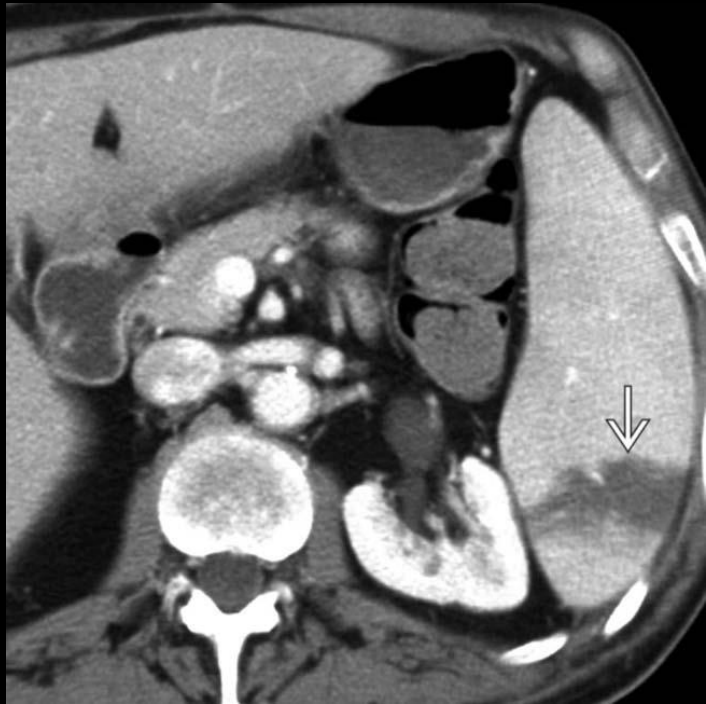
AAST Guidelines

- The American Association for the Surgery of Trauma (AAST) has a spleen injury grading system based on imaging
- Grade I: subcapsular hematoma < 10% of surface area; capsular tear; parenchymal laceration < 1 cm depth.
- Grade II: subcapsular hematoma 10%-50% of surface area; parenchymal laceration 1-3 cm in depth that does not involve a trabecular vessel.
- Grade III: subcapsular hematoma > 50% of surface area or expanding ruptured subcapsular or intraparenchymal hematoma; intraparenchymal hematoma > 5 cm in diameter or expanding; parenchymal laceration > 3 cm in depth or involving trabecular vessels.
- Grade IV: laceration involving segmental or hilar vessels producing major devascularization (> 25% of spleen).
- Grade V: completely shattered spleen; any injury in the presence of splenic vascular injury with active bleeding extending beyond the spleen into the peritoneum

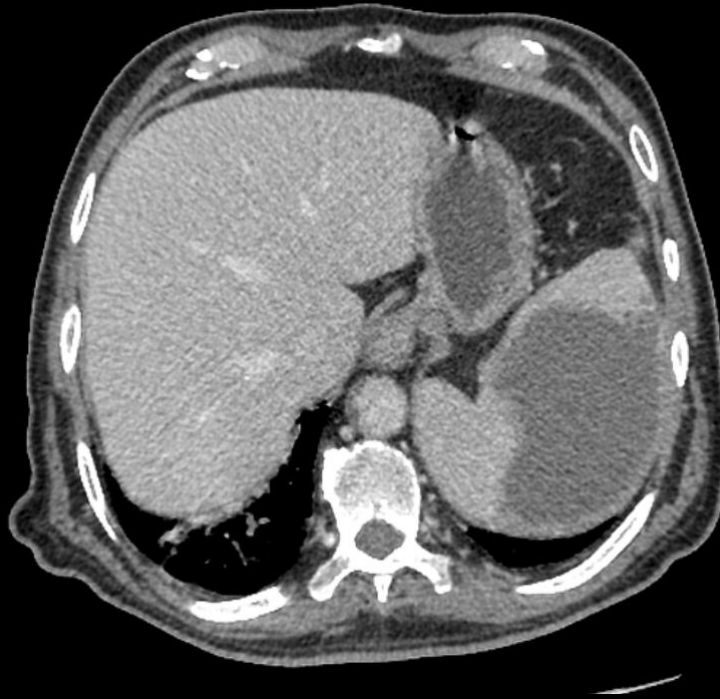
Differential Diagnosis

- The presentation of splenic injury depends upon associated internal hemorrhage. Patients may present with hypovolemic shock manifesting tachycardia, and hypotension. Other findings include tenderness in the upper left quadrant, generalized peritonitis, or referred pain to the left shoulder.
- Splenic abscess
- Splenic infarct
- Subcapsular hematoma

