

Bladder injury due to cesarean section

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Section: Abdominal imaging

Area of Interest: Obstetrics (Pregnancy / birth / postnatal period) Urinary Tract / Bladder

Imaging Technique: CT

Case Type: Clinical Case

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Patient: 38 years, female

Clinical History:

A 38-year-old pregnant primigravida woman presented with spontaneous rupture of membranes at 41 weeks. She underwent cesarean section under epidural anaesthesia for non-progressive labour despite stimulation with oxytocin. One day later, the abdomen appeared tender and the patient was unable to urinate.

Imaging Findings:

Unenhanced CT showed a status after cesarean section with an enlarged uterus and a Pfannenstiel incision. In addition, there was free abdominal fluid with a density of 5 hounsfield units (HU) (Figure 1). CT with intravenous contrast in the venous phase confirmed free fluid against the bladder and a focal defect in the bladder wall (Figure 2). CT performed an hour later confirmed the bladder wall defect (Figures 3a–3c) and an increased density of the free abdominal fluid up to 60 HU in keeping with contrast leakage from the bladder. There was also further spread of contrast properitoneal adjacent to the incision site and around the anterior abdominal musculature (Figure 4). The diagnosis of bladder injury was made.

Discussion:

A cesarean section is one of the most performed surgeries worldwide, and rates are increasing [1]. The organ which is most frequently damaged during a cesarean section is the bladder and, more specifically, the dome of the bladder [2]. Damage of the bladder with a primary cesarean section occurs in approximately 0.08–0.94% of all cases and is, therefore, a relatively rare complication [3].

Clinical presentation is usually nonspecific. Most frequent symptoms are hypogastric or lumbar pain, gastrointestinal discomfort, low-grade fever and sometimes hematuria [2,4,5]. Inability to urinate in the early postoperative period may also suggest bladder injury.

Moderate elevation of serum creatinine may be present [4].

Bladder injury that is recognized during cesarean section and immediately repaired has a better outcome compared to diagnosis a few days following delivery [4].

Medical imaging is useful to diagnose a bladder injury by revealing leakage of contrast out of the urinary bladder. Retrograde cystography, ultrasound and abdominal CT may demonstrate a bladder wall defect. Contrast-enhanced CT in the excretory phase can show direct spillage of contrast out of bladder and an increase in density of the surrounding free fluid. Retrograde cystography in combination with CT is an alternative and can replace the excretory phase [2]. On ultrasound, bladder injury should be suspected if there is a significant amount of free fluid.

If the clinical diagnosis is not clear, CT is the method of choice for the differential diagnosis with postoperative adynamic ileus, bowel laceration, uterine rupture, active bleeding and ovarian vein thrombosis. Other postoperative complications, such as endometritis, peritonitis and textiloma, can be ruled out by CT [6].

In case of a bladder injury, a trans-urethral foley catheter must be placed immediately and must stay for a minimum of 7 and up to 14 days [7,8]. Before removing the catheter, a retrograde cystography must be performed to confirm there is no leakage through the bladder injury. There is no evidence for prophylactic antibiotic use, but a urine culture should always be taken due to an increased risk of infection due to prolonged catheterization [2].

Our patient had a full recovery with no leakage on retrograde cystography after 7 days with a trans-urethral Foley catheter (Figure 5).

Differential Diagnosis List: Bowel laceration, Uterine rupture, Bladder injury after c-section, Bleeding, Infection (endometritis or peritonitis), Foreign body

Final Diagnosis: Bladder injury after c-section

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Figure 1

a



Description: Axial unenhanced CT. A significant amount of free fluid in the abdominal cavity (asterisk). A subtle amount of air in the uterus and the abdominal musculature, within a normal range following cesarean section (arrows). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

