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Case Report

Bladder Perforation from Foley Catheter Insertion in a Middle-Aged Man in the Emergency Department

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Abstract

Iatrogenic bladder perforation secondary to a Foley catheter insertion is extremely rare, and the incidence is difficult to define. Bladder rupture in general is a serious, rare complication that can lead to high morbidity and mortality if not recognized and managed promptly. In an attempt to summarize information for this case report, risk factors for bladder injury in a newly placed Foley catheter were investigated and found to be variable. In this discussion, we present a 48-year-old male who was diagnosed with a bladder perforation after a Foley catheter insertion in the emergency department for management of urinary retention. After insertion, there was a prompt return of 1000 mL of bloody urine. Computed tomography was performed, showing the tip of the catheter penetrating through the dome of the bladder. X-ray cystogram confirmed the diagnosis. The patient subsequently underwent repair of the perforation. The postoperative course was uncomplicated, and the patient recovered well. Bladder perforations can be associated with high morbidity and mortality. Prompt recognition and treatment are imperative for improved patient outcomes. This case report is presented with the goal of describing the incidence, etiology, and management of an acute iatrogenic bladder injury with peritonitis.

Keywords: Bladder Perforation, Iatrogenic, Diagnosis, Management

Introduction

Bladder rupture or perforation is a rare condition with serious complications. The bladder is anatomically protected by the pelvis; therefore, many bladder injuries are a consequence of severe bladder wall weakness or considerable blunt force trauma to the abdomen [1]. Perforations are categorized as either extra-peritoneal (EP) or intraperitoneal (IP) [1]. EP rupture releases urine into the prevesical (Space of Retzius) and perivesical spaces, whereas IP rupture releases urine into the intraperitoneal cavity [1]. The release of contaminated fluid to these abdominal cavities leads to the development of serious infections such as peritonitis and sepsis, and it is associated with up to 22-50% mortality if not detected and repaired [1,2]. EP ruptures

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Table 1. Significant Laboratory Values for Patient in the emergency department

	Patient Values	Reference Ranges	Urine Analysis			
WBC (x10e3/mcL)	8.6	4.0-10.6	**Color**	Red	**Ketones**	1+
Hemoglobin (gm/dL)	14.9	14.5-17.7	**Clarity**	Turbid	**Urobilin**	2.0
Hematocrit (%)	43	42-53	**Specific Gravity**	1.015	**Bilirubin**	3+
Creatinine (mg/dL)	2.0	0.6-1.3	**pH**	8.5	**Blood**	3+
Sodium (mmol/L)	127	136-145	**Leuk Est**	3+	**Ur WBC**	>50
Lactic Acid (mmol/L)	2.1	0.4-2.0	**Nitrate**	Negative	**Ur RBC**	>20
Ethanol (mg/dL)	215	<=3	**Protein**	3+	**Ur Bacteria**	None seen
Alcohol (%)	0.19	Critical High >0.34	**Glucose**	Trace	**Ur Squam. Epith.**	None seen

make up a majority of incidents, especially as a consequence of high-impact injury to the abdomen. IP ruptures are rare but are usually seen in non-traumatic and chronic conditions such as malignancy, chronic cystitis, and chronic substance abuse that cause irritation and weakening of the bladder wall [5]. Iatrogenic bladder perforations are even more rare, with an incidence that is not well defined. Symptoms of perforation are very nonspecific and can often go unnoticed. Urinary catheters are placed in about 12-25% of hospitalized patients [2]. Therefore, placing bladder perforation high on the differential is essential, especially with a high mortality rate. Here we present a case of iatrogenic intraperitoneal bladder perforation in a middle-aged man following a Foley catheter insertion.

Case Report

Our patient is a 48-year-old male who presented to a local emergency department complaining of a one-day history of mid-epigastric pain. He reported not feeling well for two weeks prior and mentioned a fall the day prior. The patient denied any injury or loss of consciousness from the fall. The patient reported urinary retention, not having urinated since the day prior. Pertinent medical history includes no chronic medical issues, no medications, and no previous surgeries. He is self-employed as a landscaper. Patient admits to drinking alcohol daily, including eight beers the day prior, he denies tobacco or illicit drugs. The patient's initial ethanol level was 215 mg/dL. Initial physical exam by the emergency department physician reported mild epigastric tenderness, soft, nondistended abdomen, no masses or pulsations, normal bowel sounds, and negative rebound tenderness. Due to urinary retention, emergency department staff placed a Foley

catheter. He had a prompt return of bloody urine with an initial output of 1000 mL. The patient had some initial relief but continued to have abdominal pain and bloody output from the Foley. Computed tomography (CT) of his abdomen and pelvis was obtained for further evaluation. Findings included a moderate amount of free intra-abdominal fluid, a single bubble of free air in the mid-abdomen anteriorly, and mild bladder wall thickening, particularly along the dome and the bladder. The bladder contained a Foley catheter and a small amount of air, and the Foley catheter tip appeared to have penetrated the bladder dome. Surgery was consulted due to these findings. An X-ray cystogram was conducted to confirm the diagnosis of bladder perforation, showing contrast extravasation into the abdominal cavity.

