AMSER Case of Month
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71-year old woman follows up for a colovesical fistula repair

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Patient Presentation

- The patient is a 71 year-old woman with a PMHx of HTN, hyperlipidemia, chronic kidney disease stage V, and diverticulosis.
- She underwent an exploratory laparotomy for ruptured sigmoid diverticulitis. Intraoperatively, a colovesical fistula was discovered and repaired.
- A Foley catheter was placed for 3 weeks due to suspected poor healing.
- Most recently, the patient then underwent a fluoroscopic conventional cystogram on follow-up to determine if the Foley catheter could be removed.

Physical Exam and Pertinent Diagnostic Testing

- The patient's most recent prior physical exam showed the patient was alert and oriented X3, and the Foley was in place with minimal drainage.
- On abdominal exam, a midline VAC was in place and adequately sealed, an ileostomy showed pasty stool output, and a colostomy demonstrated stool. Mild tenderness was observed in the lower abdominal quadrants.
- The patient's significant lab findings include anemia and a high white blood count as the patient had sepsis secondary to VRE and Candida Krusei during her hospitalization.
- Her prior imaging study was a CT scan performed for worsening abdominal pain which demonstrated high-grade small bowel obstruction and multiple intra-abdominal abscesses.
- On her follow-up, the question is
  - Is the repaired colovesicular fistula in functioning properly?
  - Can the Foley catheter be removed?

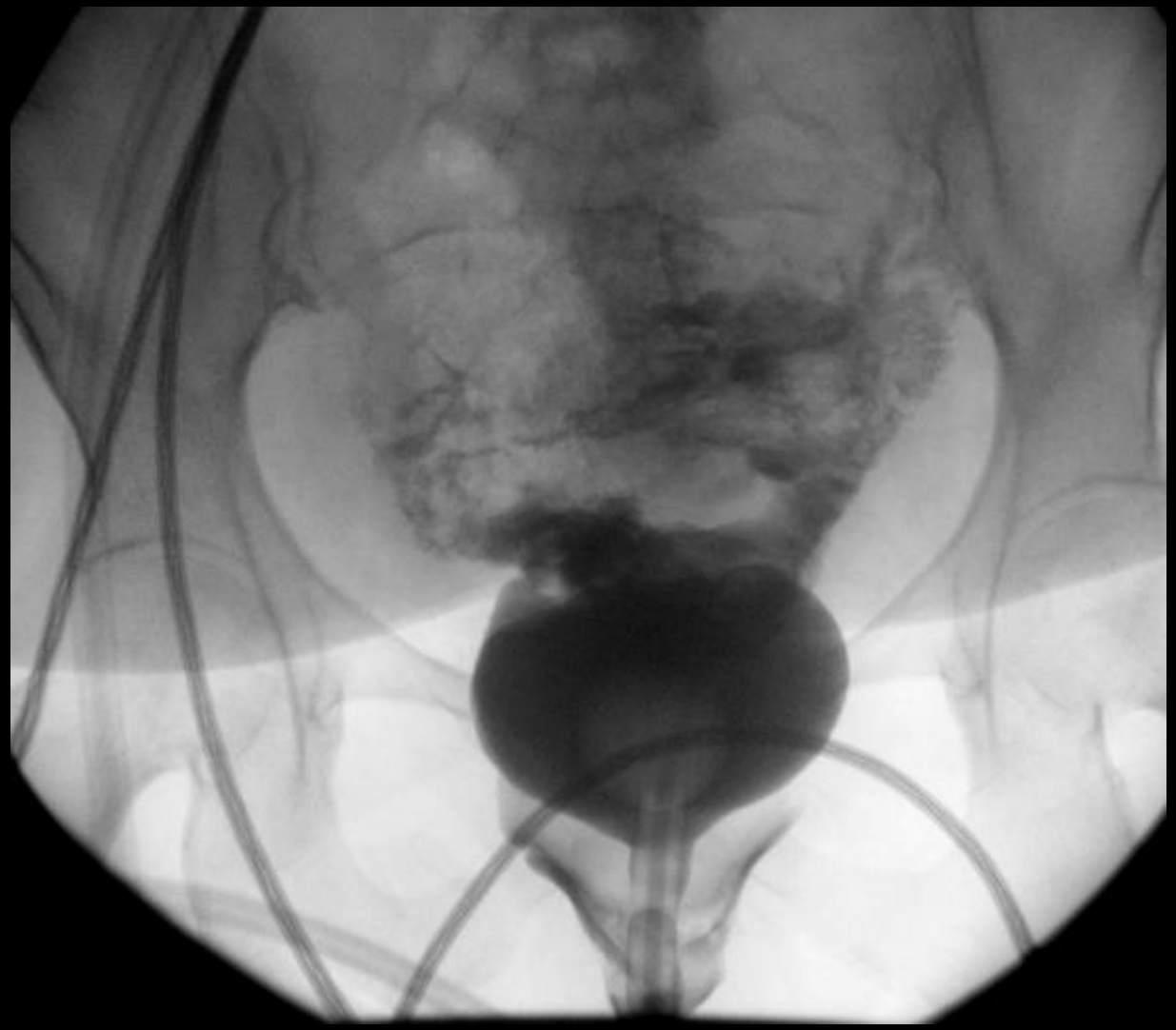
What Imaging Should We Order?

