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Trauma and Reconstruction

Creation of a Ureterocystostomy in a Transplanted Cadaveric Kidney with the Use of a Radiofrequency Guide Wire

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ABSTRACT

A duplicated collecting system (DCS) is a common anatomical variant of the kidney. As surgeons now perform more donor cadaveric transplants than in the past, the discovery of an occluded DCS may occur in the post-transplant setting. Over a dozen articles have reported on the use of DCS in the renal transplant setting. However, to our knowledge, this case report is the first to describe the creation of a ureterocystostomy with the use of a radiofrequency (RF) guide wire, involving a previously unidentified DCS in a transplanted kidney.

Introduction

A duplicated collecting system (DCS) is the result of an atypical division of the ureteric bud during development. It is the most common renal anomaly, present in nearly 1% of healthy live births. As such, it may be found incidentally in the donor transplant setting and is a potential cause of complications post-operatively. To date, there are 16 published studies in the literature of transplanted renal grafts with DCS surgically implanted with ureterocystostomy.[1,6–8] This report presents the first case in the literature of the creation of a ureterocystostomy involving a complete DCS of a transplanted kidney with the use of a radiofrequency (RF) guide wire. To our knowledge, this is also the first case described in the literature of a previously unidentified DCS in a transplanted kidney, discovered post-operatively due to ureteral occlusion.

Case presentation

We present the case of a 55 year-old woman with a history of end-stage renal disease of uncertain etiology who ultimately underwent cadaveric renal transplant in May of 2015. Her initial course was complicated by delayed graft function requiring intermittent hemodialysis and incisional fascial dehiscence requiring reclosure in the operating room. She had one early readmission with generalized malaise and GI complaints. She recovered good graft function, and her kidney function was stable for a period of time. In October of 2015, she was readmitted with elevated creatinine and worsening abdominal pain. Imaging revealed hydronephrosis of the

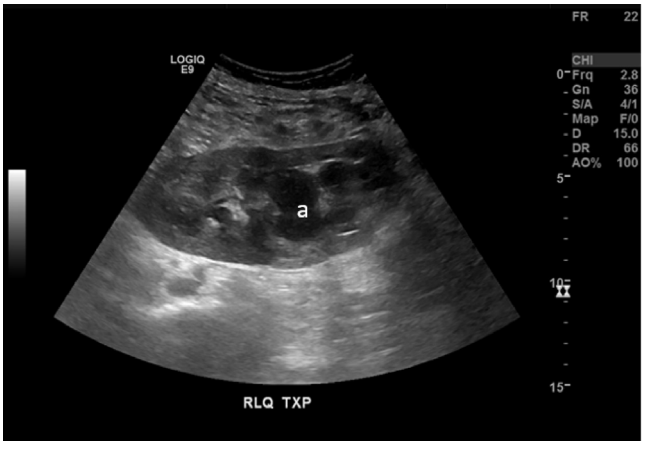

Figure 1. Renal ultrasound showing (a) hydronephrosis of the lower pole of the transplanted kidney.

Abbreviations: DCS (duplicated collecting system); NU (nephroureteral); RF (radiofrequency); IR (interventional radiology).

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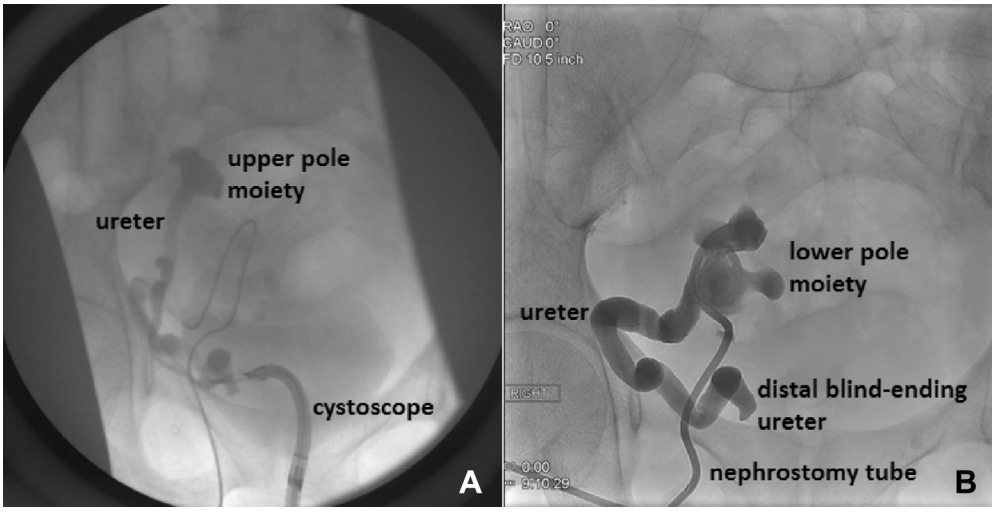

