Abstract

The decision-making process for treatment of patients with end-stage renal failure, multiple failed renal transplants, and severe comorbidities can be exceedingly difficult due to the inapplicability of many common surgery methods. In this article, we report the treatment of such a patient who underwent a third renal transplant and subsequently developed a ureteral stenosis. The third kidney had been transplanted with a high abdominal position and a partially intra- and retroperitoneally placed ureter due to a bilaterally obtained iliac fossa and severe abdominal adhesions. For the severe ureteric stenosis, an alternative urinary tract reconstruction was developed by making use of the native ureter contralateral to the graft by tunneling under the sigmoid. We recommend this surgical method as a valid alternative for patients with severe ureteric graft stenosis, when treatment with stenting and common surgical ureter reconstruction methods are not feasible.

Key words: Complex receptor, Constriction, End-stage renal disease, Orthotopic, Pathologic, Ureter

Introduction

The decision-making process to treat patients with end-stage renal disease and an extensive medical background, including multiple failed transplants and severe comorbidities, can be extremely difficult. In this article, we report the surgical treatment of such a patient who underwent a third renal transplant procedure and subsequently developed a ureteral stenosis of the transplanted kidney.

Case Report

Patient history

A 22-year-old man was admitted to the hospital for a third transplant due to end-stage renal failure. His medical history included premature birth with perinatal asphyxia, spastic tetraplegia, mild mental retardation, and severe vertebral column scoliosis. He developed end-stage renal failure by perinatal asphyxia and dysplasia of the kidneys and a neuropathic bladder by tetraplegia. As a result of continuous infectious diseases, he received nephrectomy of both kidneys, without the removal of both ureters. In 2001, he started on peritoneal dialysis, which was replaced by hemodialysis 1 year later. In 2006 and 2008, he received renal transplants in the right and the left iliac fossa, respectively, which
were both rejected but not removed. The patient returned to hemodialysis but preferred to receive a third transplant.

**Third transplant procedure**

In November 2014, the patient received a renal transplant from a donor after cardiac death, which had an acceptable mismatch of panel reactive antibody of 99%, mismatch 0-1-0 (*Cytomegalovirus* test negative, *Epstein-Barr virus* test negative). The donor’s left kidney was placed high at the right side of the recipient’s abdominal cavity because the left side was not feasible due to deterioration of the kyphosis through aging. The old right transplant incision was extended to the upper side of the abdomen. This, however, was done using an intraperitoneal approach because the retroperitoneal approach had been impossible due to severe adhesions after peritoneal dialysis and the first transplant. In addition, the ureter was placed partially intra- and retroperitoneally due to these adhesions. The distal part was anastomosed with the urinary bladder by means of the Lich-Gregoir technique, and a ureteral stent (J stent) was placed as a routine stent. The vascular anastomoses of the kidney were done end-to-side to the vena cava and in the lower part of the aorta. Because the kidney was placed high in the abdominal cavity, the distance from the kidney to the urinary bladder was longer than average. However, after kidney reperfusion, vascularization of the distal ureter was good.

The kidney functioned properly after transplant. However, 2 weeks later, the patient developed pain at the side of the renal transplant. Additional investigations revealed a mild to moderate hydronephrosis with stenosis of the distal ureter (Figure 1). The hydronephrosis was treated by a nephrostomy drain and retrograde placement of a J stent. Because of recurrent dilation of the collecting system after removal of the nephrostomy drain and the stent, reconstruction of the ureteric stenosis using the native ureter was considered. An urethrocytoscopy measurement was performed to assess the integrity of the native ureters by the insertion of a catheter from the urinary bladder. This measurement revealed 11-cm right and 25-cm left native ureter lengths. On the basis of these results, it was agreed to anastomose the transplanted ureter with the left native ureter.

