

## Case Report

# Isolated intraperitoneal rupture of the urinary bladder following blunt trauma abdomen

Praveen Kumar Arumugam\*

Department of General Surgery, Government Medical College and Hospital, Chandigarh, India

**Received:** 10 March 2017

**Accepted:** 01 April 2017

**\*Correspondence:**

Dr. Praveen Kumar Arumugam,

E-mail: [praveen.k2423@gmail.com](mailto:praveen.k2423@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

Bladder injuries occur due to blunt, penetrating or iatrogenic trauma. The ones that occur following blunt trauma are commonly associated with pelvic fractures and can range from contusions to bladder rupture. Extraperitoneal ruptures occur more commonly than intraperitoneal ruptures. Here we present an uncommon case of intraperitoneal bladder rupture without any bony or solid organ injury. Following a fall from his motorbike a 42-year-old gentleman presented to us with abdominal pain, inability to pass urine with features of peritonism. CT cystography showed contrast leak into the peritoneal cavity. No other injuries were detected. The patient was taken up for emergency laparotomy and a full thickness rent in the bladder dome, 7 cm in length was found which was repaired in two layers with a supra pubic catheter. The patient improved post operatively and was discharged on the 3rd post-operative day. Intraperitoneal bladder ruptures are possible even without pelvic fractures and can be missed on routine imaging of the abdomen. A high degree of suspicion with appropriate imaging (CT cystography) is necessary in all such cases to ensure timely diagnosis and intervention.

**Keywords:** Bladder injury, Blunt trauma abdomen, CT cystography, Intraperitoneal bladder rupture, Reverse auto dialysis

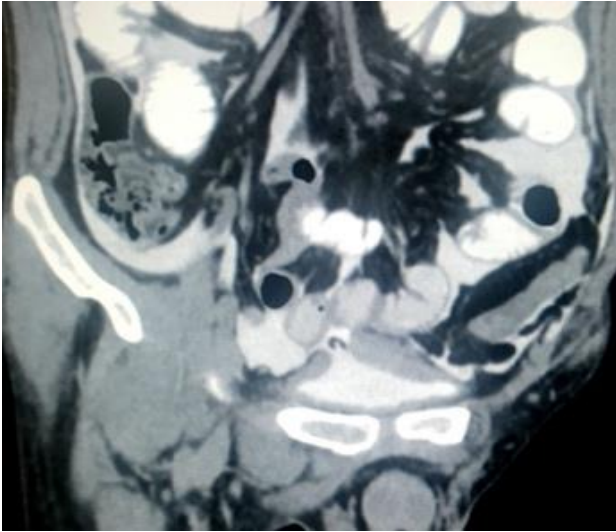
### INTRODUCTION

Bladder injuries account for 1.5% of patients with blunt trauma abdomen. The most common cause being road traffic accident (90%).<sup>1</sup> Bladder injuries are suspected when there is an associated pelvic fracture. Extra peritoneal ruptures are more common than intraperitoneal ruptures.<sup>2</sup> Rupture of the bladder occurs when the bladder is distended and intra-vesical pressure exceeds 300 cm of H<sub>2</sub>O.<sup>3</sup> A routine contrast enhanced CT is inaccurate in diagnosing bladder injury. CT cystography is the investigation of choice for diagnosing bladder injury.<sup>5</sup> Operative management is the treatment for intraperitoneal bladder rupture while the extraperitoneal injuries can be managed conservatively.<sup>7,8</sup>

