



Trauma and reconstruction

Bladder perforation: A rare complication of retention management

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ABSTRACT

A healthy 25 year old woman presented with acute urinary retention following alcohol ingestion. A 14 french foley catheter drained over 1 L of haematuria immediately. Due to worsening and persistent abdominal pain, CT and ultrasound imaging was performed, demonstrating only a small amount of free fluid. Diagnostic laparoscopy revealed an intraperitoneal bladder perforation with the foley catheter visible. The bladder defect was repaired and she recovered well. This is a rare case of likely iatrogenic bladder perforation from simple catheterisation without predisposing comorbidities, highlighting the importance of correct technique and awareness of potential complications.

Introduction

Bladder rupture is most commonly the result of blunt force abdominal and/or pelvic trauma and is also known to occur with iatrogenic injury such as that related to surgical intervention. However, it is also a very rare complication of indwelling catheter placement. Up to 25% of patients admitted to hospital are catheterised at least once during the course of their stay.¹ As an extremely common procedure, potential complications should be considered if the clinical course is poor.

Case report

A 25 year old woman presented to Emergency with suprapubic pain, inability to micturate for approximately 12 hours, nausea and vomiting. The night prior she had ingested 9–10 standard drinks of alcohol, but denied other substance use. Her only medical history was an open appendectomy; she was otherwise well with no regular medications.

A 14 french foley indwelling catheter (IDC) was placed in Emergency for urinary retention, draining 1000ml of moderately blood-stained urine with sediment. However after catheterisation the patient reported worse and persistent lower abdominal pain prompting a non-contrast computed tomography (CT) scan. This confirmed the position of the IDC within a decompressed bladder, associated intravesical locules of gas presumed to be related to instrumentation and no other significant intra-abdominal findings, including no associated free fluid (Fig. 1a).

She had physiologically appropriate volumes of urine output

overnight with haematuria settling to light rosé as recorded in physical documentation by nursing staff. The patient had persistent opioid analgesia requirements for lower abdominal pain, however remained haemodynamically stable and afebrile. She failed a trial of void the following morning, with painful retention of 600mL indicating a sensate bladder. A 12 french IDC was re-inserted and the patient underwent a transvaginal pelvic ultrasound. This showed 90ml of pelvic free fluid and the IDC once again was demonstrated to be within the bladder.

To investigate the persistent abdominal pain, a diagnostic laparoscopy was performed. An intraperitoneal bladder perforation was immediately evident with the catheter tip visualised within the peritoneal cavity through an approximately two-centimetre defect (Fig. 1b). Free fluid and extensive liver adhesions were evident (Fig. 1c). The bladder defect was repaired in two layers with deep muscularis mucosa sutures re-enforced with an adventitial continuous suture. The repair was found to be watertight on instillation of normal saline and leak testing.

The patient had an uneventful post-operative course. Intra-operative microbial swabs and all sexually transmitted infection screens were negative and there was no growth on urine culture. A fluoroscopic cystogram was performed two weeks post repair which confirmed bladder integrity without extravascular contrast and the patient successfully completed a trial of void. Follow up was performed by way of a flexible cystoscopy under local anaesthetic. This confirmed a well healed bladder without mucosal defect or underlying pathology seen.

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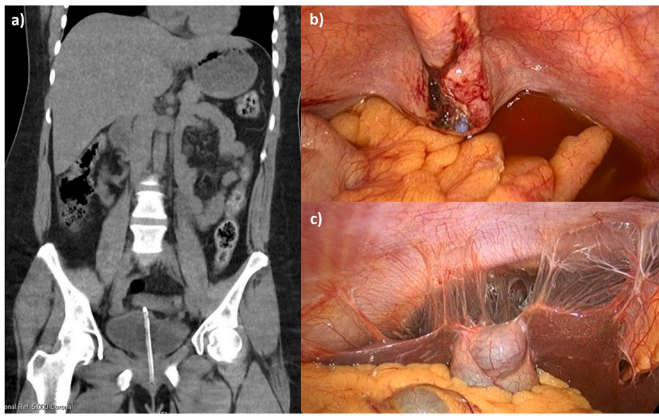


Fig. 1. a) CT non-contrast coronal view, b) Laparoscopic view of intraperitoneal bladder perforation with tip of foley catheter on view and free fluid evident in the pelvis, c) Laparoscopic view of liver adhesions.

Discussion

If not recognised promptly, bladder perforation can be a life-threatening condition. Intraperitoneal bladder rupture typically is characterised by abdominal pain with guarding due to peritonitis, although this can be non-specific and vague.² The most frequent sign of bladder rupture in the traumatic setting is macroscopic haematuria.³

No other cases of acute catheterisation-related bladder rupture in healthy young people were identified on review of the literature, with all other cases involving patients over the age of 37 (the vast majority over 65) and with multiple comorbidities, commonly bladder or prostate pathology and long-term in-dwelling catheters.

It is likely our patient experienced alcohol-induced diuresis and possible bladder dysfunction resulting in urinary retention. Her catheterisation may have resulted in perforation from the focal force of the catheter tip in an overdistended therefore thin-walled bladder. The bladder wall thickness reduces as the bladder distends (an empty bladder wall thickness estimated at <5mm and distended <3mm).³ We postulate that catheterisation resulted in perforation for a number of reasons; there was new haematuria, immediate and ongoing lower abdominal pain (not relieved by catheterisation) and the risk factors for

perforation with a distended bladder were highest. The lack of free fluid may be due to the catheter tip at the dome occluding the perforation, with the catheter draining the urine within the bladder. Generally, the sensitivity of CT detecting bladder trauma is 83%, and may be misinterpreted in the context of minimal or no apparent free fluid.⁴ Alternatively, a spontaneous bladder rupture is possible and has been reported in the literature associated with alcohol-related diuresis, however this patient had no peritonitis on arrival or significant free fluid on initial imaging (which would be expected following intraperitoneal rupture with high intravesical pressure) and her pain worsened after catheterisation.

The liver adhesions were thought to be inflammatory secondary to the perforation and free fluid. No underlying infection or predisposing comorbidities were identified.

In this case diagnosis and repair was completed laparoscopically, which is now accepted practice for repair in the stable patient with intraperitoneal bladder rupture even in the setting of blunt-force trauma.⁴

In conclusion, bladder perforation secondary to catheter placement is rare but should be considered in persistent pain post catheterisation. This case has emphasised to our service the importance of having a high threshold of suspicion for bladder perforation and education regarding catheterisation technique to minimise risk of bladder injury or malplacement.

Declaration of competing interest

All authors declare that they have no conflict of interest or additional sources of support or funding to declare. Patient consent was obtained for publication.

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