



Contents lists available at ScienceDirect

## Urological Science

journal homepage: [www.urol-sci.com](http://www.urol-sci.com)

## Case report

## Nonoperative treatment for intraperitoneal bladder rupture



Jiun-Hung Geng<sup>a</sup>, Hsiao-Chun Chang<sup>b,\*</sup>, Shiu-Dong Chung<sup>b</sup>, Pei-Hwei Chen<sup>b</sup>, Bin Chiu<sup>b</sup>,  
Chung-You Tsai<sup>b</sup>, Ching-Hwa Yang<sup>b</sup>, Shun-Fa Hung<sup>b</sup>

<sup>a</sup> Department of Urology, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

<sup>b</sup> Department of Surgery, Far Eastern Memorial Hospital, Banciao, New Taipei City, Taiwan

## ARTICLE INFO

## Article history:

Received 18 September 2012

Received in revised form

13 November 2012

Accepted 27 May 2013

Available online 17 August 2013

## Keywords:

bladder rupture

intraperitoneal

nonoperative treatment

## ABSTRACT

Surgical repair is the standard therapy for intraperitoneal bladder rupture (IPR); however, there has been an increasing tendency toward conservative management in cases of genitourinary trauma. We herein present a case of IPR that was successfully managed conservatively.

Copyright © 2013, Taiwan Urological Association. Published by Elsevier Taiwan LLC.

Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/4.0/).

## 1. Introduction

Bladder rupture may be caused by external trauma, iatrogenic trauma, or spontaneous rupture. The probability of bladder injury varies according to the degree of bladder distention; therefore, a full bladder is more likely to become injured than an empty one. Surgical repair is the recommended treatment for intraperitoneal bladder rupture (IPR), whereas conservative management is the standard of care in most cases of extraperitoneal bladder rupture (EPR). However, there has been an increasing tendency toward conservative management in cases of genitourinary trauma.<sup>1</sup> We herein present a case of IPR that was successfully managed conservatively.

## 2. Case report

A 48-year-old male claimed that he had been hit by someone in the abdomen when he was drunk, and was sent to the local hospital in China 6 hours after this incident due to severe abdominal pain. Pain control was performed but in vain. He went to another hospital with complaints of severe abdominal pain, abdominal distention, and no urine output. A urethral catheter was inserted and his condition improved. The urethral catheter was removed 5 days later. However,

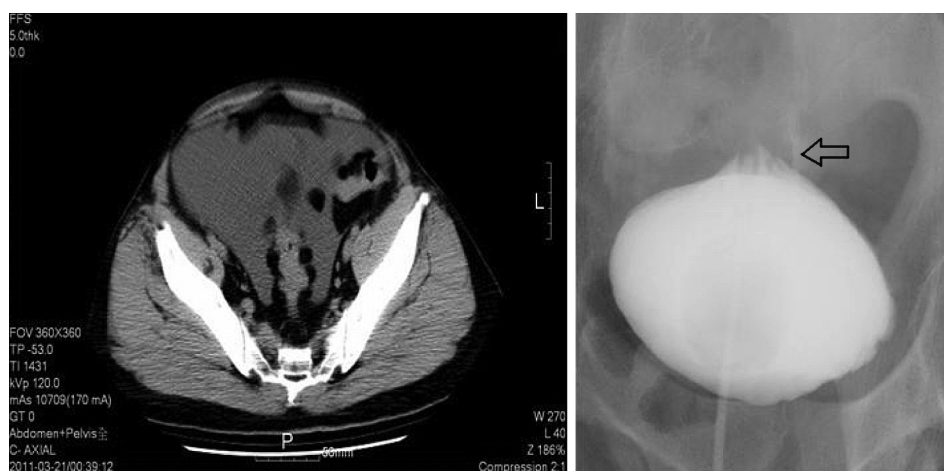
he still felt discomfort and a lot of pain killers were administered. He came back to Taiwan for help 2 weeks after the injury, and due to persistent abdominal pain, he was sent to our emergency department. An abdominal sonographic scan showed massive ascites, and therefore paracentesis was performed. An analysis of the ascites revealed elevated creatinine (Cr) level of up to 44 mg/dL, and results of a biochemical study confirmed azotemia (blood urea nitrogen: 66 mg/dL; Cr: 5.82 mg/dL). Cystography and computed tomography were performed and IPR was impressed and no other intraperitoneal organs injury was noted (Fig. 1). Two-way 22-Fr urethral catheter was inserted and 4000 mL of light yellow fluids were drained. Broad-spectrum antimicrobial agents were then administered. His condition improved and after 10 days of catheter *in situ*, cystography showed no extravasation on contrast and the catheter was removed. The follow-up examination showed no signs (ascites, abdominal pain, hematuria, pyuria) suggestive of any complications.