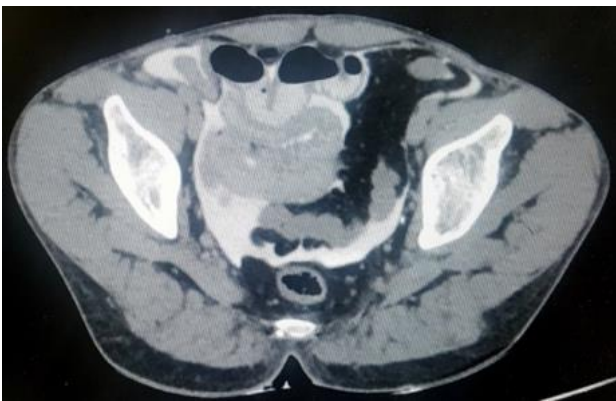
### CASE REPORT

A 42-year-old gentleman presented to the surgical emergency with complaints of lower abdominal pain for 12 hours associated with inability to urinate following a fall from his motorcycle 24 hours back. He did not have any external soft tissue injuries. On examination his vitals were stable, abdomen was distended with signs of peritonism, more so in the lower abdomen. The patient was catheterized and about 500 ml of blood tinged urine was drained which later cleared. Radiographs did not reveal any bony injury to the pelvis or free air under the diaphragm. Suspecting a bladder injury, a CT cystography was done which showed extravasation of contrast into peritoneal cavity confirming the diagnosis of

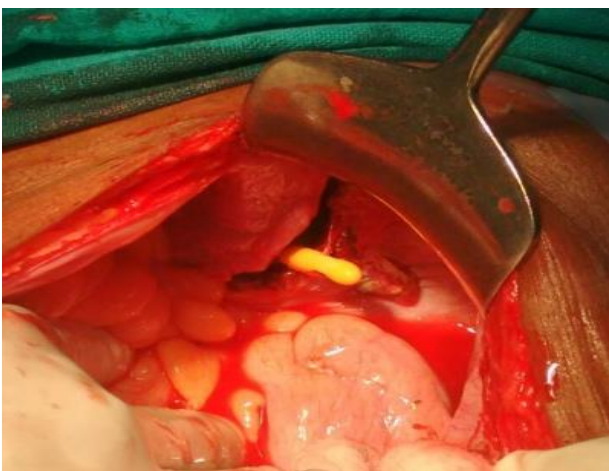
intraperitoneal bladder rupture (Figure 1A, 1B). There was no other organ injury or bone fracture.



**Figure 1A: CT cystogram showing rupture of the bladder dome.**



**Figure 1B: Extravasation of contrast intraperitoneally between bowel loops.**



**Figure 2. Intraoperative image showing rupture of bladder with Foley's catheter tip visible through the 7 cm rent.**

The patient was taken up for emergency laparotomy. Intra operatively, a 7cm rent in the dome of the urinary bladder was identified exposing the foleys catheter with urinary ascites (Figure 2). There was no other organ injury. The bladder was repaired with 2-0 vicryl in two layers with supra pubic catheterization.

The post-operative period was uneventful and the patient was discharged on the 3rd post-operative day with urethral and supra pubic catheters in situ. The urethral catheter was removed 4 days later followed by removal of the suprapubic catheter after 2 weeks.

## DISCUSSION

The most common etiology for bladder rupture is road traffic accident accounting for 90% of bladder injuries. In patients with blunt trauma abdomen, bladder injuries occur in only about 1.5%. Pelvic fractures are the most common associated injuries occurring in 80% of instances of bladder injury. An additional 80% of patients have bowel injury or intraperitoneal solid organ injury.<sup>1</sup> Extra peritoneal rupture (EPR) occurs in approximately 60-65% of cases, and intra peritoneal rupture (IPR) is seen in 25%.<sup>2</sup> An isolated intraperitoneal bladder rupture without any other injuries thereby is a rare occurrence. Other causes of bladder injury are falls and industrial trauma. The mechanism of intraperitoneal rupture is due to sudden increase in intra-vesical pressure when the bladder is full. This leads to rupture of the dome as its muscles fibers are widely separated and hence not well supported. This area has least resistance to sudden change in the intra-vesical pressure. A pressure above 300 cm of H<sub>2</sub>O causes the bladder to rupture.<sup>3</sup>

The most common feature of bladder rupture is hematuria, either microscopic or gross and is a good indicator bladder injury. IPR results in urine getting collected in the peritoneum resulting in signs of peritonism, making it difficult to differentiate it from other causes of peritonitis such as bowel or solid organ injury. Hematuria is absent in 15% of cases of IPR.<sup>3</sup> A delayed presentation is seen in some cases with non-passage of urine and lower abdominal pain. Intraperitoneal rupture of the bladder leads to urinary ascites which causes movement of solutes across a concentration gradient through the peritoneum. This leads to increase in the levels of serum urea, creatinine and potassium with decrease in serum sodium concentration. This phenomenon is called 'reverse autodialysis' and presents with 'pseudo renal failure'.<sup>4</sup>

