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Case Report

Extraperitoneal bladder perforation secondary to transurethral resection of bladder tumor ☆,☆☆

Doan Tien Luu, MD^{a,b,1}, Nguyen Minh Duc, MD, MSc^{b,c,d,1,*}, Thieu-Thi Tra My, MD^b, Tran-Thi Ly, MD^b, Luong Viet Bang, MD^e, Bui-Van Lenh, MD^{a,b}

^aDepartment of Radiology, Hanoi Medical University Hospital, Ha Noi, Viet Nam

^bDepartment of Radiology, Hanoi Medical University, Ha Noi, Viet Nam

^cDepartment of Radiology, Pham Ngoc Thach University of Medicine, Ho Chi Minh City, Viet Nam

^dDepartment of Radiology, Children's Hospital 2, Ho Chi Minh City, Viet Nam

^eDepartment of Pathology, Hanoi Medical University, Ha Noi, Viet Nam

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ABSTRACT

Transurethral resection of bladder tumor (TURBT) is one possible treatment approach for bladder tumors. Bladder wall perforation is one potential complication of TURBT. Signs of perforation include abdominal distension, the inability to distend the bladder, and the low retrieval of irrigation fluids. Peritonitis may occur if a perforation diagnosis is delayed. Early detection and diagnosis are crucial for the prevention of severe complications, such as peritonitis and sepsis. Here, we describe a case of a 69-year-old male with a bladder rupture secondary to TURBT.

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Introduction

Transurethral resection of a bladder tumor (TURBT) is the most effective treatment for bladder cancer [1]. Bladder wall perforation is one of the most common complications of TURBT, with an incidence of 0.9%–5% [2]. Extraperitoneal bladder perforation occurs more frequently than intraperitoneal perforation [3]. Symptoms may present immediately postperforation; however, some patients present with delayed clinical symptoms, leading to severe complications [4]. In this

article, we aimed to describe a case of bladder rupture secondary to TURBT to underscore the importance of prompt diagnosis and immediate intervention in cases of suspected perforation.

Case report

A 69-year-old male was admitted to the hospital due to hematuria and pain when urinating for 1 week. Abdominal

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* Corresponding author.

E-mail address: bsnguyenminhduc@pnt.edu.vn (N.M. Duc).

¹ Two authors contributed equally to this article as co-first authors.

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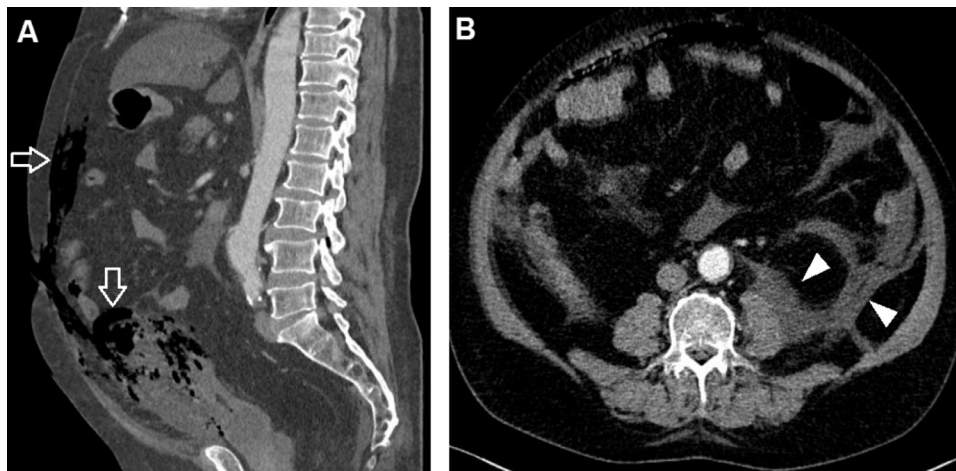


Fig. 1 – Coronal abdominal CT image showing multiple gas foci in the extraperitoneal space (A, arrows). Axial abdominal CT image showing extraperitoneal fluid (B, arrowheads).

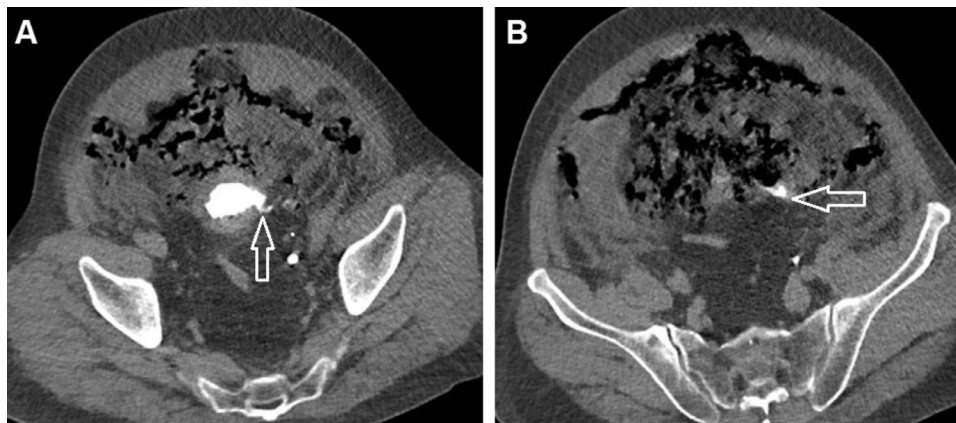


Fig. 2 – Delayed phase CT showing the interruption of the bladder wall (A, arrow) and extravasation into the extraperitoneal space (B, arrow)

