

Thermal injury causing delayed perforation of small bowel after transurethral resection of bladder tumor without evidence of bladder perforation

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ABRAHAM NE, SIMON R, SHAHO. Thermal injury causing delayed perforation of small bowel after transurethral resection of bladder tumor without evidence of bladder perforation. *The Canadian Journal of Urology*. 2011;18(4):5836-5838.

Risk of thermal injury to the bowel when utilizing electrocautery at the bladder dome has been reported anecdotally. This is a case report of a 64-year-old man with urothelial carcinoma in situ of the bladder who underwent transurethral resection of bladder tumor at the posterior

bladder wall near the dome without evidence of perforation. The postoperative course was complicated by delayed small bowel perforation likely secondary to transmission of thermal energy during fulguration of the resection bed. This injury highlights the need for particular prudence when resecting and fulgurating bladder tumors using monopolar electrocautery, specifically in the regions adjacent to bowel.

Key Words: urothelial carcinoma of the bladder, transurethral resection bladder tumor, postoperative complication

Case report

A 64-year-old man with past medical history significant for coronary artery disease, hypertension, chronic kidney disease (creatinine 3.0), hypothyroidism, and

anemia presented with microscopic hematuria. He denied gross hematuria, lower urinary tract symptoms, history of nephrolithiasis, recurrent urinary tract infections, or occupational exposure to chemicals. He had a 74 pack-year history of smoking tobacco. Urine cytology was negative. CT urogram revealed normal kidneys bilaterally without any hydronephrosis or renal mass, no ureteral filling defects, and no bladder masses. On office cystoscopy, 2 cm-3 cm of flat, erythematous lesions were visualized at the posterior dome and right lateral wall, see Figure 1. Biopsy of

Accepted for publication April 2011

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Figure 1. Lesions seen on cystoscopy.

these two areas was performed revealing urothelial carcinoma in situ (CIS). Given the potential of understaging bladder cancer by relying on office-based cystoscopy and biopsy alone, transurethral resection of bladder tumor (TURBT) was performed. Systematic examination of the bladder during TURBT revealed a 2 cm raised, broad-based lesion on the posterior wall of the bladder nearing the dome with surrounding erythema and a similar 2 cm lesion on the right posterolateral wall. Electrosurgical loop resection of the raised aspect of the two lesions was performed. Muscle fibers were visualized but no perivesical fat was noted. A roller ball cautery device was utilized to fulgurate the resection bed and surrounding erythema to maintain hemostasis. An 18 French Foley catheter was left in place due to the deep level of resection with plan for removal in 3 days.

On postoperative day two, the patient presented to the emergency room complaining of nausea, vomiting, and severe abdominal pain. He reported constipation and obstipation. He denied fevers or chills. His Foley catheter had been draining clear urine since discharge from the hospital. On exam the patient's abdomen was distended with rebound and guarding on palpation suspicious for peritonitis. CT scan of the abdomen with oral contrast was performed revealing free intraperitoneal air anterior to the bladder wall and fluid in the pelvis without evidence of oral contrast extravasation, see Figure 2.

Given the history of recent TURBT, clinical exam, and CT findings, the patient was taken emergently for exploratory laparotomy for presumed intraperitoneal bladder rupture/perforation. Upon entry into the peritoneum, 200 cc of bilious fluid was evacuated. The bladder was examined and no bladder injury

was identified. The Foley catheter was irrigated with indigo carmine without extravasation from the bladder noted. The bowel was examined and a 1 cm enterotomy suggestive of thermal injury was identified in the ileum approximately 15 cm from the ileocecal valve. General surgery consult performed a primary repair of the enterotomy after irrigating the abdominal cavity with normal saline irrigation and examining the small intestine. The patient tolerated the procedure well and was subsequently discharged once pain was adequately controlled and he was tolerating po intake. He passed a voiding trial 2 weeks postoperatively.

The patient's final pathology revealed urothelial CIS. Muscularis propria was present in specimen and negative for carcinoma. The patient will be initiated on intravesical BCG treatment.

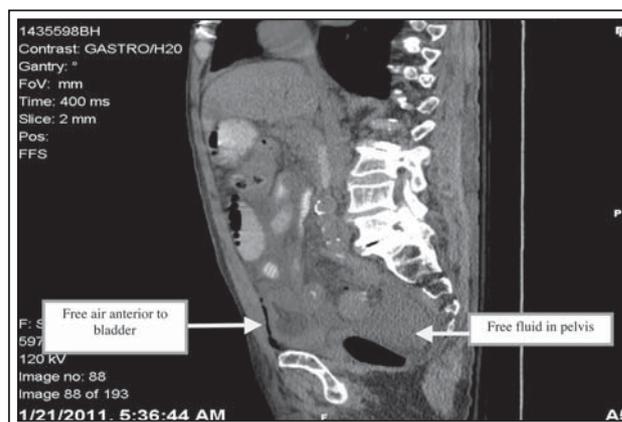


Figure 2. CT scan showing free intraperitoneal air anterior to bladder.

Discussion

The morbidity and mortality for TURBT are 5.1%-43.3% and 0.8%-1.3%, respectively.¹ Common complications include postoperative bleeding, infection, bladder perforation, transurethral resection syndrome, and urinary retention. Risk of thermal injury to the bowel when performing aggressive electrocautery at the dome of the bladder has been reported anecdotally. This is the first case report in the literature, to our knowledge, describing this complication, particularly without evidence of a full thickness bladder perforation. In monopolar electrosurgery, high frequency alternating electric current is utilized for cutting and coagulation. The current travels through a circuit initiated in the electrosurgery unit, subsequently traveling through the electrosurgical instrument, through the patient, and finally back to the electrosurgical unit via the patient plate electrode or grounding pad.² The likely mechanism of injury was transmission of thermal energy through a thin area of bladder wall to adjacent bowel during fulguration leading to delayed perforation of the small bowel. The appearance of the enterotomy was suggestive of thermal injury. This could be repaired primarily due to the limited surrounding inflammation and inclusion of sufficient viable appearing bowel in the re-approximating sutures.

Several techniques could potentially circumvent such injury during TURBT. Decreasing the distention of the bladder may allow the bladder to descend away from adjacent structures. When fulgurating or resecting at the bladder dome, placing the patient in Trendelenburg position may help the bowel move cranially, thereby separating itself from the bladder. Lowering the coagulation current may reduce the thermal energy transmitted to adjacent tissue. Use of bipolar electrocautery may decrease thermal injury since the current travels from the electrosurgical unit through the instrument and back, without including the patient's body as part of the circuit. Fulguration should also be used sparingly, especially at the bladder dome.

Conclusion

We report the first case of thermal injury to small bowel during TURBT, additionally without evidence of a full-thickness bladder perforation. This injury can be avoided with cautious surgical technique and highlights the need for particular prudence when resecting and fulgurating bladder tumors using monopolar electrocautery, specifically in the regions adjacent to the bowel. □

References

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