

CASE REPORT

An Unusual Iatrogenic Injury of Urinary Bladder Following Foley's Catheterization

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ABSTRACT

Urinary bladder perforation is most commonly observed after pelvic trauma. It can also be a result of iatrogenic injury during various surgical procedures. Very rarely, diseased bladder can spontaneously rupture. Traumatic bladder rupture is a serious event with mortality rate approaching 50%. Urinary bladder diverticulae are present of the bladder wall and are a consequence of bladder outflow obstruction, for example in prostatic enlargement. Foley's catheterization is most commonly associated commonly with urethral trauma. We presented a emphasis is made unique case of perforation of urinary bladder diverticulum after Foley's catheterization. To the best of our knowledge, such a case has never been reported before in the medical literature. An emphasis was made on the fact that, physicians should keep in mind the differential of perforated urinary bladder while attending a patient with abdominal pain because the signs and symptoms are very non specific urinary bladder while attending a patient with abdominal pain just because its signs and symptoms are very non-specific. In addition, missing a perforated urinary bladder is easy and can result in significant morbidity and mortality.

Keywords: Bladder Diverticulum; Urinary Catheters; Perforation.

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INTRODUCTION

Urinary bladder in adults is well protected within the pelvis¹. Rupture of urinary bladder is most commonly the result of pelvic and/or abdominal trauma, with about 1.6% of all blunt abdominal traumas resulting in bladder rupture as per American Urological Association (AUA). Intraperitoneal ruptures are associated with significant morbidity and mortality¹⁻³. Bladder trauma can also be a result of iatrogenic injuries during gynecological, colorectal, and urological procedures¹. In the following case report, we presented an unusual case of an elderly male who came with an intraperitoneal bladder diverticulum rupture due to Foley's catheter placement.

CASE PRESENTATION

An 82-years-old male, hypothyroid (last thyroid stimulating hormone (TSH): 19.4 μ IU/ml), history of

cerebrovascular accident (CVA) in December 2019, presented in the Emergency Department of Dr. Ziauddin Hospital, with the complaints of lower abdominal pain for the past 3 days and absolute constipation for one day.

In the past, he had been suffering from lower urinary tract symptoms (LUTS) due to enlarged prostate which got aggravated after he suffered from CVA. Ultrasound done during that period had showed significant post void residual volume, so he was advised by his urologist to get catheterized. Three days prior to his presentation in emergency room (ER), a private nurse changed his urinary catheter at home and silicon Foley's was passed.

Upon examination in ER, he was hemodynamically stable. Abdominal examination revealed an appendectomy scar in right iliac fossa. Abdomen was distended; there was generalized tenderness but was maximum in the lower abdomen with

guarding in that region. Gut sounds were sluggish and examination of hernial orifices revealed a reducible inguinal hernia on the right side.

Digital rectal examination was also unremarkable. His blood workup was sent which showed a white cell count of $14.7 \times 10^9/L$ with 87% neutrophils and a C-reactive protein (CRP) of 14.3. TSH repeated at

our setup was $12.6 \mu U/ml$ (normal range: 0.5 - 8.9 $\mu U/ml$). Ultrasound Abdomen showed thick walled urinary bladder and a well-defined anechoic area along the superior wall of urinary bladder with Foley's bulb in it measuring 3.4x3.2cms, representing bladder diverticulum. An abdominal X-ray supine (Figure 1) was ordered which showed an unusually high tip of Foley's catheter.



Figure 1: Abdominal x-ray (supine): the unusually high tip of Foley's catheter raised the suspicion of a ruptured urinary bladder.

Based on history and examination, a differential diagnosis of intestinal obstruction and urinary bladder perforation was made and computed tomography (CT) scan whole abdomen with intravenous (IV) and oral contrast was done. During scan, patient's bladder was filled retrograde with contrast. CT scan showed a diffusely thick-walled urinary bladder with trabeculations and diverticulae arising from right and left lateral wall.

There was significant perivesical fat stranding. Upon filling the bladder retrograde, a focal breach at the region of dome of urinary bladder was appreciated (Figure 2a), with spillage of contrast into the intraperitoneal location outlining the small bowel loops (Figure 2b) in mid abdomen. Contrast was also seen in bilateral paracolic gutter and perivesical region. However, there was no evidence of bowel obstruction.