Figure 2. Retrograde pyelography demonstrates a normal upper pole moiety (A), and antegrade pyelography shows a hydronephrotic lower pole moiety with no evidence of drainage - the distal ureter ends in a blind pouch (B).

transplant kidney (Fig. 1). She had a nephrostomy tube placed, and the working diagnosis was a stricture at the anastomosis. She was managed unsuccessfully with a series of nephrostomy tubes over the following six months, and attempts at nephroureteral (NU) stent placement were unable to traverse the ureterovesical junction. Urology was consulted in April 2016 for evaluation of ureteral stricture. Office cystoscopy was unremarkable. In May 2016, she had antegrade and retrograde pyelography, and we discovered a complete duplicated transplanted system (Fig. 2).

In July of 2016, Urology and Interventional Radiology (IR) performed a joint case - cystoscopy and antegrade RF guide wire creation of a ureterocystostomy (Fig. 3). We began the case by placing a cystoscope in to the bladder. Next, we instilled contrast antegrade through her nephrostomy tube, into her dilated lower pole moiety. A ureteral catheter was advanced in antegrade fashion to the distal end of the ureter. The ureter was clearly blind-ending. The RF guide wire was advanced through the catheter. The end of the RF wire is marked with a radiopaque tip, and we used this marker to help guide us. The cystoscope was used to help direct the passage of the wire, by looking for indentation on the bladder wall as the wire was manipulated at the end of the catheter. We ablated tissue with the radiofrequency energy of the wire and created a new channel between the ureter and the bladder. With direct vision from the cystoscope, we confirmed entry of the RF wire into the bladder. A flexible grasper was used to bring the wire out through her urethra. We then placed an NU stent over the wire, in order to allow the neoanastomosis to heal.

Over the next several months, imaging with IR demonstrated a persistent ureteral stricture and attempts at clamping the nephrostomy tube failed. In October 2016, she underwent stent exchange and repeat neo-ureteral tract dilation. In December 2016, she underwent laser incision of the neoanastomosis due to the persistent stricture. The NU stent was exchanged for a percutaneous nephrostomy tube. Ultimately, a nephrostogram showed a patent neoanastomosis. The percutaneous nephrostomy tube was removed in January 2017, without further complication to date.

Discussion

A DCS is the most common congenital renal variant, accounting for nearly 1% of all live births, and occurring twice as often in females.[2] A DCS usually remains asymptomatic throughout life. In a