## 3. Discussion

The most common cause of bladder rupture is trauma (96%), which includes blunt, penetrating, and iatrogenic injuries. Other causes are spontaneous rupture (<1%) and intoxication (2.9%). EPR occurs in approximately 60–65% of cases, and IPR in 25%. Over 80% of patients with bladder rupture also have pelvic fracture, bowel injury, or intraperitoneal solid organ injury.<sup>2</sup> Nowadays, it is generally considered that EPR can mostly be managed with catheter drainage alone. By contrast, IPR has uniformly been repaired

\* Corresponding author. Department of Surgery, Far Eastern Memorial Hospital, Number 21, Section 2, Nanya South Road, Banciao District, New Taipei City 220, Taiwan.

E-mail address: [u9001090@hotmail.com](mailto:u9001090@hotmail.com) (H.-C. Chang).



**Fig. 1.** Cross section of contrast-enhanced computed tomography and cystography shows bladder rupture with massive ascites in the peritoneal space.

surgically as these ruptures are often much larger than suggested on cystogram, are unlikely to heal spontaneously, and may result in electrolyte abnormalities (hyperkalemia, hypernatremia, uremia, acidosis) and fatal peritonitis.

In the 1970s, Mulkey and Witherington,<sup>3</sup> Richardson and Leadbetter,<sup>4</sup> and Robards et al<sup>5</sup> published three papers (case reports), respectively, about the nonoperative management for IPR and concluded surgical repair might not be the only choice. These were the earliest trials of nonoperative management in IPR. In 2002, Pansadoro et al<sup>6</sup> reported the successful management of two cases of IPR following transurethral resection of bladder tumor using intraperitoneal and transurethral Foley catheters *in situ*. In 2003, a similar management of three cases of massive fluid extravasation into the peritoneal cavity after transurethral resection of bladder tumor was described.<sup>7</sup> In 2008, Basiri and Radfar<sup>8</sup> claimed that they had conservatively treated for the first time a case of spontaneous intraperitoneal rupture of the urinary bladder due to prostate cancer.

Moreover, Osman et al<sup>9</sup> in 2005 performed a study involving eight pediatric patients with post-traumatic IPR, in which the patients were grouped equally for open surgical repair and conservative treatments. All the children receiving conservative treatments demonstrated significant improvement in general condition within a few hours of the bladder and peritoneal drainage. Intraperitoneal tube drains were removed at 1–4 days. There were no postintervention complications and surgical treatment was never required. The mean indwelling catheter duration was  $11.8 \pm 2.6$  days.<sup>9</sup>

We reviewed case series of nonoperative treatment for IPR since 1974 in the English literature (Table 1).<sup>3,6–9</sup> Six reports with 12

patients were reported. The causes of IPR are complications of transurethral resection of bladder tumors, spontaneous rupture, and blunt trauma. The nonoperative treatment included only urethral catheter indwelling in six patients (50%), only percutaneous peritoneal drainage in one patient (8.3%), and urethral catheter indwelling with percutaneous peritoneal drainage in five patients (41.7%). The reason for combining urethral catheter with percutaneous peritoneal drainage is incomplete drainage by either of them and the hint for incomplete drainage is persistent discomforts after initial treatments. The duration of urethral catheter indwelling varies from 7 days to 5 weeks and the duration of percutaneous peritoneal drainage varies from 3 days to 10 days. Although there is still no standard conservative treatment for IPR, we believed that the duration of drainage is 7–14 days, and cystography is suggested prior to removing the catheter. In the 12 patients, no complication was noted after nonoperative treatments.

