

Complete endoscopic management of a retained bullet in the bladder

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Cite as: *Can Urol Assoc J* 2013;7:E143-E145. <http://dx.doi.org/10.5489/cuaj.258>

Abstract

A 25-year-old male gunshot victim presented at our institution with gross hematuria following Foley catheter insertion. Computed tomography and cystogram did not show a bladder perforation, but were notable for a left ischial fracture and the presence of a bullet within the bladder. After failed attempts at retrieving the bullet with a resectoscope and loop, as well as a cystoscope and stone crusher, a 26 French nephroscope was inserted transurethraly, and the bullet was successfully engaged and removed using a Perc NCircle (Cook Medical, Bloomington, IN) grasper. The extraperitoneal injury was managed conservatively with catheter drainage. To our knowledge, this represents the first case of successful transurethral management of a retained intravesical bullet. Such an approach may benefit patients with retained intravesical bullets or other challenging intravesical foreign bodies and may be helpful in select circumstances to spare patients from more extensive surgeries.

Case report

We present a 25-year-old male gunshot victim with gross hematuria noted after Foley catheter insertion. He had a history of urethral disruption, also from a gunshot wound, requiring open cystotomy and antegrade catheter insertion. A computed tomography (CT) and cystogram did not show a bladder perforation, but were notable for a left ischial fracture and the presence of a bullet within the bladder (Fig. 1).

Proctoscopy was negative for a rectal injury, and cystourethroscopy demonstrated a left anterolateral bladder wall defect, where the bullet had entered the bladder, as well as an intravesical bullet (Fig. 2, part A). After failed attempts at retrieving the bullet with a resectoscope and loop, as well as a cystoscope and stone crusher, a 26 French nephroscope was inserted transurethraly, and the bullet was successfully engaged and removed using a Perc NCircle (Cook Medical, Bloomington, IN) grasper (Fig. 2, part B). The extraperitoneal

injury was managed conservatively with catheter drainage (Fig. 3).

Discussion

Injuries to the genitourinary system among civilians sustaining gunshot wounds are uncommon, occurring in up to 10.5% of cases.¹ The bladder is the third most commonly injured urogenital organ overall in the trauma setting (13% to 19%), behind the kidney (17% to 55%) and scrotum (21% to 26%).¹⁻⁵ In most cases of genitourinary bullet injury, injury to non-genitourinary organs concomitantly occurs (85% to 92%), and the possibility of minimally invasive management is often precluded. Operative intervention for bladder injury due to gunshot injury typically includes laparotomy and primary repair, especially when the injury is intraperitoneal.

Successful conservative management of gunshot-related extraperitoneal bladder injury with Foley catheter drainage has been described in multiple prospective and retrospective studies,⁶ though not in the specific setting of a retained intravesical bullet. Reports of retained intravesical bullets are rare, and the literature generally does not distinguish management of this particular entity as separate from management of bladder injury due to gunshot in general. This situation is unique in that an exploratory procedure may not truly be necessary if concomitant organ injury is absent and the perforation is extraperitoneal, but conservative management with catheter drainage alone does not address the retained bullet.

Management of the retained bullet can vary with the nature of injury, circumstances surrounding the injury, and the means available to the operative surgeon. Specifically, spontaneous passage of intravesical bullets per urethra upon voiding has been reported, usually in the setting of an unrecognized bladder injury.⁷⁻¹⁰ In other cases, however, a retained intravesical bullet has led to urinary retention.¹¹ Also, calculus formation due to heterogeneous enucleation and infection can occur if removal is delayed.¹² As such, it is recommended that an intravesical bullet be actively removed. Although transurethral unroofing with laparoscopic-