**Ureter reconstruction procedure**

A median laparotomy was performed. The sigmoid and the colon descendens were mobilized and freed from the retroperitoneum. The whole longer portion of the left native ureter was mobilized from the urinary bladder up to the colon’s splenic flexure. The mobilized portion of the left ureter was vital and well vascularized. During the next step, the freed portion of the left ureter was tunneled under the sigmoid close to the proximal part of the ureter of the transplanted kidney. The ureter of the transplanted kidney was dissected from the retroperitoneum up to the stenosis, and it was subsequently ligated close to the renal pelvis of the transplanted kidney and cut. An end-to-end anastomosis was made between the ureter of the transplanted kidney and the left remaining native ureter using polydioxanone 4/0 suture and placement of a J stent. The anastomosis was tested with sterile 0.9% NaCl for leakage and good passage into the urinary bladder. The test revealed no leakage and good passage to the urinary bladder. The peritoneal cavity was drained with one drain placed close to the ureter-ureter anastomosis, and the abdomen was closed. The postoperative course was without severe complications. Two days later, antegrade pyelography revealed good passage
to the urine bladder (Figure 2). The peritoneal drain was successfully removed after 8 days, the J stent after 14 days, and the nephrostomy drain after 25 days. On day 29, the patient was discharged from the hospital. After 13 months, the third transplanted kidney developed chronic rejection; despite medical treatment, this resulted in a transplantectomy.

**Figure 2. Antegrade Pyelogram After Ureter Reconstruction of the Transplanted Kidney Revealing a Good Passage Into the Urine Bladder and an In Situ Placement of the Nephrostomy Drain and J Stent**

**Discussion**

In cases unsuitable for heterotopic renal transplant, an orthotopic renal transplant is worth considering. Two recent studies have recommended this technique for patients with advanced atherosclerosis disease of the iliac arteries, bilaterally retained iliac fossae from previous kidney transplants, pelvic malformations, venous thrombosis, and obesity. The studies additionally described that the orthotopic technique is challenging, with a slightly higher complication rate. Nevertheless, the present case reveals that an almost orthotopic position between the right common iliac artery and the patient’s liver is feasible in highly complicated cases with one of these indications.

The complication rate of ureteric stenosis after orthotopic transplant is slightly higher than the rate of ureteric stenosis in heterotopic renal transplants. It remains arguable whether this is caused by poor vascularization due to an above-average length of the transplanted ureter. Two retrospective studies stated that the length of the transplanted ureter does not affect postoperative urologic complications, but these studies do not mention a ureter length exceeding 12 cm.

Most common ureter reconstruction methods are not feasible in patients with extensive medical history. An anastomosis to the native ureter can be an appropriate method. However, Pike and associates stated that this method was not appropriate as dissection of the native ureter is often difficult in the presence of a transplanted kidney and the integrity of a native ureter is mostly not known or investigated. Here, however, we showed that assessment of the integrity of the ureters can be done properly by urologists using urethrocystoscopy during the preoperative period. Moreover, this method provides the opportunity to directly measure the length of the rest of the ureter and to place into the lumen of the ureter one of the stents to make it easier to find the ureter during the operation.

Use of the contralateral native ureter in graft ureter reconstruction has, to the authors’ knowledge, only been described in detail in the study of Orlando and associates. Their technique entailed retroperitoneoscopic preparation of the native ureter contralateral to the renal graft, followed by an open anastomosis to the transplant ureter through the Retzius space. Retroperitoneoscopic preparation allows for surgery with high precision; however, in our case, an open approach with tunneling under the sigmoid was preferred because of the patient’s complex anatomy.

In conclusion, renal transplant with a high abdominal position is an appropriate alternative in cases unsuitable for heterotopic transplant, even in patients with severe comorbidities. In addition, ureter reconstruction by use of the native ureter contralateral to the graft through tunneling under the sigmoid is a recommended and a safe surgical approach for a ureteric stricture when treatment with stenting and primary surgical reparation are not feasible.

**References**