

## Extraperitoneal Bladder Rupture Without Pelvic Fracture Due to High-impact Blunt Trauma: The Report of Two Cases

*Pelvik Fraktürün Eşlik Etmediği Yüksek Enerjili Künt Travmaya Bağlı Ekstraperitoneal Mesane Rüptürü:İki Olgunun Bildirimi*

Ömer Faruk ÇELİK<sup>1</sup>, Haldun AKOĞLU<sup>2</sup>, Serkan Emre EROĞLU<sup>3</sup>, Özge ONUR<sup>2</sup>, Arzu DENİZBAŞI<sup>2</sup>

### ABSTRACT

Blunt trauma of the abdomen may cause rupture of the bladder especially when the bladder is distended. It is shown that 70–97% of patients with bladder rupture from trauma have associated pelvic fractures, and retrograde cystogram is the gold standard for the diagnosis. In this report, we present two cases of extraperitoneal Type IV bladder rupture diagnosed with retrograde CT cystography with urethral contrast. Contrary to the literature, in both cases, no pelvic fractures were present despite high-energy impactations. Epidural and subdural hematomas in both cases certify the high-energy of the impact these patients were exposed. Both cases were managed with simple catheterization and drainage. We think that retrograde CT cystography is an indispensable diagnostic tool for blunt pelvic trauma patients since bladder injuries may occur without pelvic fractures. Absence of meatal blood or pelvic fractures may not necessarily rule-out the presence of bladder injuries.

### Keywords

Bladder, rupture, trauma

### ÖZET

Künt batın travması, özellikle mesane dolu iken meydana geldiyse, mesane rüptürüne yol açabilir. Mesane rüptürü hastalarının %70 ila %97'sinde eşlik eden bir pelvik kırık da olduğu gösterilmiş olup tanıda altın standart retrograd sistogramdır. Bu olgu serisinde, üretral kontrast ile yapılan retrograd BT sistografi ile tanısı konulan iki farklı ekstraperitoneal tip IV mesane rüptürü olgunu bildiriyoruz. Literatürün aksine, her iki vakada da yüksek enerjili künt travmaya rağmen pelvik kırık belirlenmemiştir. Her iki vakada da epidural ve subdural kanamalar görülmesi bu hastaların maruz kaldığı yüksek enerjili travmayı kanıtlamaktadır. Her iki vaka da basit kateterizasyon ve drenaj ile tedavi edilmiştir. Mesane rüptürü pelvik kırık olmaksızın da görülebildiğinden künt batın travmasında retrograd BT sistografinin vazgeçilmez bir tanısal test olduğu görüşündeyiz. Meada kan olmaması ya da pelvik kırık görülmemesinin mesane rüptürü olmadığını birer göstergesi kabul edilemeyeceği inancındayız.

### Anahtar Kelimeler

Mesane, rüptür, travma

<sup>1</sup> Cizre State.Hospital Emergency Medicine Department, Sirnak, Turkey

<sup>2</sup> Marmara University School of Medicine, Department of Emergency Medicine, Istanbul, Turkey,

<sup>3</sup> University of Health Sciences Umraniye Education and Research Hospital, Department of Emergency Medicine, Istanbul, Turkey,

**Corresponding Author:** Ass. Prof. Haldun Akoglu, Marmara University School of Medicine, Department of Emergency Medicine, Istanbul, Turkey, Pendik Training and Research Hospital Ust Kaynarca / Pendik / Istanbul; Turkey **E-mail:** [haldun.akoglu@marmara.edu.tr](mailto:haldun.akoglu@marmara.edu.tr)

## Introduction

In up to 8% of the patient with pelvic trauma, bladder and/or urethral injuries coexist (1). It is hard to distinguish the mortality associated with genitourinary injuries from the overall mortality of multiple trauma patients, which range from 11% to 44% (2, 3). External trauma, usually a blow to the abdomen, may cause rupture of the bladder especially when the bladder is distended. Retrograde cystogram is accepted as the gold standard for the diagnosis of bladder rupture. The diagnosis is made when contrast material is seen spilling out of the bladder into the peritoneal cavity (intraperitoneal rupture) or into the retroperitoneal area surrounding the bladder (extraperitoneal rupture). This study can be done with plain films or with CT (4). 70–97% of patients with bladder rupture from blunt trauma have associated pelvic fractures, and a combination of pelvic fracture and gross hematuria is an absolute indication for immediate retrograde cystography (4). On the contrary, microscopic hematuria is a relative indication, and a need for a radiological exam is controversial in the literature (4). A formal surgical repair should be considered for all patients with an intraperitoneal bladder rupture. If the urine clears of blood promptly with a catheter that drains well, and if the bladder neck is not involved in the injury, catheter drainage may be used as the sole treatment option in extraperitoneal bladder rupture (5).

With this case series, we present two cases of extraperitoneal Type IV bladder rupture without pelvic fractures that were treated with observation and simple urinary catheter drainage.

### Case 1

A 50 years-old male was presented to our Trauma Center with a history of fall from about 7,5-meter height. His vital signs were stable and GCS was 14. He was managed upon ATLS guidelines. On physical examination, an abrasion at right temporal region of the head and tenderness on right hemithorax were present. Pelvic compression test was normal. Neither high-riding prostate nor blood at the urethral meatus was present. Upon pan-CT examination, no findings were present except a small epidural hematoma (< 0.5 cm), and fractures of the right 2<sup>nd</sup> and 7<sup>th</sup> ribs without hemo- or pneumothorax. No associated injuries were noted in CT imaging. His first urine revealed a macroscopic hematuria. To rule-out injury of the urethra or bladder a retrograde CT cystography with contrast was performed. Extraperitoneal extravasation of the contrast material was prominent behind the posterior wall of the bladder, which was classified as complex Type IV bladder rupture (Figure 1). He was admitted to

the Urology floor for observation. Surgical repair was not performed since urine passage was adequate without any complications.