The patient was taken to the operating room and underwent a diagnostic laparoscopy, converted to an exploratory laparotomy, washout of urine, and repair of a 5 cm laceration at the dome of the bladder. A JP drain was left in the repaired area, and a Foley catheter was left indwelling in the bladder. The patient's postoperative hospital course was uncomplicated, and he was subsequently discharged on postoperative day 3 with the JP drain and Foley catheter. The patient was evaluated in the clinic for follow-up two weeks later and underwent a cystogram, showing the bladder was intact. The Foley and the JP drain were removed, and no further issues were reported.

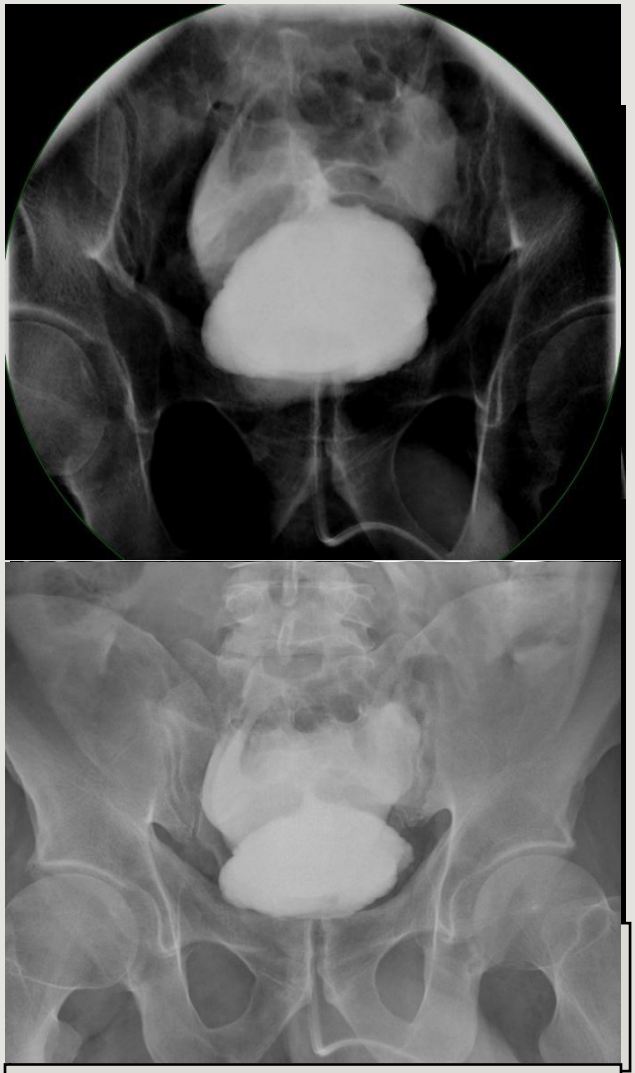

Figure 2. XR cystogram prior to surgery: contrast extravasation into abdominal cavity

Discussion

Etiology

Bladder rupture can be caused by traumatic or spontaneous etiologies [5]. Traumatic bladder rupture is due to blunt abdominal trauma, often at the weaker points of the bladder, such as the dome, seen from a rise in intravesicular pressure [1]. Bladder rupture is classified as either EP or IP and can be associated with a high morbidity and mortality rate [1,2,5]. EP bladder ruptures are more common than IP bladder ruptures, occurring from forceful impact to the anterior bladder. Non-traumatic causes of bladder injury include malignancy, chronic cystitis or pyelonephritis, repeated catheterizations, outflow obstruction/stones, substance abuse, and iatrogenic hypospadias [4].