Figure 2

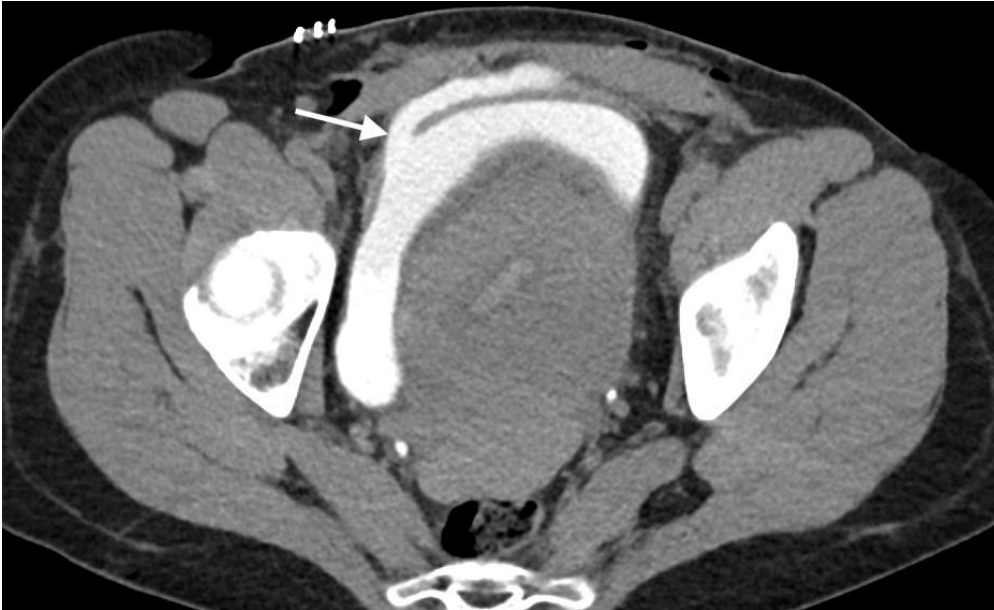
a



Description: Axial CT with intravenous contrast in the venous phase. Free fluid against a focal disrupted bladder wall (arrow). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

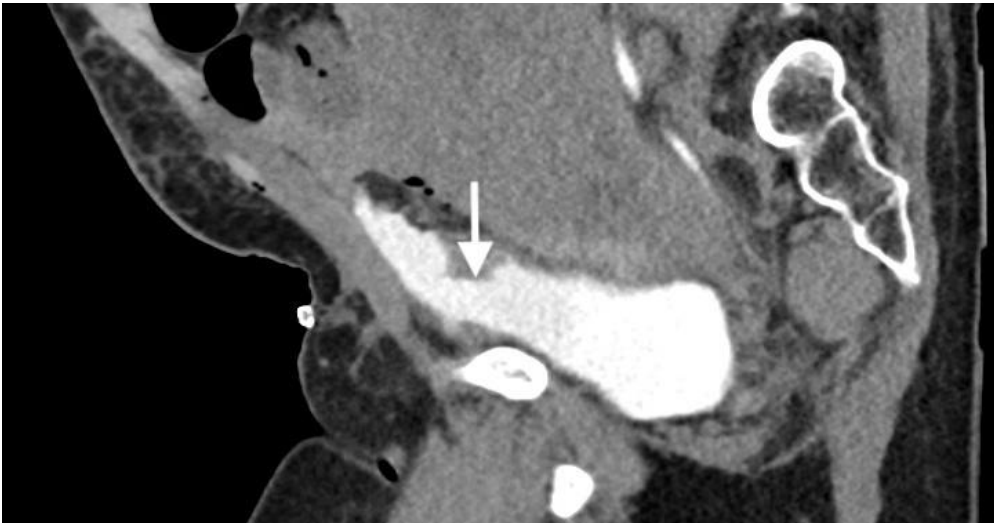
Figure 3

a



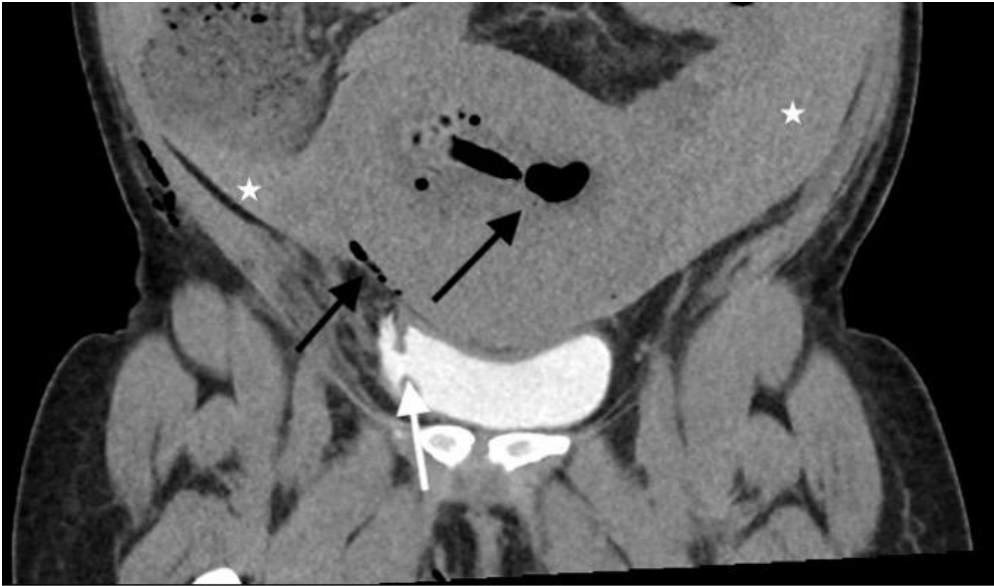
Description: Axial CT in the delayed phase (1 hour). Dense contrast in and out of the bladder with a clear defect in the bladder wall of approximately 1.5cm (arrow). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

