

# Delayed Diagnosis of Bladder Injury Following a Routine Cesarean Section

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RAD 4001

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# Clinical History

- 39y.o. F POD#3 from an uncomplicated repeat CS w/BTL
  - PMHx: cHTN w/hx of Pre-E in previous pregnancy, HIV, seizure disorder
  - On POD#2 pt had a non-eclamptic generalized tonic clonic seizure 2/2 to lowered seizure threshold post-partum, during this seizure her foley catheter was replaced with some hematuria noticed and she received a work-up to r/o stroke because of hemiparesis during postictal phase
  - Hematuria improved and was assumed to be 2/2 to traumatic foley insertion during her seizure
  - On POD#3 pt complained of significant abdominal pain, she was not passing flatus and thus was given colace and a CT abd/pelvis w/o contrast was ordered

# CT Abd/Pelvis w/o contrast on POD#3

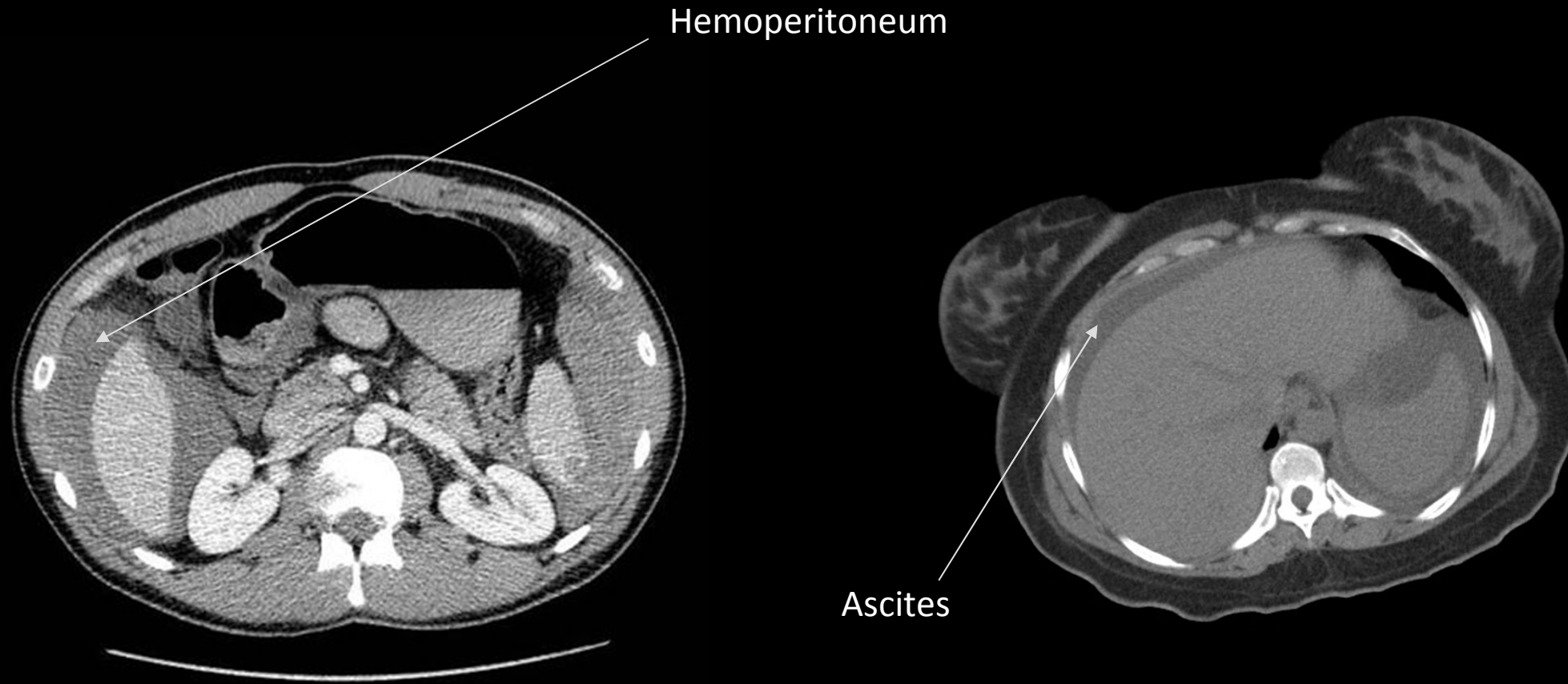


# Results of the CT Abd/Pelvis

- Impression

1. Expected immediate post –section changes w/small to moderate amount of blood products within the endometrial cavity and endocervical canal and also small hematoma anterior to uterus
2. Small to moderate amount of abdominal and pelvic ascites
3. Few punctate bilateral renal nonobstructing calculi
4. Colonic gaseous distention with mild prominence of cecum
5. No finding to explain abdominal pain

