

Oncology

Metastatic Renal Cell Carcinoma to the Contralateral Ureter: A Rare Phenomenon

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ABSTRACT

Metastatic renal cell carcinoma (RCC) to the contralateral ureter is a rare phenomenon. We report a metastatic RCC to the contralateral ureter 5 months after right radical nephrectomy for Fuhrman grade 3/4 clear cell adenocarcinoma with pathologic T3 staging. The distal ureter was excised followed by partial ileal ureteral substitution. Pathology confirmed metastatic clear cell RCC Fuhrman grade 2/4. Ileal ureteral substitution has been shown to provide good long-term functional outcomes and should be considered as a possible option for surgical treatment of ureteral metastasis.

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Introduction

After nephrectomy for localized renal cell carcinoma (RCC) between 20%–40% of patients will develop metastatic or locally recurring disease.¹ RCC with metastasis to the contralateral ureter is a rare phenomenon of which to our knowledge only 7 cases have been described. We report a case involving the management of a patient who presented with metachronous RCC metastasis to the contralateral ureter.

Case report

An asymptomatic 61-year-old male presented with left hydronephrosis extending from the renal pelvis to the S2 level on surveillance CT imaging. His past medical history was notable for right radical nephrectomy in August 2014 for right renal cell carcinoma, with metastasis to the lungs and mediastinum, and chronic kidney disease. Pathology revealed Fuhrman grade 3/4 clear cell adenocarcinoma with pathologic T3N1M0 staging. Following uneventful radical nephrectomy, the patient was started on 800 mg PO daily Pazopanib. Follow-up surveillance CT imaging showed regression of

his mediastinal and retroperitoneal lymphadenopathy; however, CT imaging performed 5 months after his nephrectomy revealed an enhancing mass in his left distal ureter.

As a result of the surveillance CT imaging findings, flexible ureteroscopy and ureteral cytology of the left ureter was performed; however cytology findings were not conclusive for a diagnosis. A left ureteral stent was placed that was later transitioned to a nephrostomy tube in preparation of open reconstructive surgery. The metastatic work-up included CT urogram, serum chemistries, and cystoscopy.

CT urogram demonstrated a mid-to-distal 2.2 cm obstructing intraluminal mass of the ureter with no contrast distal to the mass. Serum creatinine was 1.4 mg/dL, GFR 51, hemoglobin 14.6 g/dL. Calcium and phosphate were within normal limits, and urinalysis and urine culture were negative. Cystoscopy was performed to assess for bladder volume, as a Boari flap was considered for ureteral reconstruction. The results revealed that the patient's bladder capacity was approximately 200 mL, and he was not considered an appropriate candidate for a Boari flap. After discussion the patient was consented to open distal ureterectomy with ileal ureter creation. An upper midline incision was made, the left ureter was identified and dissected, and the mass was palpated at the mid-portion of the ureter. Five-centimeters of the mid-portion of left ureter was excised to obtain negative tumor-margins. Twelve-centimeters of ileum was placed from the bladder to the upper

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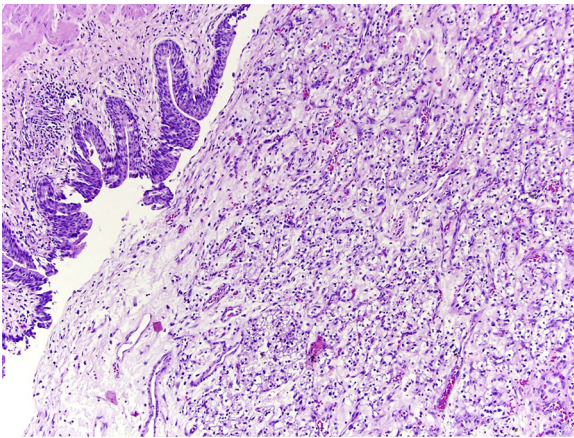


Figure 1. Microscopic image (100 \times) of the left ureter lined by normal urothelium (black arrow) and facing metastatic tumor nodule (white arrow) filling ureteral lumen. The tumor is composed of clear cells with classic architecture of alveolar nests and tightly packed tubules surrounded by delicate blood vessels. An immunohistochemistry with a sensitive and specific marker of renal tubular origin PAX8 showed diffuse nuclear staining of tumor and confirming morphologic impression of extra-renal metastasis of clear cell RCC, Fuhrman grade 2.

ureter, after confirming negative frozen sections proximally and distally. An 8 French \times 24 cm double pigtail ureteral stent, 20 French Foley catheter, and JP drain were placed. Pathologic evaluation of the 3.5 cm mass confirmed metastatic clear cell RCC Fuhrman grade 2/4 (Fig. 1). Final permanent surgical margins were free of carcinoma. The patient had no complications following surgery and will be followed with cystoscopy in clinic. He has resumed his Pazopanib, at the recommendation of his oncologist and follow-up CT 7/15/2015 showed no lymphadenopathy.

