

Transurethral holmium laser vaporization to the urethral tumour through a ureteroscope

Aihua Li, MD; Wei Fang, MD; Xiaoming Zuo, MD; Feng Zhang, MD; Weiwu Li, MD; Honghai Lu, MD; Sikuan Liu, MD; Hui Wang, MD; Binghui Zhang, MD

Department of Urology, Yangpu Hospital, School of Medicine, Tongji University Shanghai, China

Cite as: *Can Urol Assoc J* 2014;8(11-12):e913-5. <http://dx.doi.org/10.5489/cuaj.2026>
Published online December 15, 2014.

Abstract

We present 2 cases of urethral cancers: one is recurrent bladder transitional cell carcinoma accompanied by urethral metastatic carcinoma located on the right side of verumontanum, and the other is primary bladder and metastatic urethral adenocarcinoma. The urethral tumour was treated by transurethral holmium laser vaporization to the urethral tumour through a ureteroscope and the bladder tumour was treated with transurethral resection and degeneration of the bladder tumour (TURD-Bt). After the second or third therapy, patients were free of urethral or bladder tumour recurrence; they also did not experience urethral stricture or urinary incontinence during the 24- to 36-month follow-up. Transurethral holmium laser vaporization and TURD-Bt could be performed to treat non-invasive urethral cancer accompanied with bladder cancer and preserve the urethra and bladder.

Introduction

Urethral cancer is an uncommon neoplasm, which usually manifests as dysuria and hematuria. Most bladder cancers recur after the initial treatment, including at sites outside the bladder, such as the urethra. These patients may prefer to preserve their bladder and urethra for normal voiding function.^{1,2} We describe 2 cases of urethral cancers: one is recurrent bladder transitional cell carcinoma accompanied by urethral carcinoma, and the other is primary bladder and urethral adenocarcinoma. These patients were treated with transurethral holmium laser vaporization to urethral tumour and transurethral resection and degeneration of the bladder tumour (TURD-Bt).³

Operative technique

Surgery was performed using spinal anesthesia. First, transurethral holmium laser vaporization was used to the urethral tumour through a 6-Fr Storz ureteroscope, and the lesions in the urethra were ablated using a 300- μ m fibre with settings of 30 Hz and 2.0 Joules (60 watts). Then, TURD-Bt was performed to the bladder tumour as previously described.³

Patients had immediate postoperative pirarubicin instillation, and then regular postoperative intravesical pirarubicin therapy was administered for 2 years in both patients. Follow-up was performed at month 1, urinary cytology and cystoscopy were performed every 3 months, and ultrasonography was performed every 6 months for 2 years.

Case reports

Case 1

A 65-year-old man presented with a history of multiple non-invasive bladder carcinomas treated with transurethral resection of bladder tumour (TUR-Bt) 5 times since 2001. In 2008, he presented with gross hematuria. Cystoscopy revealed 2 tumours measuring 1.8 \times 1.6 cm and 1 \times 1.2 cm on the anterior wall of the bladder, and one metastatic tumour measuring 0.8 \times 1 cm on the prostatic urethra near the right side of the verumontanum. Histological examination of the biopsy specimens revealed grade 1 non-invasive bladder transitional cell carcinoma and urethral transitional cell carcinoma. Surgical options were discussed with the patient, but he refused the the radical cystoprostatectomy or any other open surgeries. Therefore, transurethral holmium laser vaporization through a ureteroscope was performed to the urethral tumour first and then TURD-Bt was performed to the bladder tumour. The urethral neoplasm relapsed twice (in July 2010 and July 2011). On pathology, the biopsies

showed grade 2 superficial urothelial carcinoma, and the transitional holmium laser vaporizations were performed again. After the third treatment and after 36 months of surveillance, his cystoscopy revealed no urethral or bladder recurrence and no formation of urethral stricture or urinary incontinence.

Case 2

A 74-year-old woman presented with gross hematuria in June 2011. Cystoscopy revealed a 2.8 × 1.3 cm tumour on the bottom of the bladder and a 1.5 × 1.5 cm metastatic tumour from the 6 o'clock position of the urethral middle part. Pathological diagnosis was grade 2 bladder adenocarcinoma and urethral adenocarcinoma. The patient only wanted a urethra and bladder sparing minimally invasive surgery; therefore, she was treated by transurethral holmium laser vaporization to the urethral tumour and TURD-Bt to the bladder tumour. In July 2012, a 0.3 × 0.3 cm urethral recurrent tumour was found at the 7 o'clock position of the proximal urethra by cystoscopy. Pathological diagnosis was grade 2 urethral adenocarcinoma, so a transurethral holmium laser vaporization was again performed. After the second therapy after 24 months of surveillance, she was free of tumour recurrence and surgical complication.

Both patients had immediate postoperative pirarubicin instillation and then regular postoperative intravesical pirarubicin therapy for 2 years.

