Percutaneous Management of Upper Tract Urothelial Carcinoma in a Transplant Kidney

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Key Words

Urothelial cancer • Ureteroscopy • Tumor •
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Abstract

Upper tract urothelial carcinoma (UTUC) accounts for approximately 5% of all urothelial cancers. The gold standard for managing UTUC is radical nephroureterectomy. Management options may vary depending on the overall clinical picture of the patient and it becomes particularly complex when UTUC develops in a transplanted kidney. We herein present a case report of a 56-year-old male with UTUC in a transplant kidney managed percutaneously with successful salvage of the transplant kidney. Copyright © 2014 S. Karger AG, Basel

Introduction

Upper tract urothelial carcinoma (UTUC) accounts for approximately 5% of all urothelial cancers [1]. Unlike bladder cancer, UTUC typically presents with advanced stage (> 50% pT2–4) [1, 2] at time of diagnosis and has overall poorer prognosis [3]. Currently, the gold standard for managing UTUC is radical nephroureterectomy [4], however, small volume, low-grade tumors and/or elderly

patients with multiple co-morbidities, may be managed via endoscopic and/or less commonly with percutaneous approach utilizing endoscopic resection or Holmium laser ablation or both [5].

While these treatment modalities present an accepted standard for managing UTUC in the native kidneys, there is no current guideline or recommendations for managing UTUC in transplant kidneys. We sought to present a case with UTUC in a transplanted kidney and commented on its management and reviewed current available literature.

Case Report

A 56-year-old male with end-stage renal failure whom underwent uneventful right cadaveric renal transplant in 2004 presented with a 5-month history of gross hematuria. Laboratory tests revealed normal renal function including serum creatinine of 0.9mg/dl. A non-contrast computerized tomography scan demonstrated a solid mass in the renal pelvis of the transplanted kidney. The native kidneys appear unremarkable. After detailed discussion with patient, different treatment modalities were detailed including endoscopic and/or radical nephroureterectomy. Risks, benefits and possible complications were extensively discussed with the patient after appropriate counseling. Subsequently, patient elected to undergo endoscopic treatment with Holmium laser ablation of the UTUC in the transplant kidney. At time of flexible ureteropyeloscopy, a papillary mass was incompletely visualized in the renal pelvis of the transplant kidney. Adding to this, there was an acute angulation of the implanted ureter located at bladder dome which

Fig. 1. Antegrade nephrostogram study demonstrates a large filling defect located in the renal pelvis of the transplant kidney.

limited the endoscopic access to the papillary mass. However, brush cytology of the papillary mass was obtained but endoscopic resection or laser ablation of the papillary mass was aborted due to significant technical difficulty. Brush cytology was inconclusive for malignancy.

Consequently, percutaneous approach for treatment of UTUC in transplant kidney was recommended and patient wished to proceed. Prior to the procedure, a direct upper pole percutaneous nephrostomy tube was successfully placed into the transplant kidney by interventional radiology. An antegrade nephrostogram demonstrated a large filling defect located in the renal pelvis of transplant kidney (fig. 1). Prior to tumor ablation, the percutaneous tract was balloon dilated with placement of a 30 French Amplatz sheath which allowed the introduction of a 26 French nephroscope into the collecting system of the transplant kidney. After systematic surveillance of the collecting system, a large papillary tumor was clearly visualized and cold cup biopsies were taken for pathology, followed by satisfactory Holmium laser ablation of the renal pelvis mass. At the conclusion of the tumor ablation, an 18 French couillard tip catheter was passed over the guide wire into the renal pelvis and left in place to maintain adequate urinary drainage. A repeat antegrade nephrostogram was performed at the end of the procedure which revealed that the filling defect was no longer visualized or contrast extravasation (fig. 2). The patient was discharged home with the renal pelvic catheter in place and to return for a planned second look percutaneous approach 4 weeks later. Final pathology revealed non-invasive high-grade urothelial cancer (pTa) of the renal pelvis of the transplant kidney. Four weeks later, an antegrade nephrostogram revealed no residual filling defects. Subsequently, a flexible cystoscope was then inserted into the dilated tract and the previous tumor site was visualized. Thorough systematic examination of all calyces and collecting system was

Fig. 2. A repeat antegrade nephrostogram study at the conclusion of the percutaneous Holmium laser ablation of the renal pelvis tumor demonstrates no filling defects or contrast extravasation.

Fig. 3. Surveillance ureteroscopy and retrograde pyelogram of the transplant kidney revealed no residual filling defect or masses six months after laser tumor ablation and BCG treatment.

performed revealing no residual tumors or mucosal abnormalities. A repeat cold cup biopsy was performed of the previous tumor site and couillard tip catheter was replaced. Pathology of the repeat biopsy revealed acute and chronic inflammatory changes with no evidence of residual UTUC. Patient tolerated procedure with no complications.

Two weeks later, Bacillus Calmette–Guérin (BCG) infusion via nephrostomy tube was initiated for 6-week course and tolerated. The percutaneous tube was then discontinued at the com-

pletion of the BCG treatments. Six months later, a surveillance ureteroscopy and retrograde pyelogram of the transplant kidney revealed no residual filling defect or masses (fig. 3). Repeat ureteroscopic surveillance of the UTUC of the transplant kidney was performed every 6 months for the next 2 years with no evidence of tumor recurrences. He is planned to undergo yearly ureteroscopic surveillance thereafter.