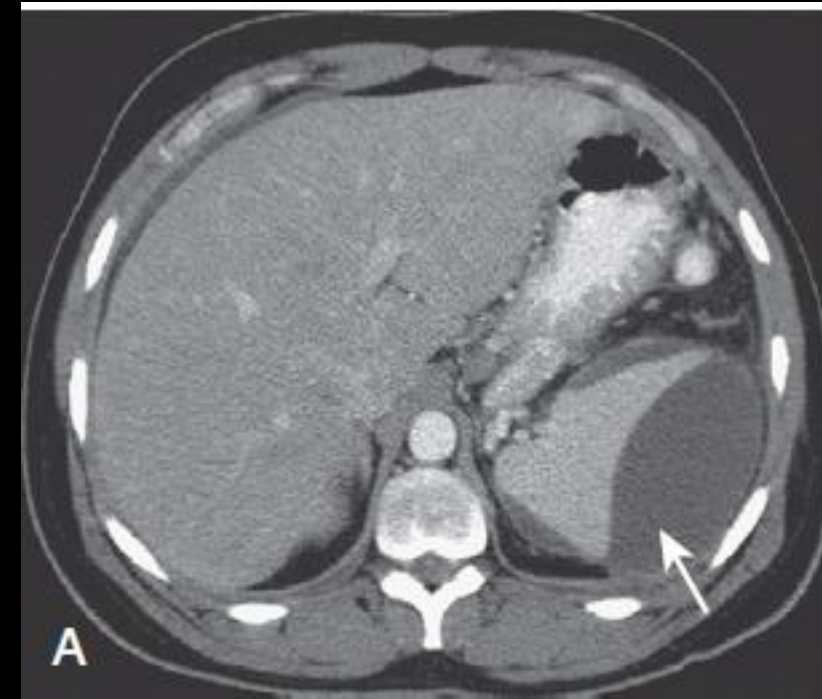
Splenic infarct vs abscess vs hematoma



<https://radiopaedia.org/articles/splenic-infarction?lang=us>



<https://radiopaedia.org/cases/splenic-abscess>



Learning radiology – recognizing the basics 3rd edition textbook

Discussion

- Pathophysiology
 - Acute rupture: injury of the splenic capsule and possibly the splenic parenchymal tissue → acute intra-abdominal bleeding
 - Delayed rupture: injury of the splenic parenchymal tissue in an initially intact splenic capsule → central or subcapsular hematoma → asymptomatic interval (days to weeks) as hematoma distends inside the capsule → subsequent capsular rupture with intra-abdominal bleeding
 - For this patient, he has a splenic laceration measuring up to 2 cm is noted along the inferomedial aspect consistent with AAST grade 2 injury. No active extravasation is identified

