

Conservative treatment of concomitant extraperitoneal bladder rupture and intrabladder blood clot formation: Case report of application of ureteral catheterization

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Abstract

Most extraperitoneal bladder ruptures can be treated conservatively with catheter drainage only. However, in patients with concomitant intrabladder blood clot formation and extraperitoneal bladder rupture, surgery for blood clot evacuation and bladder repair are usually needed due to occlusion of the urinary catheter. In our patient, we used a ureteral catheter to bypass the clots in the bladder to provide adequate urinary drainage. This procedure serves as a valuable tool in the conservative treatment of extraperitoneal bladder injury.

Introduction

Most patients with blunt trauma resulting in extraperitoneal bladder rupture (EBR) can be managed conservatively with catheter drainage alone.¹⁻⁵ However, in patients with concomitant intrabladder blood clot formation and EBR, the urinary catheter is sometimes occluded by clots and thus fails to drain properly.^{3,4} In this case, the conservative treatment was abandoned and surgical repair was necessary. We present the successful application of ureteral catheterization in the conservative management of a patient with EBR and inadequate urinary drainage related to clot formation.

Case report

A 27-year-old man was brought to our major trauma referral centre because he was run over by a vehicle. On arrival, the patient was conscious, and there was no hemodynamic instability. Focused assessment of sonography for trauma (FAST) revealed no intra-abdominal free-fluid accumulation. However, intrabladder blood clot formation was noted (Fig. 1). A computed tomography scan and a cystogram showed

extraperitoneal bladder rupture and stable pelvic fracture with contrast extravasation (Fig. 2). After angioembolization for hemostasis, he underwent definitive treatment of bladder injury as per our established protocol (Fig. 3).

Massive intrabladder blood clots occluded the urinary catheter, which resulted in inadequate drainage. This conservative treatment failed and therefore surgery for blood clot evacuation and cystorrhaphy seemed necessary. However, instead of surgery, retrograde ureteral catheters, designed for retrograde pyelography, were inserted into each ureter via ureteral orifice cystoscopically on the second day the patient was at the hospital; thus bypassing the blood clots in the bladder and providing adequate urinary drainage. This procedure was performed under spinal anesthesia. There was no extravasation on the following cystogram after one week, and the bilateral ureteral catheters were removed uneventfully on the tenth day.

Discussion

Urinary bladder ruptures are typically caused by external trauma, and blunt trauma accounts for 67% to 86% of bladder ruptures.³ The surgical repair of bladder rupture, either via laparotomy or laparoscopy, is usually needed in patients with intraperitoneal bladder rupture.^{6,7} On the other hand, most EBRs can be treated conservatively with urinary catheter drainage only.¹⁻⁵ A cystogram is usually performed 10 days after the injury, and more than 85% of bladders are healed by this time.⁴

Conservative treatment of EBR can fail for various reasons, such as dysfunction of the catheter, concomitant vaginal/rectal injuries or pelvic ring fracture which require internal fixation.^{6,8} In addition, blood clot formation might result in urinary catheter occlusion and thus inadequate drainage. Surgery is typically required to treat these relatively rare patients to evacuate the blood clots and repair the ruptured bladder via cystoscopy or laparotomy; this surgery exposes

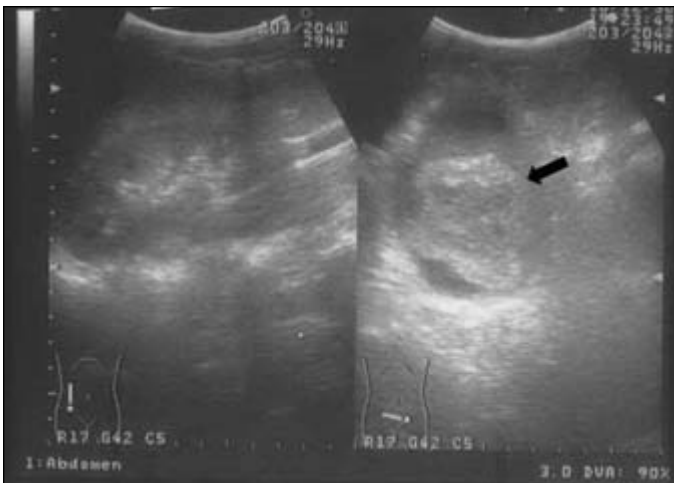


Fig. 1. Sonography revealed intrabladder blood clot formation (arrow).

patients to the risks of surgery and general anesthesia. As a result, clinicians face a dilemma in the management of patients with concomitant EBR and intrabladder blood clot formation.