# Hemoperitoneum vs. ascites



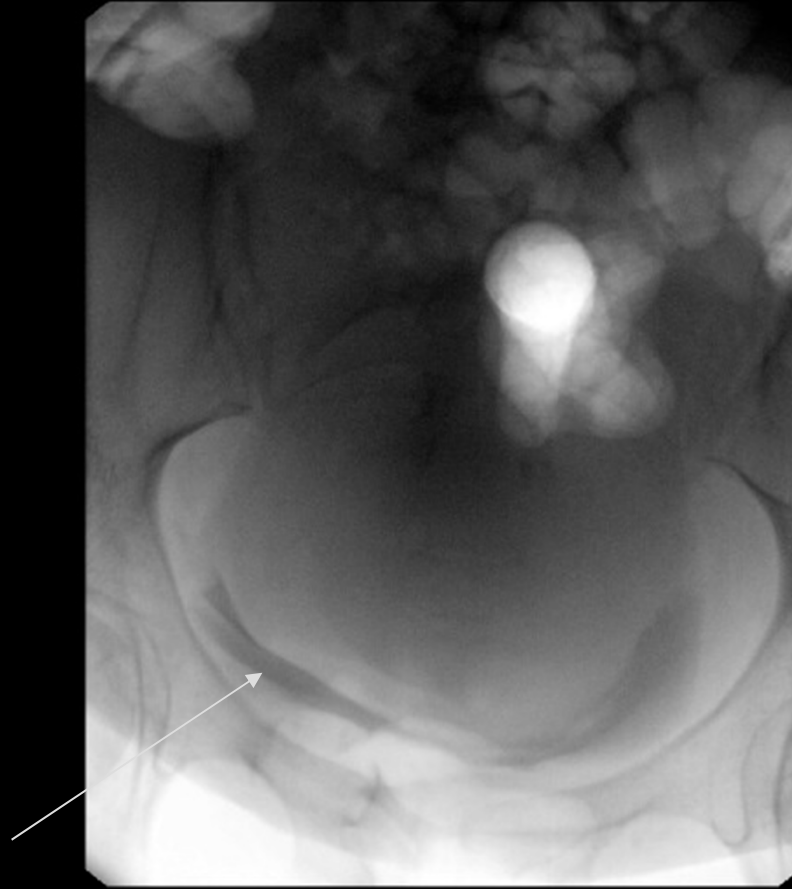
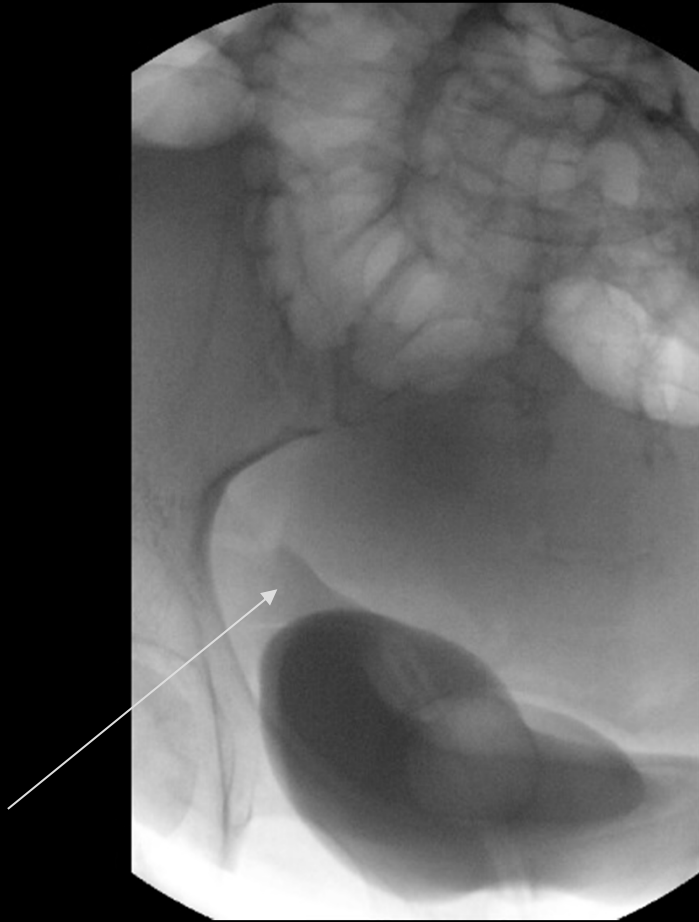
# Differential Diagnosis for Abdominal Pain following CS