Discussion

Shoemaker first described ileal ureteral substitution in 1906, but it was not until 1959 that this method of reconstruction became popular.² Since that time ileal ureter replacement has become the preferred method of fixing long ureteral defects, or as in our case, ureteral defects that are not amenable to other reconstructive techniques.

Verduyck et al³ followed 18 patients who underwent ileal ureteral substitution between 1981 and 2000. Of these patients 86% had good renal function 65-months post-operatively. The authors reported that six patients required several surgical re-interventions in the long-term for obstruction at the uretero-ileal anastomosis, recurrent hematuria, stenosis, and uretero-ileal calculi. Six patients developed recurrent urinary tract infections (UTI), of which only one patient was treated uneventfully with antibiotic therapy.

A retrospective study reviewed 17 patients who underwent ileal ureteral substitution from 1980 to 2010 of which 11 patients had improved or stable renal function, while 3 patients required dialysis.⁴ Recurrent UTI developed in 5 patients, of which 2 patients developed chronic pyelonephritis requiring surgical management.

More recently, some researchers have started to evaluate the benefits of open vs. minimally invasive approach to performing ileal ureter substitution. Sim et al² retrospectively reviewed a total of 5 patients who underwent minimally invasive ileal ureter substitution. Four of the patients were treated laparoscopically and 1 patient was treated robotically. At 22-month median follow-up there were no noted complications.

In 2009 Stein et al, reported on 14 patients who had undergone laparoscopic or open ileal ureter substitution. They noted that patients who underwent laparoscopy recuperated faster and were less likely to require narcotic analgesics compared to their open ileal ureter counterparts. The authors also reported that 3 patients presented with post-operative complications of pneumonia, urine leak, and ureteral injury after transection of the ureter during laparoscopy.

Currently, there have been 51 reported cases of metastatic RCC to the ureter; with only 9 reported cases to the contralateral ureter^{5,6} that we are aware of. Reconstructive options for metachronous metastasis to the contralateral ureter should be determined based on the length of the defect, bladder capacity, and location of the defect. As in our case, ileal ureteral substitution proved a suitable option for the surgical management of our patient's metastatic clear cell adenocarcinoma. Recent studies suggest potential benefits with use of minimally invasive ileal ureter substitution. However, more data is needed comparing these minimally invasive techniques to an open approach. Long-term outcome studies have reported overall good functional kidney outcomes following substitution of ureter for ileum.

Conclusion

Patients with ureteral metastasis often develop loss of renal function, which is critical in a solitary unit. Although the ureter is a rare site for metachronous metastases to occur, excision and reconstruction should be considered to reduce disease burden, preserve renal function, and maintain quality of life. Ileal ureter substitution provides good long-term outcomes and should be considered for patients diagnosed with ureteral metastasis.

Conflict of interest

No conflict of interest.

References

1. Tosco L, Van Poppel H, Frea B, et al. Survival and impact of clinical prognostic factors in surgically treated metastatic renal cell carcinoma. *Eur Urol.* 2013;63(4):646–652.
2. Sim A, Todenhöfer T, Mischinger J, et al. Intracorporeal ileal ureter replacement using laparoscopy and robotics. *Cent European J Urol.* 2014;67(4):420–423.
3. Verduyck FJ, Heesakkers JP, Debruyne FM. Long-term results of ileum interposition for ureteral obstruction. *Eur Urol.* 2002;42(2):181–187.
4. Wolff B, Chartier-Kastler E, Mozer P, et al. Long-term functional outcomes after ileal ureter substitution: a single-center experience. *Urology.* 2011;78(3):692–695.
5. Zorn KC, Orvieto MA, Mikhail AA, et al. Solitary ureteral metastases of renal cell carcinoma. *Urology.* 2006;68(2):428.e5–428.e7.
6. Zhang HJ, Sheng L, Zhang ZW, et al. Contralateral ureteral metastasis 4 years after radical nephrectomy. *Int J Surg Case Rep.* 2012;3(1):37–38.