American College of Radiology
ACR Appropriateness Criteria®
Left Lower Quadrant Pain-Suspected Diverticulitis

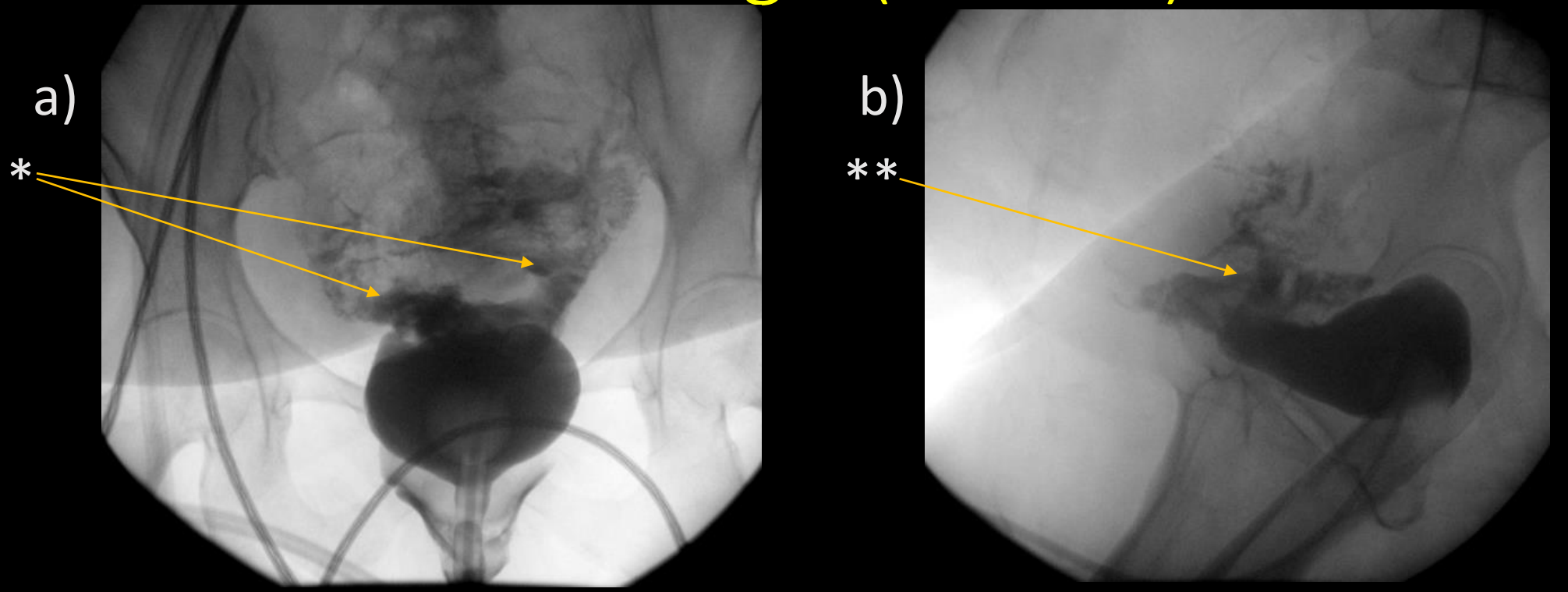
Fluoroscopy Cystography

A fluoroscopic cystogram is an alternative imaging modality for evaluation of potential colovesical fistula following diverticulitis [62,63]. While CT cystography allows for anatomic detail and 3-D depiction of the pelvic anatomy, a cystogram provides a dynamic evaluation of the urinary bladder and provides greater spatial resolution.

Findings (unlabeled)



Findings: (labeled)



Fluoroscopic cystogram in a patient with a history of colovesical fistula status-post repair. For the study, 250 mL of Cystografin was administered through a Foley catheter. Extravasation of contrast into the peritoneal cavity was visible superiorly* (a, AP view) and anteriorly** (b, lateral view), outlining the peritoneal cavity.

Final Dx:

Intraperitoneal bladder rupture

Epidemiology

- Bladder rupture tends to occur in young males, as they are more likely to experience high-energy injuries [1].
- Rupture may also occur from an iatrogenic injury during obstetric/gynecologic procedures.
- About 60% of bladder ruptures are extraperitoneal, 30% are intraperitoneal, and 10% are combined [2].
- The usual presentation involves hematuria, abdominal pain, as well as difficulty with urination [3].

