Inguinal Herniation of a Transplant Ureter: Lessons Learned From a Case of “Water Over the Bridge”

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Abstract

Inguinal herniation of the transplant ureter is rare, and there is a paucity of reports in the literature. Herniation is usually secondary to implanting a long redundant ureter and may be precipitated by its course over the spermatic cord. Most often, there is loss of the allograft owing to delayed presentation and chronic ureteric obstruction. Here, we report a case of inguinal herniation of a transplant ureter with obstruction and graft dysfunction.

A 72-year-old man presented 9 years after deceased-donor kidney transplant, with progressive graft dysfunction and a symptomatic right inguinal hernia. A nephrostogram and subsequent surgery confirmed herniation of a loop of transplant ureter into the inguinal canal with a proximal dilated ureter and hydronephrosis. A long and redundant ureter had been anastomosed “over” the spermatic cord to the bladder during the original operation. The ureter was shortened by excising the distal segment, and the proximal dilated ureter was anastomosed to the bladder passing it “underneath” the spermatic cord. We used a Vicryl (polyglactin 910) mesh to repair the hernia. The graft function improved to baseline levels after the nephrostomy and remained stable after the surgery.

This case emphasizes the need to keep the ureter short, and the importance of passing it underneath the spermatic cord before anastomosing to the bladder. Transplant and general surgeons should be aware of such presentations of graft dysfunction with inguinal hernia to avoid delayed diagnosis and graft loss.

Key words: Kidney transplant, Hydronephrosis, Graft dysfunction

Introduction

Renal transplant is the optimal treatment for end-stage renal disease. Surgical techniques for renal transplant are well established, and the procedure is associated with low complication rates when compared with other abdominal organ transplants. Ureteric implant techniques vary among transplant centers and among transplant surgeons. Most surgeons will shorten a redundant ureter before an anastomosis for it to take a direct course to the bladder, which avoids the risk of kinking and ischemic strictures. In men, transplant ureters are passed under the spermatic cord (“water underneath the bridge”) before anastomosing it to the bladder. The latter avoids kinking and obstruction because of a taut spermatic cord.

Inguinal herniation of the transplant ureter is rare after a renal transplant and there is a paucity of reports in the literature. Most often, the allograft is lost because of delayed presentation and chronic ureteric obstruction. Here, we discuss a case of inguinal herniation of a transplant ureter to learn from this case and avoid future complications.

Case Report

A 72-year-old man presented with progressive graft dysfunction and a symptomatic right inguinal hernia 9 years after undergoing a renal transplant. He had received a deceased-donor renal transplant (donation after brain death) for end-stage renal disease.
secondary to IgA nephropathy. The graft was implanted extraperitoneally through a Gibson incision in the right iliac fossa. There were a single renal artery and a vein, which were implanted on the external iliac vessels. The ureter was implanted onlay to the bladder over double J stent. The patient had stable renal functions and was given immunosuppression with cyclosporine and azathioprine.

He presented with progressive groin swelling, which caused pain and discomfort of 6 months' duration. At presentation, the hernia was completely reducible. The patient wanted surgical repair for the hernia and on preoperative screening, we noted that his serum creatinine concentration had risen from the baseline of 150 to 160 μmol/L to 304 μmol/L. Six months before presenting, the patient had undergone a transperitoneal laparoscopic radical left native nephrectomy for a renal cell cancer (PT1a, N0, M0, Fuhrman grade 3). Otherwise, there was no relevant social or familial history linked to this presentation.

An ultrasound scan of the transplant kidney showed hydronephrosis with a dilated pelvicaliceal system and proximal ureter. An urgent percutaneous nephrostomy was done, and the serum creatinine concentration returned to its baseline level. An antegrade nephrostogram confirmed hydronephrosis with a grossly dilated proximal ureter, which looped back onto itself, protruding down into the right inguinal canal (Figure 1). The distal ureter was of smooth caliber, with no focal obstructing lesions; contrast medium passed into the bladder (Figure 1).

The patient underwent elective surgical exploration via the previous transplant incision, so we could view the simultaneous reconstruction of the ureter and repair of hernia. The inguinal hernia contained grossly distended transplant ureter looped back onto itself (Figure 2). This was traced distally over the spermatic cord, to the nondilated lower ureter; it was evident that a long redundant ureter had been anastomosed to the bladder over the spermatic cord when the original transplant had been done (Figure 3A). The ureter was shortened by excising the distal segment, and the proximal dilated ureter was anastomosed to the bladder by passing it underneath the spermatic cord using an onlay technique over a double J stent (Figure 3B). We used a Vicryl (polyglactin 910) mesh (Ethicon, West Somerville, NJ, USA) to repair the hernia.

The patient's serum creatinine concentration returned to baseline levels within a few days after nephrostomy, where it remained stable postoperatively.

Figure 1. Nephrostogram Showing Hydronephrosis and a Dilated Proximal Ureter Looping Down Into the Inguinal Canal

Figure 2. An Operative Photograph Showing a Dilated Ureter Crossing Over the Spermatic Cord

Figure 3A. A Schematic Representation of the Ureteric Herniation (the Redundant Ureter Passes Over the Spermatic Cord)

Figure 3B. A Schematic Representation of the Ureteric Reconstruction (the Ureter Correctly Passes Under the Spermatic Cord)
Discussed

Transplant ureteric obstruction are mostly due to ureteric strictures, can occur up to 5% of renal transplants. 12 Other causes of ureteric obstruction are ureterolithiasis, kink, preexisting pelvicureteric obstruction, external compression, and BK virus infection. 13 Inguinal herniation of a transplant ureter is rare after a renal transplant and usually is associated with implementing a long redundant ureter, as was the case in our patient. Additionally, in our patient, the ureter had been passed over the spermatic cord, which may have led to the obstruction.

Two events prior to presentation may have precipitated the hernia and/or the obstruction. The patient underwent a transperitoneal laparoscopic procedure 6 months before the presentation, and the increased intra-abdominal pressure and exacerbation of weakness of the abdominal musculature may have contributed to the hernia. The long and redundant ureter then herniated into the inguinal canal with a secondary obstruction leading to progressive graft dysfunction. The patient also had symptoms of urinary outflow obstruction, which may have contributed to herniation by raising the intra-abdominal pressure. An alternate explanation is that the process began by obstructing the ureter because of its course over the spermatic cord. The distended and redundant proximal ureter then took the easiest way into the hernia sac. Transplant ureteric herniation after a laparoscopic procedure and ureteric obstruction because of its passage over the spermatic cord both have been described. 14,15

Irrespective of the actual sequence of events, there were 2 avoidable factors, which led to this complication: (1) implantation of a long redundant ureter, and (2) the course of the ureter in its relation to the spermatic cord. Herniation of the ureter through the transplant wound is not uncommon; however, herniation into the inguinal canal is rare and is always associated with implanting a long ureter. 16 This complication could have been avoided with a short direct course of the ureter to the bladder passing underneath the spermatic cord. Although our patient was managed surgically, Pourafkari and associates 3 reported a conservative approach with ureteroscopic dilatation and a retrograde catheter insertion in a surgically unfit patient, thereby relieving the ureteric obstruction. Their patient died of cardiac arrest 4 months after the procedure.

Given the current situation with the shortage of donor organs, it is imperative that grafts are not lost from avoidable factors. The case also underscores the need for urgent decompression in any case of renal obstruction, so that irreversible damage is avoided to functional renal units. Transplant and general surgeons must be aware of such presentations of graft dysfunction with inguinal hernia, so as to avoid delayed diagnosis and prevent graft loss.

References