Discussion

Urethral carcinoma is a rare tumour with a poor prognosis. Its management is controversial. The surgical approach to the urethral cancer depends largely on the location and extent of the tumour; grade and histopathologic type are less important. The standard treatment is surgical excision. In localized anterior urethral carcinoma, urethra-sparing surgery is an alternative to primary urethrectomy, and can be performed by transurethral resection. Other conservative approaches include intraurethral agents (5-fluorouracil or bacillus Calmette-Guérin [BCG]), transurethral resection + intraurethral agents, pelvic radiotherapy, and intraluminal brachytherapy. However, poor survival figures have been recorded for all forms of treatment.^{1,4-8} The median survival of patients with urethral transitional cell carcinoma after radical cystectomy is only 28 months after diagnosis.⁹

There are several advantages to holmium laser vaporization to the urethral tumour through a ureteroscope. First, holmium laser provides tissue destruction with a depth of penetration of about 0.5 mm, which could be controlled so that it does not damage deeper tissue. It is important to protect the urethral sphincter and avoid urinary incontinence. Second, holmium laser does not easily cause scar

tissue when used to vaporize the tumour, which could avoid a formation of urethral stricture. Third, the urethral cavity is smaller and a 6-Fr ureteroscope could easily access the cavity, which will facilitate surgery.² Holmium laser gives a clean cut of the base of the tumour, so that we can get the complete tumour for histopathology examination. The resection would be much faster than vaporization; however, the risk of stricture is also less with holmium laser resection than with ablation. In the future, we could also use resection instead of vaporization, if surgical conditions permit. TURD-Bt is a newly modified surgery from TUR-Bt. In contrast with holmium laser vaporization, the simple coagulating current in TURD-Bt can damage deeper tissues. The damaging effects could be seen in tissues 5 to 6 mm under the burned surface. Complete resection and degeneration of the bladder tumour can be expected and the bladder wall can be preserved during a TURD-Bt. The incidence of tumour recurrence is decreased by degenerating the invisible residual tumour in the deep tissue and suspicious lesions.^{3,10-14} On other hand, transurethral resection and degeneration to the urethral tumour would not be advisable with its significant depth of penetration.

In case 1, the patient had recurrent bladder cancer accompanied by metastatic urethral cancer and the urethral lesion was adjacent to the verumontanum. If the urethral tumour was treated with transurethral resection with a high-frequency current, the urethral sphincter could be damaged. Meanwhile, the ureteroscope was finer than the resectoscope, which facilitates surgical management of the tumour in the narrow urethra. In case 2, the patient had primary bladder cancer accompanied by metastatic urethral cancer. Both patients had urethral cancer recurrence after surgery, but after the second or third therapy, during the 24- to 36-month follow-up period, they were without recurrence or surgical complication.

Conclusion

These 2 case reports have shown the benefits of transurethral holmium laser vaporization to treat metastatic urethral cancer. Transurethral holmium laser vaporization and TURD-Bt could be performed to treat non-invasive urethral cancer accompanied by bladder cancer, and to preserve the urethra and bladder. However, postoperative surveillance should be done and a cystoscopy for the bladder cancer should always include the urinary tract to avoid missing the urethral tumour.⁶

Competing interests: Authors declare no competing financial or personal interests.

This paper has been peer-reviewed.

References

1. Samzadeh M, Basiri A. Preservation of erectile function and urinary continence in squamous cell carcinoma of the bulbomembranous urethra. *Urology J* 2012;9:711-3.
2. Liss MA, Ronningen L, Dash A. Holmium laser fulguration of superficial urothelial carcinoma of the pendulous urethra. *Indian J Urol* 2012;28:427-9. <http://dx.doi.org/10.4103/0970-1591.105758>
3. Li A, Fang W, Zhang F, et al. Transurethral resection and degeneration of bladder tumor. *Can Urol Assoc J* 2013;7:E812-6. <http://dx.doi.org/10.5489/cuaj.363>
4. Dayyani F, Hoffman K, Eifel P, et al. Management of advanced primary urethral carcinomas. *BJU Int* 2014;114:25-31. <http://dx.doi.org/10.1111/bju.12630>
5. Gakis G, Witjes JA, Compérat E, et al. EAU guidelines on primary urethral carcinoma. *Eur Urol* 2013;64:823-30. <http://dx.doi.org/10.1016/j.eururo.2013.03.044>
6. Grivas PD, Davenport M, Montie JE, et al. Urethral cancer. *Hematol Oncol Clin North Am* 2012;26:1291-314. <http://dx.doi.org/10.1016/j.hoc.2012.08.006>
7. Huguet J. Diagnosis and treatment of urethral recurrence after radical cystectomy in the male. *Actas Urol Esp* 2012;36:42-7. <http://dx.doi.org/10.1016/j.acuro.2011.06.009>
8. Sherwood JB, Sagalowsky AI. The diagnosis and treatment of urethral recurrence after radical cystectomy. *Urol Oncol* 2006;24:356-61. <http://dx.doi.org/10.1016/j.urolonc.2005.11.027>
9. Clark PE, Stein JP, Groshen SG, et al. The management of urethral transitional cell carcinoma after radical cystectomy for invasive bladder cancer. *J Urol* 2004;172(4 Pt 1):1342-7. <http://dx.doi.org/10.1097/01.ju.0000138208.07426.19>
10. Li AH, Li DX, Fu KY, et al. Effect of electrovaporization on renal tissue of rabbit in vivo. *Chin J Clin Anat* 2001;19:353-6.
11. Li AH, Fu KY, Li DX, et al. Effect of high-frequency electrovaporization on muscular tissue of rabbit in vivo. *Chin J Clin Anat* 2002;20:65-7.
12. Li AH, Fu KY, Li DX, et al. Electroevaporization of human prostatic tissue in vivo. *Chin J Urol* 2002;23:751-3.
13. Li AH, Fu KY, Li DX. Effects of a high-frequency electrovaporization on dermal tissue of rabbit in vivo. *Chin J Clin Anat* 2003;21:170-2.
14. Li AH, Li DX, Song HB. Effect of electrovaporization on different tissues in vitro. *J Modern Urol* 1998;3:247-9.

Correspondence: Dr. Aihua Li, Department of Urology, Yangpu Hospital, School of Medicine, Tongji University Shanghai, China; li121288@aliyun.com