

IMAGES IN CLINICAL RADIOLOGY



Traumatic urinary bladder rupture: the usefulness of CT cystography

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A 38-year-old male presented at the emergency unit with acute abdominal pain and massive hematuria after a fall in the stairs of his home. At physical examination, tenderness was found in the hypogastric area and in both right and left iliac regions. The first radiological investigation performed was ultrasonography (Fig. A). Free liquid was found in the Morisson pouch, in the perihepatic-space and in the perisplenic fossa. The bladder contained blood clots and there was no liquid in the Douglas pouch. Active bleeding was not excluded. Unenhanced and contrast-enhanced CT of the abdomen in arterial, venous and late phase was performed and large amount of intraperitoneal liquid was confirmed but without evident cause (Fig. B). There were no visceral injuries neither skeletal lesion nor vascular lesion. 60 minutes later, an additional cystography phase was performed and revealed a rupture in the superior aspect of the bladder with intraperitoneal spilling of contrast (Fig. C and D).

Consequently, the patient was admitted for surgical repair of the bladder defect.

Comment

In blunt abdominal trauma, rupture of the urinary bladder is an uncommon injury. Intraperitoneal bladder rupture (10-20% of cases) occurs typically in patient with already distended bladder. According to the literature, intraperitoneal bladder rupture constituted the third most frequent cause following bowel and mesentery injury of symptomatic intra-abdominal free fluid after blunt abdominal trauma. Iatrogenic and spontaneous causes include pelvic surgery, suprapubic or Foley catheter placement, bladder biopsy, ureteral stent manipulations, radiation therapy, and infection. Conventional cystography has long been considered the gold standard in evaluating patient with suspected traumatic bladder lesion. According to Vaccaro et al (1) CT cystography represents an alternative and may be routinely used in trauma patients with pelvic fracture as well as patients with hematuria or even in patients with severe pelvic trauma with no known pelvic fractures.

Vaccaro et al. made a comprehensive review paper of CT cystographic findings in bladder injury and established a comprehensive classification (Table I).

Intraperitoneal bladder ruptures and combined intraperitoneal and extraperitoneal ruptures require laparotomy with surgical repair of the bladder defect. Contusions and interstitial injuries are managed conservatively with Foley catheterization. Most extraperitoneal ruptures may be treated with catheter drainage of the bladder (1). The detection of bladder rupture as well as its accurate classification is essential for optimal management of the patient and can be achieved by CT on delayed cystographic images.

I	Bladder contusion	Incomplete or partial tear of the bladder mucosa. Findings at conventional and CT cystography are normal.
II	Intraperitoneal rupture	CT cystography demonstrates intraperitoneal contrast material around bowel loops, between mesenteric folds, and in the paracolic gutters.
III	Interstitial bladder injury	Intramural or partial-thickness laceration with intact serosa. CT cystography may demonstrate intramural contrast material without extravasation.
IVa	Simple extraperitoneal rupture	Extravasation of contrast material confined to the perivesical space.
IVb	Complex extraperitoneal rupture	The contrast material extends beyond the perivesical space and may dissect into a variety of fascial planes and spaces.
V	Combined bladder injury	CT cystography usually demonstrates extravasation patterns that are typical for both types of injury.

Note: There are reported cases of surgically proved combined ruptures in which only one component of bladder injury was demonstrated at cystography.

Reference

1. Vaccaro J.P., Brody J.M.: CT cystography in the evaluation of major bladder trauma. *RadioGraphics*, 2000, 20: 1373-1381.

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