

Endourology

Transurethral resection syndrome: A rare complication of intraperitoneal bladder perforation during transurethral resection of bladder tumor

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ABSTRACT

Transurethral resection (TUR) syndrome is a rare and serious complication of bladder perforation during transurethral resection of bladder tumor (TURBT), secondary to the excessive absorption of electrolytes-free irrigating fluid by extravascular route. Its defined as the combination of clinical cardiovascular and/or neurological manifestations, along with hyponatremia.

Herein we report a rare case of 61-year-old patient, who presented a typical and severe TUR syndrome, secondary to intraperitoneal bladder perforation during TURBT, requiring intubation and positive inotropic drugs in the intensive care unit (ICU), and which was successfully managed conservatively. The patient was discharged from the hospital without any complications.

Introduction

Transurethral resection of bladder tumor (TURBT) is the standard surgical procedure to staging and treating bladder tumors. However, this procedure is not always harmless and can lead to many complications. Intraperitoneal bladder perforation although infrequent during TURBT is a serious complication with a risk of extravascular absorption of irrigating fluid, bowel injury, peritonitis, and extravascular tumor seeding.¹ The use of hypotonic solution as irrigating fluid during monopolar TURBT can be complicated by the occurrence of transurethral resection (TUR) syndrome in case of bladder perforation.^{1,2}

We report a rare case of 61-year-old male patient, who presented a severe and typical TUR syndrome, secondary to intraperitoneal bladder perforation during TURBT. Through this case, we aimed to emphasize that a severe TUR syndrome can also occur during TURBT, and prompt and accurate diagnosis is essential for successful management.

Case presentation

A 61-year-old male patient, heavy smoker, without medical history, was admitted to the urology department to undergo TURBT under spinal anesthesia.

A TURBT was performed with monopolar resectoscope, using 1.5% Glycine, bladder exploration revealed a multifocal papillary bladder

tumor, with a large mass at the anterior bladder wall. At the end of the procedure, the patient complained of severe abdominal pain, general discomfort and nausea. Vital parameters were normal, physical examination revealed abdominal distension with generalized tenderness. The hemostasis was achieved, cystoscopy did not detect a bladder perforation, and a large-bore 22 Fr three-way urethral catheter was inserted. CT-urography revealed large amounts of intraperitoneal fluid, associated to pneumoperitoneum, and perivesical fat infiltration (Figs. 1 and 2), delayed excretory-phase showed contrast extravasation into the peritoneal cavity through a defect in the dome of bladder (Figs. 1b and 2).

After the radiological exploration, the patient suddenly developed, vomiting, agitation, confusion then coma, hypotension (76/45 mmHg) and hypoxemia (SpO₂ 86%), he was quickly taken to intensive care unit (ICU) intubated and ventilated, and a low-dose positive inotropic agent was administered, inducing hemodynamic stability. A chest x-ray and ECG were normal. Control laboratory testing revealed hemoglobin of 12.2 g/dL, hematocrit of 37%, cardiac troponin of 1.051 ng/mL, with decrease in serum sodium concentration from 139 mmol/L to 121 mmol/L. The diagnosis of transurethral resection syndrome was subsequently retained. The patient received continuous infusion of normal saline, 3% hypertonic saline solution, and 20 mg of furosemide. Six hours later, the sodium concentration was increased to 126 mmol/L, and continued to slowly increase over the next 2 days and stabilized around

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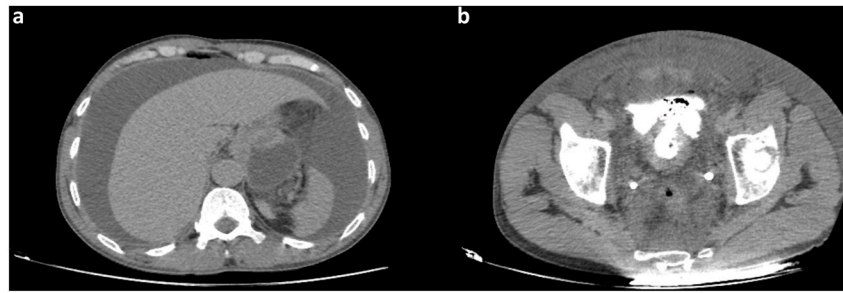


Fig. 1. (a) Axial view on CT scan showing large amounts of intraperitoneal fluid. (b) CT of pelvis revealing contrast extravasation from a perforation at the dome of bladder, with perivesical fat infiltration.