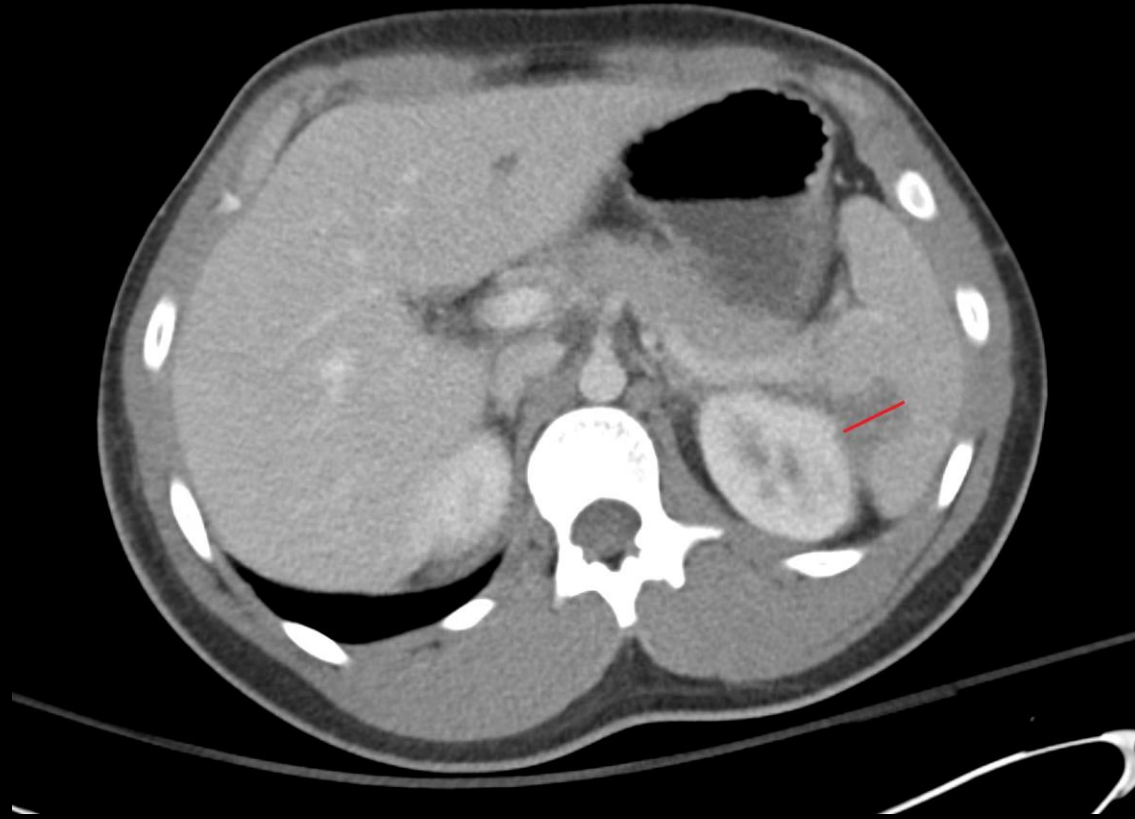
Management

- Followed clinically
- Tylenol every 6 hours and Ibuprofen every 6 hours as needed for pain if needed
- No further workup was done
- Treatment options for a patient with splenic injury:
 - The higher the grade the more likely the need for an intervention
 - Grade I and II are usually followed clinically unless they worsen
 - Grade IV and V usually require surgery
- Procedures that may be used if patient's state continues to worsen
 - Arterial embolization/coiling
 - Splenorrhaphy
 - Splenectomy

Further management for this patient

- Other than his splenic laceration, Pt was taken by orthopedic surgery for open reduction internal fixation of a fracture of the distal tibia involving the medial malleolus as well as open reduction internal fixation of the fibula. Pt tolerated procedure well. Pt received Ancef x 24 hrs post operatively and worked with PT for mobilization
- In terms of discharge instructions for his splenic injury:
 - Activity: No contact sports/PE for 5 weeks due to solid organ injury, avoid activities with high risk for re-injury, slowly advance activity as tolerated
 - Diet: Regular diet
 - Medications: Tylenol every 6 hours and Ibuprofen every 6 hours as needed for pain

Final Diagnosis



- Splenic laceration consistent with AAST grade 2 injury
- Grade II: subcapsular hematoma 10%-50% of surface area; parenchymal laceration 1-3 cm in depth that does not involve a trabecular vessel.

ACR appropriateness Criteria

Variant 6: Major blunt trauma. Hemodynamically stable. Suspected urinary system, including urethra trauma. Initial imaging.		
Procedure	Appropriateness Category	Relative Radiation Level
Fluoroscopy retrograde urethrography	Usually Appropriate	☼☼☼
Radiography trauma series	Usually Appropriate	☼☼☼
CT abdomen and pelvis with IV contrast	Usually Appropriate	☼☼☼
CT whole body with IV contrast	Usually Appropriate	☼☼☼☼
CTA abdomen and pelvis with IV contrast	Usually Appropriate	☼☼☼☼
US FAST scan chest abdomen pelvis	Usually Appropriate	○
CT abdomen and pelvis without IV contrast	May Be Appropriate	☼☼☼
CT urography	May Be Appropriate (Disagreement)	☼☼☼☼
CT whole body without IV contrast	May Be Appropriate	☼☼☼☼
Radiography intravenous urography	Usually Not Appropriate	☼☼☼
US abdomen and pelvis	Usually Not Appropriate	○
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☼☼☼☼
MR urography	Usually Not Appropriate	○
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	○
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	○

Cost of imaging

- **Estimate range for CT Abdomen and Pelvis with Contrast is:
\$2,492.50 - \$3,738.74**

Take Home Points / Teaching points

- A suspicion for splenic injury is increased with left upper quadrant and/or left chest trauma; however, clinical history and physical examination are not sufficiently sensitive or specific for the presence of splenic injury.
- Splenic injury is graded (I through V) depending upon the extent and depth of splenic hematoma and/or laceration identified on CT scan or intraoperatively. Splenic injury grading is one factor used to stratify patient management.
- For hemodynamically stable patients with low-grade (I to III) injuries, we suggest nonoperative management over definitive surgical intervention
- For hemodynamically stable patients with active contrast extravasation or contrast blush on CT scan, we suggest initial splenic embolization over observation

References

- <https://www.uptodate.com/contents/management-of-splenic-injury-in-the-adult-trauma-patient#H22>
- <https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/>
- <https://next.amboss.com/us/article/Bh0zTf?q=splenic%20trauma>
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- <https://radiopaedia.org/cases/splenic-abscess>
- <https://radiopaedia.org/articles/aast-spleen-injury-scale?lang=us>
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Questions?