b



Description: Sagittal CT in the delayed phase (1 hour). Dense contrast in and out of the bladder with a clear defect in the bladder wall (arrow). Note the properitoneal contrast adjacent to the anterior abdominal musculature (asterisk). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

c



Description: Coronal CT in the delayed phase (1 hour). Dense contrast in and out of the bladder with a clear defect in the bladder wall (arrow). Free fluid in the abdominal cavity (asterisks) and air in and around the uterus (black arrows). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

Figure 4

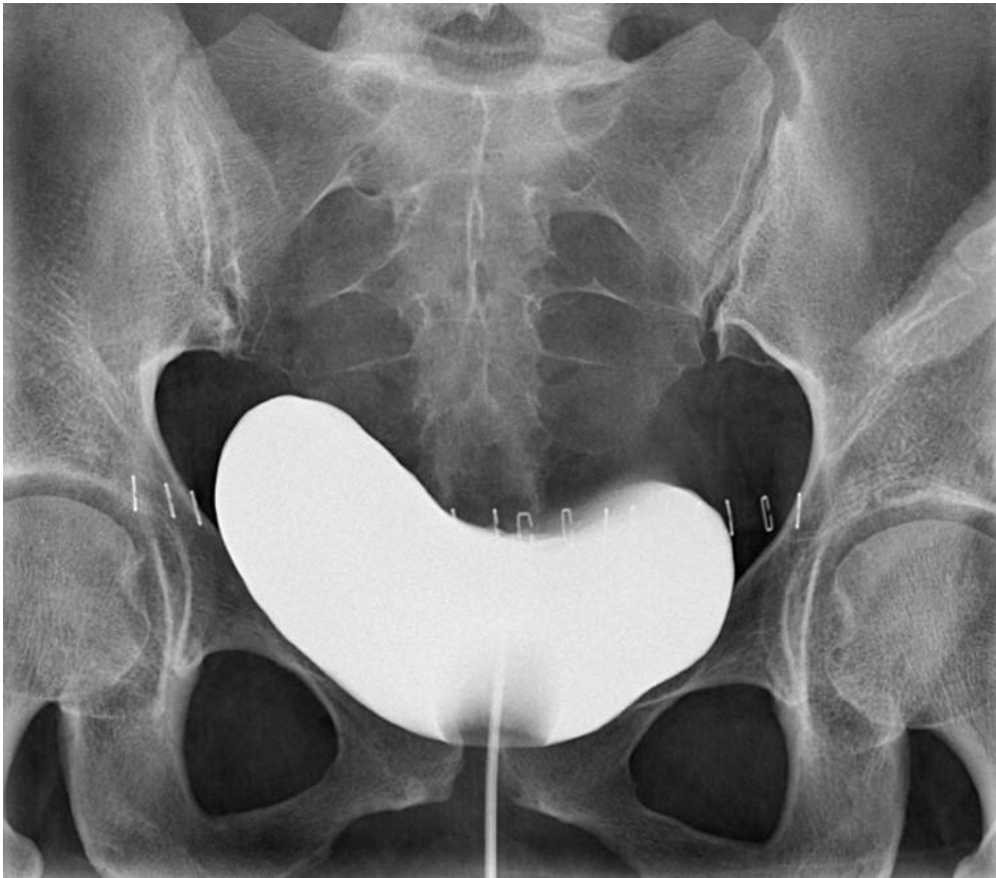
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Description: Axial CT in the delayed phase. The free fluid in the abdominal cavity has a density of 62 HU (yellow circle), indicating contrast spilling. Properitoneal contrast adjacent to the anterior abdominal musculature (arrow). **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023

Figure 5

a



Description: Retrograde cystography shows no remaining bladder wall defect. **Origin:** © Filip Vanhoenacker – Department of Radiology, General Hospital Sint Maarten, Mechelen, Belgium, 2023