Because intrabladder blood clot formation plays a key role in the failure of the conservative management of EBR, clots should be evacuated to maintain adequate drainage function of the urinary catheter. In the case of this patient, we initially tried to use cystoscopy to evacuate blood clots, in the hopes that the catheter would not be occluded, and the conservative treatment would be successful if the blood clots were cleared cystoscopically. During the cystoscopy procedure, it was necessary to keep the bladder distended for operating space by continuous urologic irrigation.⁹

In practice, the cystoscopic removal of blood clots is difficult because of persistent extravasation related to bladder rupture and continuous irrigation. In addition, the persistent extravasation causes intra-abdominal wall dissection and intractable pain.

In our case, conservative management of EBR failed due to dysfunction of the urinary catheter, which was occluded by blood clots. Therefore, we used a ureteral catheter to bypass the clots in the bladder. Urinary drainage could proceed via the ureteral catheter, which would not be occluded

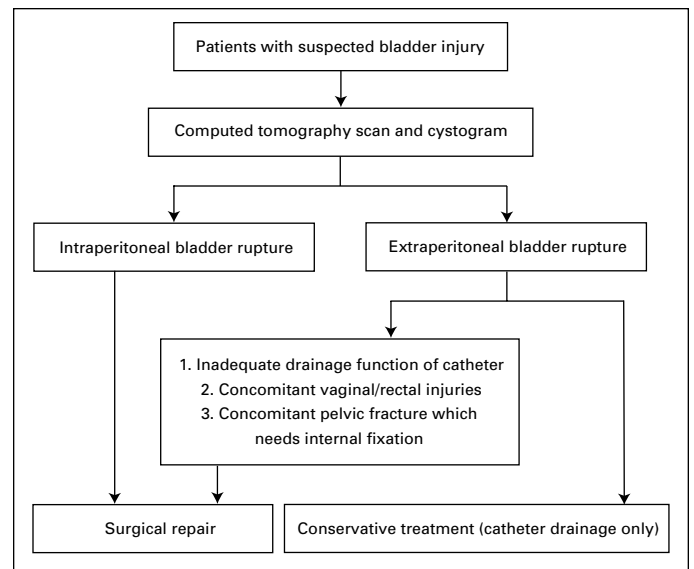


Fig. 3. Established protocol for definitive treatment of bladder injury.

by the intrabladder blood clots. Furthermore, surgical repair was avoided, and the patient's bladder rupture healed after one week. However, this procedure should be performed carefully due to potential difficulties of positioning patients with pelvic fractures to perform cystoscopy.

To our knowledge, there are very few reports about the application of ureteral catheterization in the conservative treatment of EBR.^{10,11} In dealing with EBR, percutaneous nephrostomy has been reported as an alternative method for urinary diversion.¹² However, compared with catheter drainage only, in our case, the percutaneous nephrostomy was too invasive.

Conclusion

A ureteral catheter is beneficial in the conservative management of patients with concomitant EBR and intrabladder blood clot formation.

Competing interests: None declared.

This paper has been peer-reviewed.

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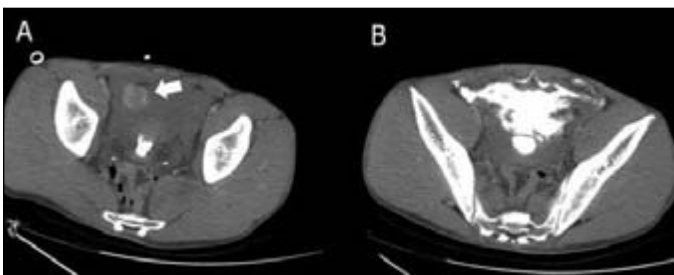


Fig. 2. An active hemorrhage was revealed on enhanced computed tomography due to contrast extravasation (arrow) (A). The cystogram revealed extraperitoneal bladder rupture (B).

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