Incidence

The majority of bladder injuries are trauma-

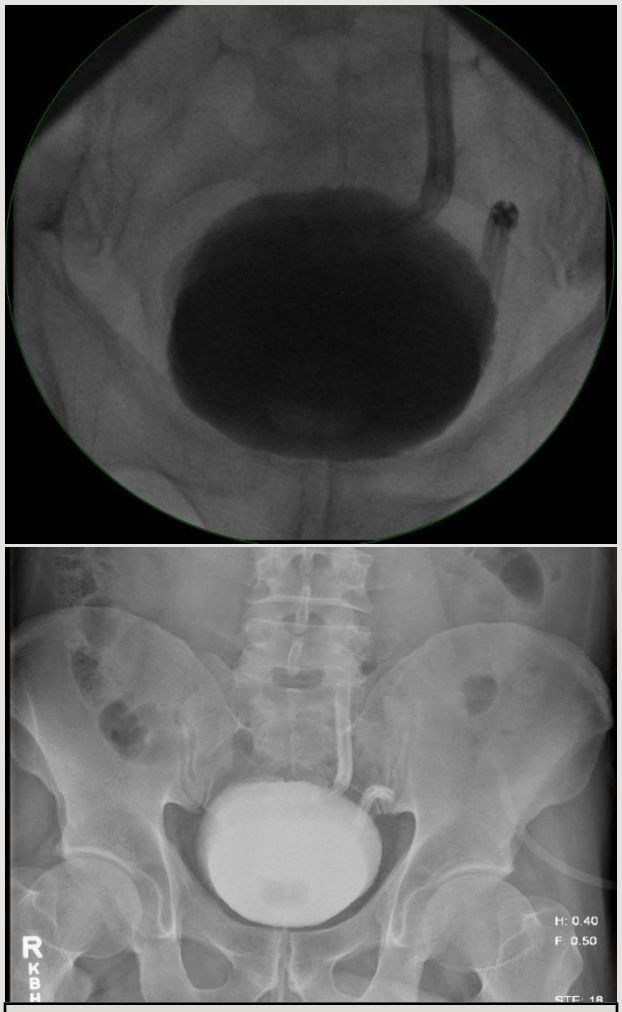

Figure 3. XR cystogram at follow up: Patient bladder wall

related and have a high morbidity and mortality rate, ranging around 22-50 % [1,2]. Typical signs and symptoms are variable and include suprapubic pain, hematuria, difficulty and painful urination, low urine output, increased bun/creatinine (due to peritoneal absorption), and free fluid on imaging [1,2]. According to the American Urology Association (AUA), gross hematuria is the most common indicator of bladder injury [3].

Spontaneous bladder perforation from a Foley catheter is rare and can be either EP or IP, usually associated with chronicbladder disease. The incidence and etiology of a single Foley catheter placement resulting in bladder injury are not well defined in the literature. One case report suggested several possible etiologies, including negative pressure sucking to the bladder wall mucosa causing irritation and necrosis, or drain obstruction causing frank perforation, or chronic microbial colonization leading to wall weakness [5]. Roughly 12 to 25 % of hospitalized patients receive a Foley catheter at some point during their admission [2].

Management

A cystogram is recommended by both the American Urological Association (AUA) and European Association of Urology (EAU) for suspected bladder injuries [6]. Plan film and CT cystography have similar specificity and sensitivity [3]. The AUA states intraperitoneal bladder ruptures “must” be repaired surgically (open or laparoscopic) and as promptly as able to avoid increased risk of peritonitis, sepsis, or other complications [3]. Complex repairs require a follow-up cystoscopy [3].

Conclusion

A commonality found in researching this topic was a delay in diagnosis, which directly correlated with poor outcomes. Bladder perforation has a high mortality and is clearly related to the rarity and delayed diagnosis. Recognition of a change in this patient’s presentation following Foley catheter placement led to prompt imaging and surgical management. It could be argued that he presented to the ER with a perforated bladder or near perforation due to overdistention or injury from falling the evening prior.

References

1. Barnard J, Overholt T, Hajiran A, Crigger C, Jessop M, Knight J, Morley C. Traumatic bladder ruptures: a ten-year review at a level 1 trauma center. Adv Urol. 2019;2019:2614586. doi:10.1155/2019/2614586

2. Paul AB, Simms L, Paul AE, Mahesan AA, Ramzanali A. A rare cause of death in a woman: iatrogenic bladder rupture in a patient with an indwelling Foley catheter. Urol Case Rep. 2016;6:30-32. doi:10.1016/j.eucr.2016.02.008

3. Morey AF, Brandes S, Dugi DD 3rd, et al. Urotrauma: AUA guideline. J Urol. 2014;192(2):327-335. doi:10.1016/j.juro.2014.05.004

4. Poola S, Mohan A. A Foley fallacy: a case of bladder rupture after “routine” Foley catheter placement. Case Rep Urol. 2018;2018:7978126. doi:10.1155/2018/7978126

5. Zhan C, Maria PP, Dym RJ. Intraperitoneal urinary bladder perforation with pneumoperitoneum in association with indwelling Foley catheter diagnosed in the emergency department. J Emerg Med. 2017;53(5):e93-e96. doi:10.1016/j.jemermed.2017.06.006

6. Bryk DJ, Zhao LC. Guideline of guidelines: a review of urological trauma guidelines. BJU Int. 2016;117(2):226-234. doi:10.1111/bju.13040

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