The diagnosis of bladder rupture is made with a cystography either conventional or CT assisted. Contrast of about 300 - 400 ml is instilled into the bladder and radiographs done. Conventional cystography also requires post void films to avoid missing extra-vasation obscured by the intra-vesical contrast in the posterior area of the bladder. Extravasation of contrast between bowel loops indicate intraperitoneal rupture. Extraperitoneal

rupture manifests as extravasation of contrast which is flame shaped and commonly around the confines of the normal bladder.<sup>5</sup> When a CT cystography is done, post void images are not necessary and CT has an added advantage of assessing other organ injury as well. Shin et al, describes the sentinel clot sign in contrast enhanced CT of the pelvis, which shows a relatively highly attenuating and heterogeneous fluid (clot) that tends to accumulate near the site of injury of the bladder.<sup>6</sup> If an associated urethral injury is suspected a retrograde urethrogram should be done and if positive, bladder can be assessed with a suprapubic catheter.<sup>5</sup>

The treatment for intraperitoneal bladder rupture is operative as urinary leak into peritoneum can cause chemical peritonitis. An explorative laparotomy should be done with repair of the bladder rent. However, there have been case reports in literature in which post-surgical (for transurethral resection of bladder tumour) and blunt trauma abdomen have been managed conservatively.<sup>7</sup> Extraperitoneal bladder ruptures can be managed conservatively with adequate urinary drainage.<sup>8</sup>

Cystoscopy helps in localizing the area of injury and also assessing the injuries near bladder neck or ureteral orifice. This helps decide a laparoscopic approach for repair in cases in which the injury is at the dome.<sup>9</sup> A bladder injury can occur due to blunt trauma abdomen even in the absence of any other bony or soft tissue injury and a high clinical suspicion helps identify these injuries early.

#### ACKNOWLEDGEMENTS

Authors would like to thank their mentor and colleagues for their valuable inputs for writing this case report.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

#### REFERENCES

1. Gomez RG, Ceballos L, Coburn M. Consensus statement on bladder injuries. *BJU International*. 2004;94:27-32
2. Morey AF. Genital and lower urinary tract trauma. *AJ Wein, LR Kavoussi, AC Novick, AW Partin, CA Peters (Eds.), Campbell-Walsh urology (10th ed.)*, Saunders, Philadelphia, PA; 2011:2513.
3. Gupta S, Ram NK, Bansal N. Intraperitoneal rupture of urinary bladder: a diagnostic conundrum. *Open Access Scientific Reports*. 2013;2:660.
4. Aber A, Hyder SA, Arumuham V. An unusual case of spontaneous bladder perforation with associated autodialysis of the ensuing urinary ascites. *Case Reports in Medicine*. 2011:Article ID 145084.
5. Corriere JN, Sandler CM. Diagnosis and management of bladder injuries. *Urologic Clinics*. 1999;33(1):67-71.
6. Shin SS, Jeong YY, Chung TW. The sentinel clot sign: a useful CT finding for the evaluation of intraperitoneal bladder rupture following blunt trauma. *Korean J Radiol*. 2007;8(6):492-7.
7. Geng JH, Chang HC, Chang HC, Chang HC, Chung SD, Chen PH, et al. Nonoperative treatment for intraperitoneal bladder rupture. *Urological Sci*. June 2014;25(2):70-2.
8. Fu CY, Shih CH, Chang PY, Hsiao CH, Wang YC, Chen RJ. Conservative treatment of concomitant extraperitoneal bladder rupture and intra-bladder blood clot formation: Case report of application of ureteral catheterization. *Canadian Urol Associat J*. 2012;6(6):E256-258.
9. Marchand TD, Hugo Cuadra R, Ricchiuti DJ. Laparoscopic repair of a traumatic bladder rupture. *Society Laparoendoscop Surg*. 2012;16(1):155-8.

**Cite this article as:** Arumugam PK. Isolated intraperitoneal rupture of the urinary bladder following blunt trauma abdomen. *Int Surg J* 2017;4:1822-4.