ultrasound revealed a mass in the left lateral wall of the bladder, measuring 20 × 30 mm, and large numbers of blood clots accumulated in the bladder cavity. Cystoscopy results revealed that the mass was lobulated. The patient underwent TURBT. After surgery, a urinary catheter was inserted into the bladder to monitor urine output and provide bladder drainage, and the patient was returned to the intensive care unit. During the second postoperative hour, the patient reported lower abdominal pain. Physical examination showed a grossly distended abdomen and decreased bowel sounds. The patient's blood pressure and heart rate were within normal ranges. No urine or blood drainage was observed, and when the bladder was irrigated with 500 mL saline, only 400 mL of urine and blood clots were retrieved through the catheter. Bladder perforation was suspected, and an abdominal computed tomography (CT) scan was performed. The arterial phase showed multiple foci of gas and fluid in the extraperitoneal space (Fig. 1), primarily concentrated in the hypogastric region. The delayed phase revealed the interruption of the bladder wall at the tumor cut site and extravasation into the extraperitoneal space (Fig. 2), suggesting a bladder rupture. The largest

diameter of the perforation on CT scans was 7 mm. The patient underwent open surgery, which confirmed the incidence of extraperitoneal bladder rupture at the site of the previous tumor with the measurement of the perforation was the same as on CT scans. The urinary bladder was repaired. The pathological examination of the tumor revealed a non-muscle-invasive transitional cell carcinoma. Abdominal CT scans performed 1 week later showed no abnormalities. Ten days after the second surgery, the patient was discharged from the hospital.

Discussion

TURBT is one of the most common operations performed in the field of urology [5]. Although TURBT is a safe and efficient technique, complications are unavoidable, including bleeding and bladder perforation, which represent the two most common complications [6]. Bladder perforations may be extra- or intraperitoneal, and the incidence of extraperitoneal perfora-

tion is higher than that of intraperitoneal perforations [2]. The tumor size and the need for multiple tumor resections, and muscle-invasive tumor may be associated with an increased risk of perforation after TURBT [6]. Other studies have suggested that potential risk factors for perforation during TURBT include tumor location in the posterior wall, increased patient age, and a history of previous bladder treatments, such as chemotherapy applied to the bladder or prior TURBT operations, which can induce a thin bladder wall [4]. The increased risk of pelvic or distant tumor recurrence due to seeding by tumor cells that escape through the perforation is a concern following TURBT [7]. The symptoms associated with bladder rupture vary, although most patients present with an acute abdomen, lower abdominal pain, and abdominal distension [8]. Occasionally, patients may present with symptoms of acute renal failure secondary to urine reabsorption, sepsis, hyperkalemia, or peritonitis [2]. Physical examination typically reveals the inability to distend the bladder and the low retrieval of irrigation fluids [2]. However, patients with small perforations may be asymptomatic [9]. Various medical imaging modalities have been used to diagnose bladder perforations, including ultrasound, abdominal CT, conventional retrograde cystography, and CT-cystography [10]. However, conventional retrograde cystography and CT-cystography are currently the gold standards for bladder perforation diagnosis [11]. Abdominal ultrasound and contrast-enhanced CT with delayed phase have lower sensitivity and specificity than other methods [10]. Extraperitoneal perforation is usually managed with adequate bladder drainage via a urethral catheter, although surgery may be required [3]. Intraperitoneal perforations are more serious than extraperitoneal perforations because they can trigger fluid leakage and absorption into the peritoneal cavity [2]. Patients with intraperitoneal perforations are more serious than extraperitoneal perforations and risk of bowel injury, may be managed with open surgery [3]. Therefore, CT scan plays an important role that not only gives exact diagnosis and evaluate the accompanying bowel injury, but also suggest appropriate surgical planning. Patients with extraperitoneal perforations are managed with surgery repaired for the perforation and the bowel. Recent studies have reported that intraperitoneal bladder perforations can be treated with minimally invasive approaches, such as laparoscopic repair or percutaneous peritoneal drainage [12,13]. In addition, the treatment of complications, such as hyperkalemia, acidosis, and sepsis, play essential roles [11]. Bladder ruptures that are diagnosed at later stages may be fatal [14].

In this patient, the presenting symptoms appeared rapidly following surgery, and an extraperitoneal bladder perforation secondary to TURBT was established in a timely manner. Although not all of bladder tumors are invaded the muscle as in this patient, there are still some other risk factors related to TURBT induced perforation. Luckily, severe complications did not develop. Abdominal CT images revealed multiple gas foci in the extraperitoneal space, which may have developed during the process of bladder irrigation. Because draining the fluid and gas proved to be difficult, the surgeon opted to perform open surgery. This report demonstrates that, although rare, bladder perforations can occur following TURBT and should always be considered as a possible severe complication in patients with the suggested clinical and radiological signs.

Conclusions

TURBT could lead to bladder perforations. Clinical symptoms and urine drainage parameters after TURBT may suggest complications. Abdominal CT plays an important role in the diagnosis and treatment-planning of suspected bladder perforation cases post-TURBT. Prompt and precise diagnosis is essential to avoid severe complications.

Informed consent

Informed consent for patient information to be published in this article was obtained.

Ethical statement

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

Author contributions

Doan TL and Nguyen MD contributed to this article as co-first authors. All authors have read the manuscript and agree to the contents.

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