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BRIEF REPORT

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Successful transplantation of pediatric en bloc kidneys with bilateral double ureters

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Abstract We report a case in which en bloc kidneys with bilateral double ureters from a 5-month-old donor were successfully transplanted into a 25-year-old recipient. No stents were used. There were no complications after the transplant. The patient remains well at more than 1.5 years post-transplantation with serum creatinine 1.2 mg/dl.

Key words Kidney transplantation, pediatric en bloc, double ureters · Pediatric en bloc kidneys, double ureters · Double ureters, pediatric en bloc kidneys

Introduction

The shortage of cadaver kidneys is a serious problem that restricts the application of kidney transplantation. The use of pediatric kidneys has been limited due to concerns over long-term functional capability, technical complications, and early graft loss. To overcome these problems, some centers perform en bloc transplants of pediatric kidneys, with graft and patient survival similar to that obtained with adult donors [4]. Nonetheless, the rate of technical complications in recipients of en bloc kidneys remains relatively high. Vascular thrombosis and acute graft rejection are the most common causes of early and late graft losses [6]. Urological complications are less common and have less impact on graft survival but can contribute to morbidity after transplantation [5]. Anatomical renal anomalies are common and, if not recognized, can also contribute to complications during either procurement or transplantation [8]. They may also be the reason for refusal of such kidneys by the transplant centers. We report herein the successful transplantation of pediatric en bloc kidneys with bilateral double ureters. To the best of our knowledge, this problem has not been previously encountered.

Case report

A set of pediatric en bloc kidneys from a 5-month-old donor was allocated for a 25-year-old female kidney transplant candidate with end-stage renal disease secondary to hypertension. She had been on continuous ambulatory peritoneal dialysis for 7 months prior to transplantation. There was a 2-antigen match in the HLA-A and -B loci and a 0 antigen match in the HLA-DR locus. T- and B-lymphocyte crossmatches were negative. The presence of single ureters bilaterally was reported by the procurement team. The backtable graft preparation was done routinely with oversewing of the aorta and vena cava proximally to the renal vessels. Upon examination of the ureters, bilateral duplication was encountered. The graft implantation was performed extraperitoneally in the right iliac fossa, with end-to-side anastomoses of the distal aorta of the graft to the recipient's right external iliac artery and the vena cava of the graft to the external iliac vein of the recipient. The graft was reperfused, and urine output was observed a few minutes later. Cold ischemia time was 27 h. Both pairs of ureters were shortened appropriately and satisfactory perfusion of the ureters was confirmed by the bleeding from the cut edges. The posterior walls of all four ureters were spatulated, and paired ureters were joined by anastomoses of their medial edges using continuous 7–0 PDS suture (Fig. 1). Two separate Lich ureteroneocystostomies were done 2 cm apart using continuous 6–0 PDS suture. No stents were used. The patient had an uneventful postoperative course, with no need for dialysis post-transplant. Her induction immunosuppression included Neoral, Cellcept, and prednisone; her maintenance immunosuppression included Neoral and prednisone.

The patient was discharged from the hospital on post-transplant day 7 with a serum creatinine of 2.4 mg/dl. Sequential renal scans with 99m-Tc DTPA performed on the 1st, 5th, 18th, and

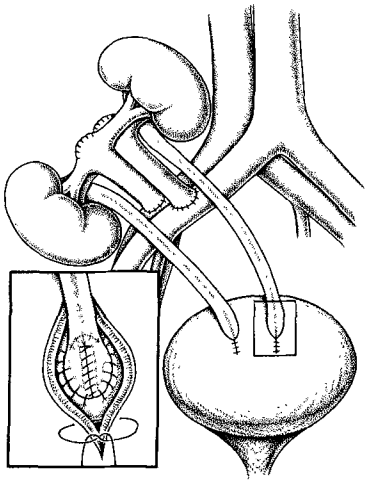

Fig. 1 The ureteroneocystostomy technique of the en-bloc kidney graft with bilateral double ureters

55th days after transplantation demonstrated improving renal function and increasing kidney size. Duplex Doppler evaluation of the graft on post-transplant day 27 showed a normal vascular flow pattern and absence of hydronephrosis. Presently, more than 1.5 years after transplantation, the patient remains well, with a serum creatinine of 1.2 mg/dl. She is normotensive on 30 mg of nifedipine daily. There have been no episodes of rejection.

Discussion

On the basis of Campbell's description, the incidence of ureteral duplication is 1 in 125, or 0.8%, and unilateral duplication occurs about six times more often than bilateral duplication [10]. Pollak et al. analyzed anatomical data on 800 cadaver kidneys procured for transplantation and found the incidence of double ureters to be about 1%, with no cases of bilateral ureteral duplication observed [8].

The first transplantation of a single kidney with double ureters was reported by Prout et al. in 1967. Two patients had received renal allografts with completely duplicated collecting systems from related donors. There were no complications related to this anomaly [9]. A poor outcome after transplantation of the kidney with bifid ureter was reported by Ackermann et al. In this case, the patient developed necrosis of the lower ureter, which resulted in persistent urinary leak. It was suggested that this complication was the result of an anomalous blood supply to that ureter. The authors concluded that any kidney with ureteral duplication should not be used [1].

Because of the uncertainty of blood supply to the duplicated ureter, Fjeldborg and Kim used a technique in which the double ureters were cut at the ureteropelvic junction, joined together, and anastomosed to the recipient's ureter [3]. This technique might unnecessarily sacrifice the donor ureter and close an avenue for secondary repair. Therefore, emphasis was placed on careful preservation of the ureteral blood supply by minimizing the hilar dissection and performing ureteroneocystostomy instead [2]. Ureteral reimplantation in kidney transplantation can be performed intravesically (Politano-Leadbetter method) or extravesically (Gregoire-Lich method) with similar results. The same principal was applied for reimplantation of two ureters in cases of either ureteral duplication [2, 9] or en bloc grafts [7]. The ureters were implanted separately [4] or as a single unit after the spatulation and conjoinment of their posterior walls [7]. The routine use of stents for double ureter support in transplantation has been advocated by some authors [7].

There are no reports in the literature on management of ureteral duplication in en bloc kidney grafts. We think that this particular anomaly may serve as the ground for denial of such grafts by the transplant centers. This case report suggests that transplantation of pediatric en bloc kidneys with ureteral duplication can be done safely with meticulous ureteroneocystostomy.

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