Discussion

A review of the published literature shows a paucity of clinical data related to the treatment of UTUC in patients with a kidney transplant. UTUC in a transplanted kidney is rare entity. Although, radical nephroureterectomy is considered the gold standard treatment for managing UTUC, there may be a role of minimally invasive management of these tumors when kidney function preservation is paramount. This case report highlights the importance of the minimally invasive approach in managing UTUC in transplant kidney patient.

Although, minimally invasive management via endoscopic measures has been known as a possible means of preserving kidney function, a long-term follow up study by Clark et al. [6] have demonstrated that percutaneous management of UTUC is technically feasible and safe in patients whom nephron-sparing management is warranted. In this case report, the clinical rationale to proceed with transplant kidney conservation in this patient was bolstered by his normal renal function, a known challenge with obtaining a new transplant in a patient with known history of urothelial cancer and technical difficulty of repeat transplant surgery.

Notwithstanding, routine upper tract surveillances will be of key importance in these patients. To date, there is not an established follow-up protocol for UTUC. One suggested algorithm is initial ureteroscopic surveillance every 3 months followed by every 6–12 months thereafter as determined by recurrence of tumor [7]. In an effort to reduce trauma to the transplant kidney we recommended for surveillance every 6 months for the first two consecutive years, followed by yearly surveillance.

There are few studies describing the role of BCG in managing UTUC, however definitive efficacy after treatment has not been proved due to lack of long-term studies [8, 9]. Although our patient is ten years post-transplant, BCG was used with caution in our patient secondary to his medication-induced immunosuppressed status. Other investigators have reported the potential efficacy of Mitomycin-C in this particular setting, but these data remains anecdotal with limited sample size and follow-up [10].

Another critical urologic consideration in the management of UTUC in transplant kidney is that the difficulty of cannulating the transplant ureter with ureteral access sheath and flexible cystoscope. This can be partly explained by the presence of transplanted ureteral anastomotic narrowing, stricture, acute angulation or kink that hinders the ureteroscopic access. This should be strongly considered and carefully thought for by the treating urologist prior to performing this procedure on a kidney transplant.

Conclusion

This case report underscores that the minimally invasive percutaneous approach to UTUC in a transplant kidney was successful and safe. It also discussed and commented on its oncologic management and long-term follow-up. Future studies are requisite to provide guidelines and recommendations for the management of UTUC, routine surveillance protocols and long-term follow-ups, particularly for patients with solitary or transplant kidneys.

References

- 1 Capitanio U, Shariat SF, Isbarn H, Weizer A, Remzi M, Roscigno M, Kikuchi E, Raman JD, Bolenz C, Bensalah K, Koppie TM, Kassouf W, Fernández MI, Ströbel P, Wheat J, Zigeuner R, Langner C, Waldert M, Oya M, Guo CC, Ng C, Montorsi F, Wood CG, Margulis V, Karakiewicz PI: Comparison of oncologic outcomes for open and laparoscopic nephroureterectomy: a multi-institutional analysis of 1249 cases. *Eur Urol* 2009; 56:1–9.
- 2 Margulis V, Shariat SF, Matin SF, Kamat AM, Zigeuner R, Kikuchi E, Lotan Y, Weizer A, Raman JD, Wood CG: Outcomes of radical nephroureterectomy: a series from the Upper Tract Urothelial Carcinoma Collaboration. *Cancer* 2009;115:1224–1233.
- 3 Siegel R, Naishadham D, Jemal A: Cancer statistics, 2012. *CA Cancer J Clin* 2012; 62: 10–29.
- 4 Cutress ML, Stewart GD, Tudor EC, Egong EA, Wells-Cole S, Phipps S, Thomas BG, Riddick AC, McNeill SA, Tolley DA: Endoscopic versus laparoscopic management of noninvasive upper tract urothelial carcinoma: 20-year single center experience. *J Urol* 2013;189:2054–2060.
- 5 Xylinas E, Rink M, Margulis V, Faison T, Comploj E, Novara G, Raman JD, Lotan Y, Guillonau B, Weizer A, Pycha A, Scherr DS, Seitz C, Sun M, Trinh QD, Karakiewicz PI, Montorsi F, Zerbib M, Gönen M, Shariat SF: Prediction of true nodal status in patients with pathological lymph node negative upper tract urothelial carcinoma at radical nephroureterectomy. *J Urol* 2013;189:468–473.
- 6 Clark P, Streem S, Geisinger M: 13-year experience with percutaneous management of upper tract transitional cell carcinoma. *J Urol* 1999;161:772–776.
- 7 Krambeck AE, Thompson RH, Lohse CM, Patterson DE, Elliott DS, Blute ML: Imperative indications for conservative management of upper tract transitional cell carcinoma. *J Urol* 2007;178:792–797.
- 8 Rastinehad AR, Ost MC, Vanderbrink BA, Greenberg KL, El-Hakim A, Marcovich R, Badlani GH, Smith AD: A 20- year experience with percutaneous resection of upper tract transitional carcinoma: is there an oncologic benefit with adjuvant bacillus calmette guerin therapy? *Urology* 2009;73:27–31.
- 9 Thalmann GN, Markwalder R, Walter B, Studer UE: Long-term experience with bacillus Calmette-Guerin therapy of upper urinary tract transitional cell carcinoma in patients not eligible for surgery. *J Urol* 2002;168: 1381–1385.
- 10 Martinez-Pineiro JA, Garcia Matres MJ, Martinez-Pineiro L: Endourological treatment of upper tract urothelial carcinomas: analysis of a series of 59 tumors. *J Urol* 1996; 156:377–385.