- Abdominal pain likely 2/2 to post-op ileus or gas pain
- Abdominal pain potentially 2/2 to new onset ascites
- Common causes of ascites:
  - CHF
  - Chronic kidney disease
  - Liver failure

# POD#5

- Foley that was inserted on POD#3 was removed, later that day pt reports to nurse that she is not voiding
- Cr increases to 2.7, on POD#6 Cr is 4.1, pt still not producing urine
- Pt still complaining of abdominal pain and constipation
- Concern for bladder injury during CS 2/2 to urinary retention, ascites on CT abd/pelvis, and increasing creatinine, extravasation of urine can cause peritoneal inflammation and discomfort as well as ileus
- Prior to foley insertion on POD#3 pt had been voiding freely

# Cystogram – POD#6



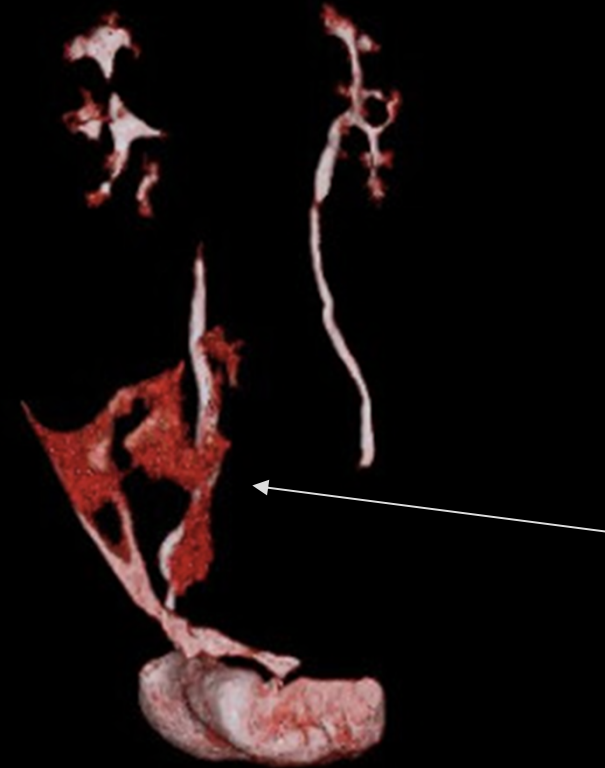


# Results of the cystogram

- Impression:

1. Extravasation of contrast during cystogram indicating bladder leak

# CT Abd/Pelvis w/wo contrast – POD#7



# Results of CT Abd/Pelvis w/wo contrast

- Impression:

1. Intraperitoneal extravasation of contrast from the anterolateral wall of the bladder, indicating leak. Extravasated contrast tracks to the perihepatic space and right lower quadrant.
2. No ureteral injury.
3. Stable punctate bilateral renal nonobstructing calculi.
4. Unchanged small hematoma anterior to the uterus.

# Bladder Injury during CS

- Bladder injury during CS is relatively rare, generally <1%
- Increased risk w/higher number of CS: 0.13% first, 0.09% second, 0.28% third, 1.17% fourth, 1.94% fifth, and 4.49% sixth cesarean delivery, usually 2/2 to adhesive disease w/bladder involvement
- 60% of patients w/bladder injury had adhesions on their repeat CS
- Injury to the bladder generally occurs when opening the peritoneal cavity or creation of a bladder flap
- 95% of injuries to the bladder occur in the dome and 5% at the trigone

# Bladder Injury during CS

- Relatively rare for a bladder injury to be overlooked during the surgery, injury can usually be identified, average size of a bladder injury is 4.2cm
- Symptoms in the postoperative period: hematuria, oliguria, lower abdominal pain, ileus, ascites, peritonitis, sepsis, fistula, and elevation of BUN/Cr