Imaging Features

- Fluoroscopic cystography is the traditional modality for investigating a possible bladder rupture.
- For intraperitoneal bladder rupture, cystography demonstrates intraperitoneal contrast material around bowel loops, in the paracolic gutters, and between mesenteric folds. In addition, a bladder dome defect is often also visible [4].
- Contrast instillation during CT can provide the adequate bladder distention needed to demonstrate contrast extravasation from the injury site. CT cystography has become the first-line evaluation for bladder injury in the acute trauma setting [5].
- CT cystography may be combined with standard CT in order to investigate the upper tracts.

Differential Diagnosis

- **Extraperitoneal bladder rupture**: accounts for about 80-90% of bladder ruptures and often results from penetrating trauma or pelvic fractures [1].
  - On fluoroscopic cystography, contrast material would be expected to be seen extravasating in the extraperitoneal space.
  - Extraperitoneal bladder ruptures are treated via an indwelling Foley catheter.
  - Like in this case, extraperitoneal bladder rupture can also lead to extravasation of contrast on fluoroscopic examination.
- **Urinoma**: Urinomas, also called uriniferous fluid collections, are collections of urine that result from leakage of the renal tract system. Trauma or urinary obstruction may result in urine extravasation into the retroperitoneum, and the extravasated urine can become encapsulated if it leads to lipolysis of surrounding fat [6].
  - Urinoma is on the differential as it can present, like in this case, as a leakage of urine from the urinary tract system, and can involve the bladder such as those cases that are secondary to bladder outlet obstruction.
  - Urinomas may also demonstrate contrast extravasation out of the urinary system into the retroperitoneal space on fluoroscopic examination.

Differential Diagnosis

Urinary ascites

•Urinary ascites is a condition in which a rupture of a bladder or ureter results in urine leakage into the peritoneal space.

•It most often presents at or shortly after birth and is often secondary to posterior urethral valves.

•Early diagnosis is crucial as it has been associated with a high mortality rate.

•Although most commonly seen at birth, it may occur in adults as a result of blunt or iatrogenic trauma.

•Patients with urinary ascites typically present with suprapubic tenderness, lower abdominal pain, abdominal distension, and with features of ascites and severe azotemia [7].

•It is differentiated from bladder rupture alone by the requirement of a relatively large amount of peritoneal fluid.

Treatment and Prognosis

- Intraperitoneal bladder ruptures require surgical repair. This is due to the risk of intra-abdominal sepsis. The procedure may be a diagnostic laparoscopy in hemodynamically stable patients, in which the bladder lumen may be evaluated and nonviable tissue debrided before a pelvic drain is placed. The bladder can then undergo retrograde filling via methylene blue to ensure watertight closure and identify leaks. After the procedure, patients should receive 1 day of IV broad-spectrum antibiotics in case of penetrating injury [8].
- This is in contrast to uncomplicated extraperitoneal bladder ruptures, which may be treated with a urinary catheter, assuming there are no ureteral or urethral injuries. If a urethral injury is seen via retrograde urethrogram, a percutaneous suprapubic catheter may be placed.
- As patients with bladder rupture tend to have other traumatic injuries, it is difficult to assess the prognosis. One retrospective study determined the mortality rate among patients with bladder rupture undergoing diagnostic laparoscopy to be 10.8%. If untreated, bladder rupture may lead to severe sepsis and peritonitis [8].

References:

1. John Barnard et al. Traumatic Bladder Ruptures: A Ten-Year Review at a Level 1 Trauma Center. Adv Urol. 2019 Dec 12;2019:2614586.

2. Hong Kuan Kok et al. Intraperitoneal bladder rupture. Br J Hosp Med (Lond). 2013 Aug;74(8):473.

3. J N Corriere Jr and CM Sandler. Bladder rupture from external trauma: diagnosis and management. World J Urol. 1999 Apr;17(2):84-9.

4. A J Iverson and A F Morey. Radiographic evaluation of suspected bladder rupture following blunt trauma: critical review. World J Surg. 2001 Dec;25(12):1588-91.

5. Shenfeld OZ, Gnessin E. Management of urogenital trauma: state of the art. Curr Opin Urol 2011;21:449-54.

6. Katherine Connolly and Mary E Norton, Urinoma. Am J Obstet Gynecol. 2021 Nov;225(5):B34-B35.

7. K Abirami, Urinary ascites, Indian J Nephrol, Mar 2012.

8. D R Bodner et al. Evaluation and treatment of bladder rupture. Semin Urol. 1955 Feb;13(1):62-5.