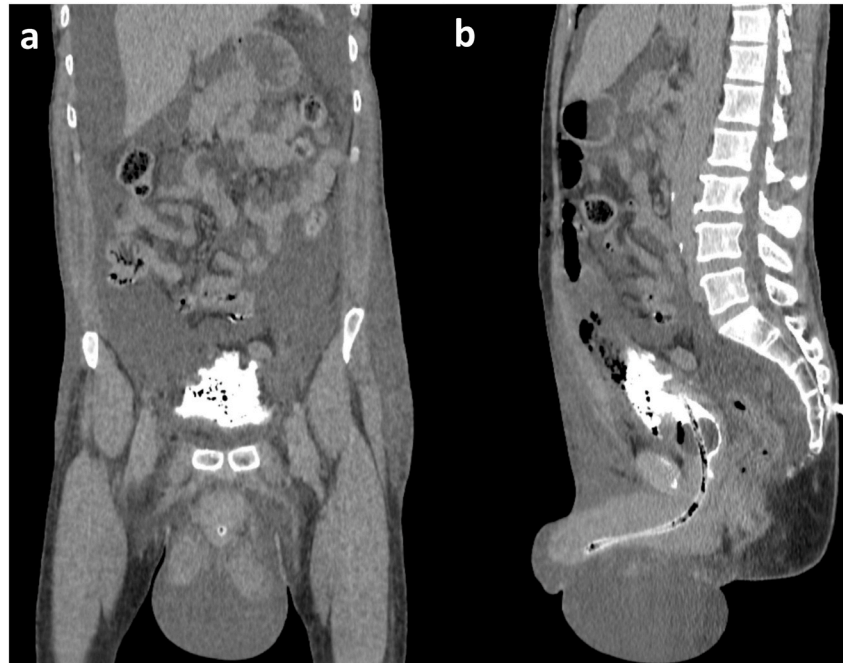


Fig. 2. (a) Coronal reconstructions of the CT scan showing large amounts of ascites descending into scrotum, with contrast extravasation and intraperitoneal free air. (b) Sagittal reconstructions of the CT scan showing intra-abdominal leakage of intravesical contrast, extending from a defect in the dome of the bladder, with pneumoperitoneum, subcutaneous emphysema at the anterior abdominal wall, and scrotal infiltration.

134 mmol/L, preoperative and postoperative creatinine values remained within the normal limits, and he was extubated 1 day later.

Given the stability of his vital parameters after initial reanimation measures, and the absence of associated comorbidities, intraperitoneal bladder perforation was managed conservatively with antibiotics, and indwelling urinary catheter.

On the 7th day, cystogram revealed no evidence of contrast agent extravasation, and the catheter was removed. The patient was discharged from the hospital on the 8th day after the surgery in good condition. Pathology of the resection revealed a low grade papillary urothelial carcinoma, stage pTa, and a re-resection was planned after 4 weeks.

Discussion

Bladder perforation during TURBT is the most significant complication after bleeding, the rate of its occurrence is relatively low, about 1.3%–5%, but it occurs much more frequently than observed or reported in the literature,¹ and can reach up to 58%, when it is systematically evaluated by performing a cystogram before and after each TURBT.³

The use of nonconducting osmotically active solutions as irrigating fluid is required during TURBT with monopolar electric resectoscope.

The accumulation of hypotonic fluid in the peritoneal cavity during TURBT and its excessive absorption by extravascular route can lead to transurethral resection syndrome, which can cause a wide variety of symptoms that include central nervous disturbances such as headache, nausea, vomiting, blurred vision, and confusion, and/or circulatory abnormalities with hypotension or hypertension, bradycardia, arrhythmia, dyspnea with pulmonary or cerebral edema, and hydro-electrolyte imbalance with hyponatremia.^{1,2}

Acute changes in mental state, is the common first symptom of TUR syndrome and may be detected earlier in conscious and alert patient.² The onset of the water and electrolyte imbalance is typically slower after uptake by the extravascular route than by the intravascular route, and hyponatremia can take between 1 and 6 hours to reach its nadir, and may be related to the amount of extravasated fluid. Hyponatremia is the result of solute shifts between the intraperitoneal electrolyte-free fluid and capillary blood, it may lead to hypovolemia with hypotension, oliguria, acute renal failure, metabolic acidosis, or even the death.^{2,4}

In our case, it appears that the use of bipolar resection in saline solution, may be an excellent and safe alternative procedure, with a low complication rate compared to monopolar resection, these complications are especially, painful abdominal distension and dyspnea related to the mass effect, particularly in the case of excessive fluid extravasation.²

Medical treatment must be arranged according to the severity of symptoms. Initial medical management is based on plasma volume expansion, hypertonic saline solutions 3% or 5%, positive inotropic drugs and respiratory support in severe cases.² Diuretic therapy is not systemically recommended, and should be used for milder cases and only after restoration of normovolemia and hemodynamic stability.⁴

Surgical management of intraperitoneal perforations during TURBT may require an immediate laparotomy or laparoscopic repair with peritoneal drainage, which remains the gold standard treatment.⁵ However, there is an increasing tendency toward conservative management in selected patients with favorable characteristics, consisting of simple bladder drainage, systemic antibiotics, and percutaneous drainage if bladder drainage is insufficient.⁵

In our patient, and given his favorable characteristics, his rapid clinical and biological improvement, and the possibility of close observation, nonoperative management proved successful.

Conclusion

TUR syndrome resulting from extravascular absorption of irrigating fluid is a rare and serious complication of intraperitoneal bladder perforation during TURBT. Prompt and accurate diagnosis is the key for appropriate management. Conservative treatment may be a safe and effective approach in carefully selected patients with intraperitoneal bladder perforation during TURBT.

Consent

Consent was obtained from the patient for the above information to be released for research purposes.

Declaration of competing interest

The authors declare that they have no conflicts of interest.

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Author contributions

All authors have contributed to this work and have read and approved the final version of the manuscript.

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