# Final Diagnosis

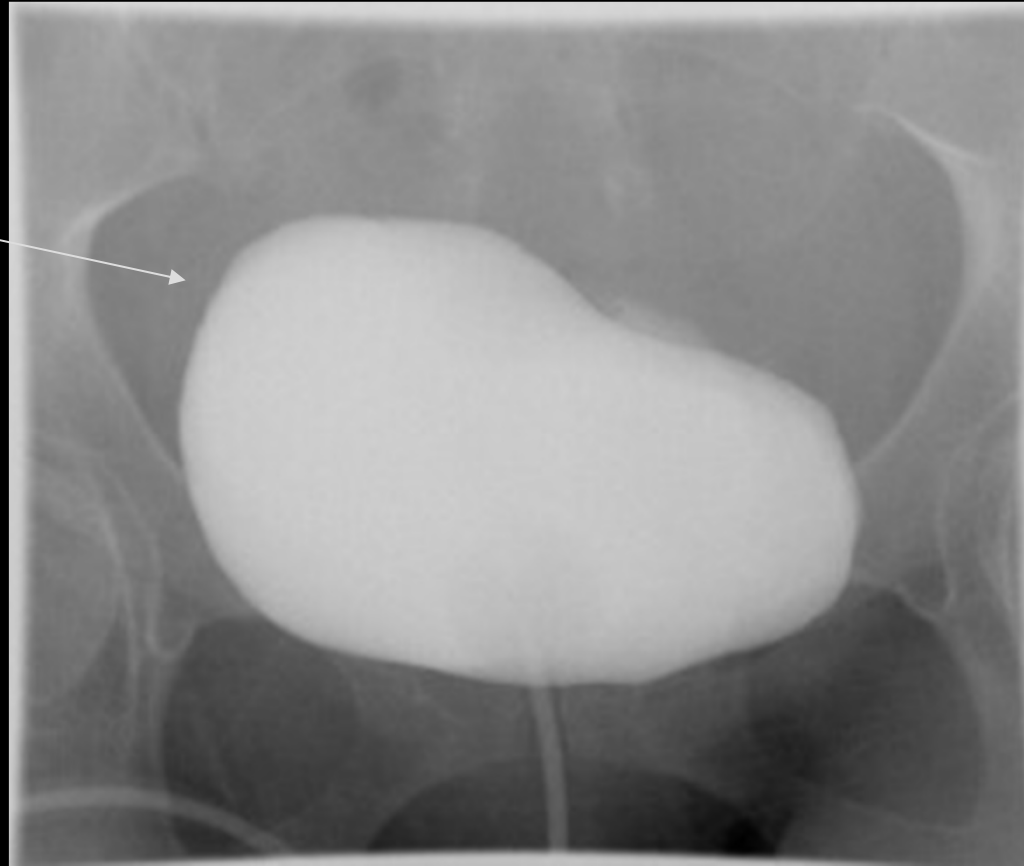
- Bladder injury to the anterolateral wall of the bladder

# Treatment

- Initially due to complicated hospital course pt refused repair, ultimately decided to proceed w/surgical repair on POD#8 due to concerns for complications such as peritonitis, sepsis
- Open bladder repair was performed by urology, pt d/c w/foley in place to be removed 7 days following procedure
- Cr returned to baseline by d/c
- Follow up cystogram one week after d/c

# Follow up cystogram

No evidence of bladder leak





# ACR appropriateness Criteria

**Variant 4: Acute nonlocalized abdominal pain. Not otherwise specified. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☼☼☼
CT abdomen and pelvis without IV contrast	Usually Appropriate	☼☼☼

**Variant 1: Penetrating trauma, lower abdomen and pelvis. Suspected lower urinary tract trauma. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
Fluoroscopy retrograde cystography	Usually Appropriate	☼☼☼
CT pelvis with bladder contrast (CT cystography)	Usually Appropriate	☼☼☼☼

# Cost of imaging

Imaging	Cost
CT Pelvis/Abdomen w/o contrast	\$5873.25
Cystogram 3+ views	\$1262.00
CT Pelvis/Abdomen w/wo contrast	\$8906.25
<b>Total</b>	<b>\$16041.50</b>

# Take Home Points

- Post-surgical ascites and abdominal pain should be concerning for bladder injury – especially in setting of other symptoms such as hematuria, oliguria, or increasing Cr
- Cystogram and CT cystography are both equally appropriate studies for suspected bladder injury
- Doing retrograde contrast, such as for cystogram is appropriate in the setting of bladder injury-caused AKI

# References

- Tarney, CM. (2013) Bladder Injury During Cesarean Section. *Curr Womens Health Rev*, 9(2): 70-76.
- Herring, W. (2015). Learning Radiology: Recognizing the Basics. Philadelphia, PA: Elsevier.
- <https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/>
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Questions?