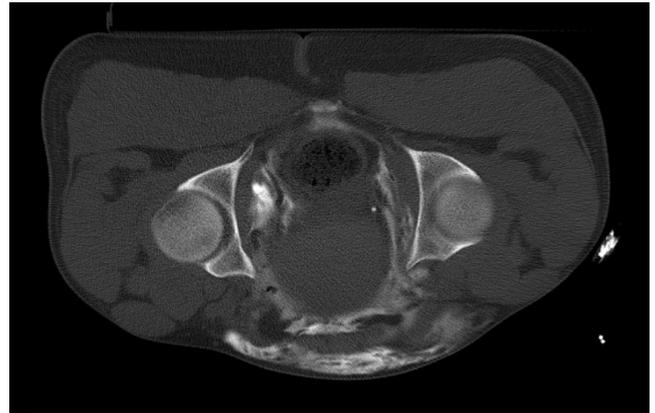


Figure 1. CT cystogram of Case 1

### Case 2

A 31 years-old male was brought to our Trauma Center by EMS after being stuck in a car accident. His vital signs were as follows: BP: 120/72 mmHg; HR: 130/min; RR: 24/min; Temp: 37.2 C; and sPO<sub>2</sub>: %97. Since GCS was 7 and neurological exam revealed a right gazed deviation, intubation with RSI algorithm was performed. On physical examination, multiple cranial and pelvic abrasions were present. Primary survey was inconclusive except blood in urethral meatus. Pan-CT examination was normal except a left subdural hematoma of 2-cm width. No pelvic fractures were noted. Retrograde CT cystography with contrast revealed prominent extraperitoneal extravasation around the neck of the bladder, which was classified as a simple Type IV bladder rupture (Figure 2). He was transferred to intensive care unit, and no surgical interventions were needed regarding urological complications at the follow-up.

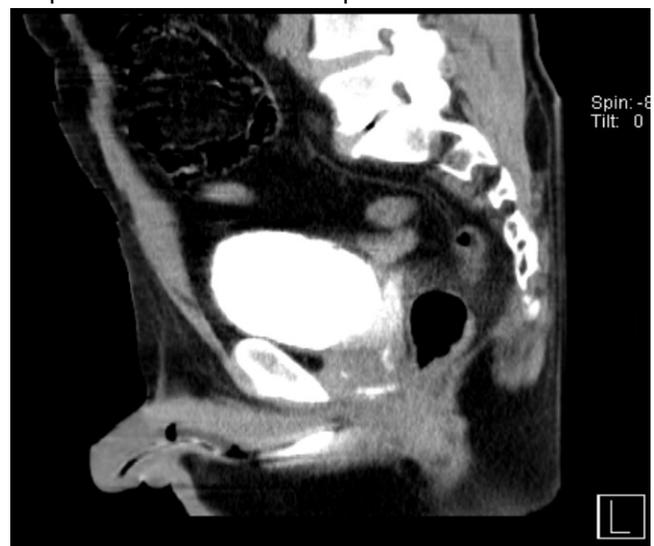


Figure 2. CT cystogram of Case 2

## Discussion

Bladder injury may occur after high-energy trauma, and traumatic bladder injuries are reported to associate with pelvic fractures (%83-%100) according to the literature (6). Epidural and subdural hematomas in above cases certify the high-energy of the impact these patients have been exposed. However, despite blunt pelvic trauma, no associated pelvic fractures were present in both of our extraperitoneal bladder rupture cases. Gross hematuria is a strong predictor of bladder, renal or associated intraabdominal injuries (7). Although, gross hematuria requires abdominal and pelvic CT to rule-out renal or associated intraabdominal injuries, routine CT of the abdomen with IV contrast alone (without retrograde cystography) is inadequate in detecting bladder rupture, even when the Foley catheter is clamped and bladder is distended. Gross hematuria, pelvic fluid, pelvic fractures (other than acetabular fractures) on CT should prompt conventional plain x-ray cystogram or retrograde CT cystography (4). CT cystography and conventional cystogram have similar accuracy rates according to previous reports and CT cystography has essentially replaced plain film cystography (8). Since patients in need of a bladder rupture evaluation will almost always need evaluation of the intra-abdominal and pelvic injuries, CT cystography should be performed as an integral part of the primary CT screening. This approach can alleviate the need for a separate conventional cystogram (9). The lack of need for post-drainage films and 3D features of CT are advantages over plain cystography.

Extraperitoneal bladder rupture may be treated conservatively with a urinary catheter (7). A control cystogram may be performed around the 10<sup>th</sup> day of the injury. According the literature, more than 85% of the bladders would be healed by this time (10). In both of our cases, extraperitoneal injuries were successfully treated with observation and urinary catheter drainage.

In conclusion, we think that retrograde CT cystography is an indispensable diagnostic tool for blunt pelvic trauma patients since bladder injuries may occur without pelvic fractures. Absence of meatal blood or pelvic fractures does not necessarily rule-out the presence of a bladder injury. After the exclusion of intraperitoneal bladder rupture, these cases may be treated with simple urinary catheter drainage.

## Conflict of Interest Statement

None declared

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