In our opinion, the most important part in treating IPR is absolutely complete drainage. This can be achieved by urethral catheter indwelling and/or percutaneous peritoneal drainage. Conservative management protects the patient from anesthetic risks and surgical complications. However, the indications for surgical repair are improper bladder drainage, deterioration of the general condition in the first few hours, prolonged urinary drainage through the peritoneal drain, lack of clinical or laboratory improvement, and concomitant injuries that need laparotomy.

Although our patient had post-traumatic IPR, he had no signs of generalized peritonitis and his condition improved with Foley catheter insertion alone. Hence, we decided not to perform surgery.

**Table 1**

Case series of nonoperative treatment for intraperitoneal bladder rupture.

References	Case no.	Age (y)	Cause	Antibiotics	Management	Complications
Mulkey and Witherington	1	69	TURBT	v	24-Fr Foley for 3 wk	No
Pansadoro et al	2	76	TURBT	v	20-Fr Foley for 14 d	No
Manikandan et al	3	65–81	TURBT	v	Percutaneous peritoneal drainage using 18-Fr Foley for 6 d Foley for 7–9 d and percutaneous peritoneal drainage using 8-Fr pigtail for 3–4 d	No
Basiri and Radfar	1	65	Spontaneous	v	Foley for 5 wk	No
Osman et al	4	1–13	Blunt trauma	v	Three patients: Foley for 9–14 d One patient: Percutaneous peritoneal drainage by 8-Fr pigtail for 10 d	No
Present study	1	48	Blunt trauma	v	22-Fr Foley for 10 d	No

TURBT = transurethral resection of bladder tumor; v = yes (Antibiotics were prescribed to the patients).

After 10 days of wide-bore urethral catheter indwelling, cystography revealed no extravasation. The patient did not have any complications after 6 months of follow-up.

In conclusion, we herein presented a case of post-traumatic intraperitoneal bladder injury, which was treated successfully by inserting a Foley catheter alone. Although the IPR treatment procedure has not changed much for more than 30 years, some case reports and series have suggested that conservative treatment in highly selective patients may have its place.

#### Conflicts of interest statement

The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

#### Source of Funding

None.

#### References

1. Santucci RA, Bartley JM. Urologic trauma guidelines: a 21st century update. *Nat Rev Urol* 2010;**7**:510–9.
2. Morey AF. Genital and lower urinary tract trauma. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. *Campbell-Walsh urology*. 10th ed. Philadelphia, PA: Saunders; 2011. p. 2513.
3. Mulkey Jr AP, Witherington R. Conservative management of vesical rupture. *Urology* 1974;**4**:426–30.
4. Richardson Jr JR, Leadbetter Jr GW. Non-operative treatment of the ruptured bladder. *J Urol* 1975;**114**:213–6.
5. Robards Jr VL, Haglund RV, Lubin EN, Leach JR. Treatment of rupture of the bladder. *J Urol* 1976;**116**:178–9.
6. Pansadoro A, Franco G, Laurenti C, Pansadoro V. Conservative treatment of intraperitoneal bladder perforation during transurethral resection of bladder tumor. *Urology* 2002;**60**:682–4.
7. Manikandan R, Lynch N, Grills RJ. Percutaneous peritoneal drainage for intraperitoneal bladder perforations during transurethral resection of bladder tumors. *J Endourol* 2003;**17**:945–7.
8. Basiri A, Radfar MH. Conservative management of early bladder rupture after postoperative radiotherapy for prostate cancer. *Urol J* 2008;**5**:269–71.
9. Osman Y, El-Tabey N, Mohsen T, El-Sherbiny M. Nonoperative treatment of isolated posttraumatic intraperitoneal bladder rupture in children—is it justified? *J Urol* 2005;**173**:955–7.