Figure 2A: CT cystogram coronal view. Upper notched arrow: focal breach in the dome of urinary bladder; lower arrow: diverticulum in the dome of bladder with focal breach. **2B:** CT scan whole abdomen with IV and oral contrast axial view. Arrows show the intraperitoneal spillage of contrast outlining the small bowel loops.

An urgent urological consult was generated and patient was taken to the operation theatre for exploration. Per-operatively, perforation was found in the diverticulum present at the superior wall of urinary bladder. Therefore, a diverticulectomy was done and bladder was repaired. Foley's and suprapubic catheter were left within the bladder during surgery. Post-operatively, patient suffered from prolonged ileus but overall recovery was otherwise unremarkable.

DISCUSSION

Spontaneous perforation of urinary bladder, rare but potentially fatal, is usually a consequence of long-standing bladder disease^{2,4}. Some of the possible etiologies include gonorrhoeal infection, radiation therapy, diabetes mellitus, neurogenic bladder, bladder diverticulae and indwelling Foley's catheter⁴. Pathological bladder wall weakness and/or increased pressure within the bladder have been recognized as risk factors of spontaneous bladder rupture⁵. Urinary bladder diverticulum is defined as outpouching of urothelial lining of bladder mucosa that projects through the detrusor muscle and represent a significant point of weakness^{5,6}. Diverticulae are a result of chronic urinary obstruction. Rupture of bladder diverticulum is an uncommon occurrence⁵. This can be a result of trauma and can be intraperitoneal or extraperitoneal.

Clinically, ruptured urinary bladder presents with pelvic pain, suprapubic tenderness, hematuria (gross or microscopic), oliguria, abdominal guard-

ing, and rigidity. Since these signs and symptoms are very nonspecific, diagnosing a ruptured urinary bladder can be difficult initially which often results in a considerable delay in reaching the diagnosis or even misdiagnosis^{2,3}. As also seen in our case report, the signs and symptoms with which our patient presented pointed towards small bowel obstruction, rather than a perforated urinary bladder. However, the history of a recent catheter changes after which the symptoms started and unusually high tip of Foley's catheter observed on abdominal X-ray raised the suspicion of bladder rupture. Unrecognized cases can become complicated, leading to peritonitis, sepsis, and renal failure¹.

It is also of importance that intraperitoneal ruptures are distinguished from extraperitoneal ones. Almost 60% of reported bladder injuries are extraperitoneal, 30% are intraperitoneal while the remaining 10% are both intra and extraperitoneal¹. Extraperitoneal rupture is more common and is associated with pelvic fractures most of the times. In this case, contrast given during scan will extravasate the bladder base and remain confined to the perivesical area¹.

Intraperitoneal rupture is the less common type with dome of bladder being the most frequent site¹. Urine drains into the abdominal cavity and early diagnosis is often difficult due to variable clinical presentation. Spontaneous and iatrogenic ruptures are mostly intraperitoneal¹. Contrast extravasates into the paracolic gutters and around bowel loops⁷. Previously, retrograde cystography was the standard investigation in evaluating

bladder injury. This is, however, time consuming and may produce false negative results if insufficient amount of contrast is filled into the bladder. In the current practice now, CT cystography or contrast enhanced CT with delayed images has a superior role in making the diagnosis of suspected bladder rupture with sensitivity and specificity both approaching 100%².

Intraperitoneal rupture of urinary bladder is a surgical emergency and without early intervention, prognosis is guarded². As per the recommended guidelines of AUA, intraperitoneal ruptures require surgical intervention. During surgery, it is important to examine the entire bladder rather than just repairing the obvious injury. A Foley's catheter is routinely left within the bladder following repair¹. Whereas for extraperitoneal ruptures; Foley's catheter drainage is now the standard treatment strategy⁵. Extraperitoneal ruptures not responding to conservative management four weeks after the injury will require surgical intervention¹. As per the statistics of Centers for Disease Control and Prevention (CDC), it is estimated that 12-25% of all hospitalized patients receive a urinary catheter during their stay. Therefore, it is important for clinicians to be aware of this rare complication³.

CONCLUSION

We had presented a unique case report of intraperitoneal bladder perforation following catheterization. It is of emphasis that since bladder injury can be easily missed, it should always be thought about in a patient presenting with abdominal pain and signs of peritonitis after catheterization as a missed diagnosis can be fatal for the patient and can result in serious morbidity and mortality.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

RS was the primary author. AH and YM were the primary surgeons and proof readers. YM was also served as a proof reader for the case report. MDK and FT were the supporting authors and helped in case report writing.

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