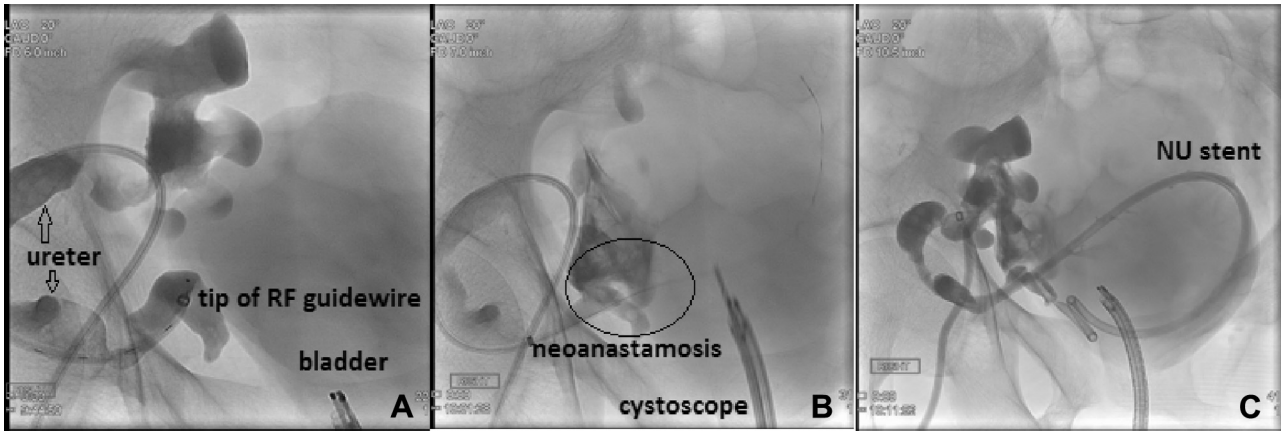

Figure 3. The joint procedure between Urology and IR - creation of the ureterocystostomy. The RF guide wire is advanced through a catheter to the distal end of the blind ending ureter, and the cystoscope is used to help direct the passage of the wire (A). The RF wire has successfully created a new channel and is now within the bladder (B). At the end of the case, there was successful placement of an NU stent (C).

recent study, Alberts et al. reported the incidence of kidney transplantation with a duplicated ureter to be 0.8%, in a group of 1588 transplantations performed between 1995 and 2012 at their center.[1] While it is much less common to encounter a DCS in a transplanted kidney, there have been several approaches to initial surgical implantation reported in the literature.[1,4]

The first documented case of a cadaveric kidney transplant with a DCS was published in 1971.[3] Since this original case, 159 additional patients receiving kidney transplantation with duplicated ureters have been described in the literature.[1,6,8] There are conflicting reports as to whether or not the presence of multiple ureters from a donor kidney is associated with a higher complication rate in the transplant kidney patient population.[1,4,6,8] There is no consensus as to whether a renal graft with a known DCS is a contraindication for use in the transplant setting.[1]

Recent advances in IR have produced a novel RF guide wire, which has been shown to effectively recanalize central vein occlusions.[5] The RF guide wire uses radiofrequency energy to vaporize tissue. It was developed to traverse occluded blood vessels, and its use is intended to create a channel in an occluded vessel. Although used historically for revascularization, we show in this case that it can be used to recanalize a ureteral obstruction in the duplicated transplant system. Upon review, we found one prior paper published on the use of the RF wire in urology.[9]

Conclusion

The discovery of an occluded DCS in the renal transplant setting is a rare occurrence that requires correction. Ureteric neoanastomosis with the use of a RF guide wire is one option to correct this problem.

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Conflicts of interest

None.

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None.

References

1. Alberts VP, Minnee RC, Van donselaar-van der pant KA, et al. Duplicated ureters and renal transplantation: a case-control study and review of the literature. *Transpl Proc*. 2013;45(9):3239–3244.
2. Campbell M. Anomalies of the Ureter. In: Campbell MF, Harrison JH, eds. *Urology*. 3rd ed. Philadelphia, PA: WB Saunders Co; 1970:1488.
3. Ackermann JR, De preez M, Rösemann E. The transplantation of a cadaver kidney with ureteral duplication: a case report. *J Urol*. 1971;106(4):494–496.
4. Haferkamp A, Dörsam J, Möhring K, Wiesel M, Staehler G. Ureteral complications in renal transplantation with more than one donor ureter. *Nephrol Dial Transpl*. 1999;14(6):1521–1524.
5. Guimaraes M, Schonholz C, Hannegan C, Anderson MB, Shi J, Selby B. Radiofrequency wire for the recanalization of central vein occlusions that have failed conventional endovascular techniques. *J Vasc Interv Radiol*. 2012;23(8):1016–1021.
6. Lasaponara F, Dalmasso E, Bosio A, et al. Kidney transplant grafts with complete ureteral duplication. *Exp Clin Transpl*. 2013;11(6):507–509.
7. Ghazanfar A, Zaki MR, Pararajasingam R, et al. Outcome of kidney transplant with double ureter: a multicenter study. *Exp Clin Transpl*. 2015;13(2):152–156.
8. Nemes B, Kanyári Z, Zádori G, et al. Horseshoe kidney transplantation. *Interv Med Appl Sci*. 2015;7(2):85–89.
9. Nirmalarajan S, Borowski A, Gearhart JP, et al. Urethral recanalization using a radiofrequency guide wire and a rendezvous approach for traversal of a pelvic fracture urethral distraction defect. *J Vasc Interv Radiol*. 2016;27(11):1768–1770.