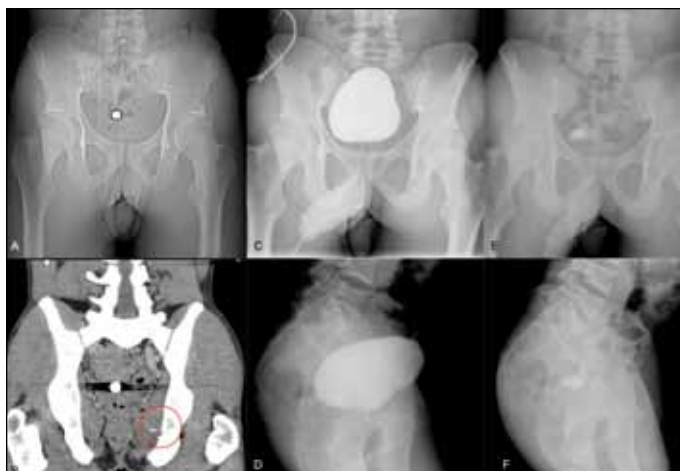


Fig. 1. (A) Scout film on computed tomography demonstrates a bullet overlying the bladder area. (B) The bullet entered the left buttocks, ricocheted off of the left ischium, causing an ischial fracture (red circle, B), and entered the bladder through its anterior wall. The filling phase of cystogram (C, D) demonstrated no bladder wall defect and obscured the bullet, which was later demonstrated on post-drainage films (E, F).

ic removal has previously been described,¹³ to our knowledge, the current article represents the first description of exclusive transurethral retrieval of a bullet.

The successful use of a transurethral nephroscope for intravesical object retrieval has been previously described, most often to help in treating large bladder stones. Successful retrieval is facilitated by the ability to remove bigger stone fragments through the larger nephroscope sheath. Moreover, use of the nephroscope allows for the introduction of tools with firm gripping capabilities that are too large to be used with a standard 21 or 22 French cystoscope (i.e., the Perc NCircle device). This is particularly useful when cystoscope-compatible graspers are unsuccessful, as was the case in this patient. Relative to cystoscopic¹⁴ and percutaneous¹⁵ treatment of bladder stones, prospective trials have shown that the use of a nephroscope has been associated with shorter operative times, avoidance of intraoperative complications

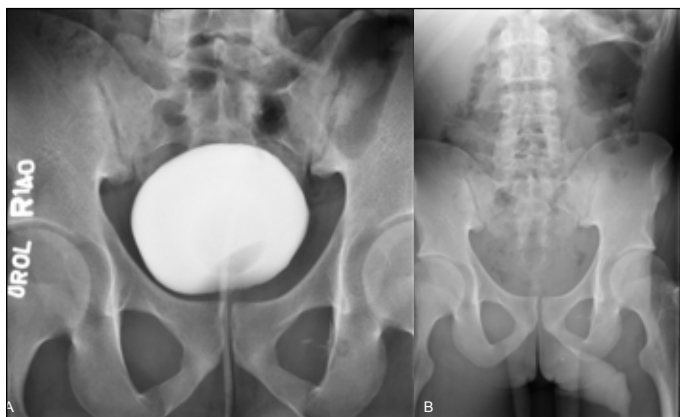


Fig. 3. (A, B) The patient's extraperitoneal bladder injury was successfully managed with catheter drainage, demonstrated by a negative cystogram performed on postoperative day 13, at which point the catheter was removed.



Fig. 2. (A) Cystoscopic image of the intravesical bullet. (B) The bullet was successfully retrieved using a Perc NCircle (Cook Medical, Bloomington, IN) grasper.

and avoidance of postoperative de novo stricture development (while stricture recurrence in those with previous known stricture disease has been described, it occurs with no greater frequency than in those undergoing analogous procedures with the use of a cystoscope).¹⁴ In addition to bladder calculi, the nephroscope has also been used in the retrieval of self-placed intravesical foreign bodies, including a thermometer¹⁶ and screws.¹⁷

One limitation of complete transurethral endoscopic management of an intravesical bullet is the inability to inspect for simultaneous ureteral injury, which is diagnosed in up to 9% of cases during open surgical exploration for cystorrhaphy.¹⁸ Therefore, complete endoscopic management would presumably be appropriate for patients with a low index of suspicion for ureteral injury, while retrograde pyelogram may be a useful adjunct in select cases.

Conclusion

We describe the first case of successful transurethral management of a retained intravesical bullet, which was performed with the use of a nephroscope. Such an approach may benefit patients with retained intravesical bullets or other challenging intravesical foreign bodies and may be helpful in select circumstances to spare patients from more extensive surgeries.

Competing interests: None declared.

This paper has been peer-reviewed.

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