Successful Transplant of a Kidney With Fibromuscular Dysplasia Having Higher Glomerular Filtration Rate Than the Contralateral Kidney

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Abstract

Fibromuscular dysplasia is the second-most commonly encountered anatomic abnormality in potential renal donors. Normotensive patients with medial fibroplasia and low-grade lesions have been used as renal donors. However, no studies have reported the optimal choice of a kidney for donation where the kidney with fibromuscular dysplasia had a larger volume and a higher glomerular filtration rate than the unaffected side. Herein, we report a case of renal transplant using a kidney with fibromuscular dysplasia that had higher glomerular filtration rate than the normal side. After transplant, hypertension and abnormal serum creatinine did not occur in either the donor or the recipient during 12 months’ follow-up.

Key words: Fibromuscular dysplasia, Kidney transplant

Introduction

For patients with end-stage renal disease, kidney transplant is the optimal treatment, giving the recipient the chance to be free of dialysis. With an increasing number of patients awaiting renal transplants, more live donors are being sought to meet the increasing demand. Fibromuscular dysplasia is the second most-common anatomic abnormality during donor evaluation. In patients with unilateral or bilateral fibromuscular dysplasia, nephrectomy was performed on the same side, or on the side with the more-severe lesion. However, no studies have reported whether using the affected side, with a higher glomerular filtration rate, could ensure donor safety. Here, we report a successful case of transplant of a kidney with fibromuscular dysplasia, but with a higher glomerular filtration rate than the other side without fibromuscular dysplasia.

Case report

A 35-year-old Korean woman was admitted for donor work-up before renal transplant. She had volunteered to donate a kidney to her husband who had been diagnosed with end-stage renal disease, and had no other history of systemic diseases (such as diabetes and hypertension). On admission, her blood pressure was 110/70 mm Hg.

The results of a chest radiography were normal, and both kidneys showed normal echogenicity and intact corticomedullary differentiation. The donor’s kidneys were within the normal size range: the right kidney measured 10.7 cm by 5.4 cm, and the left kidney measured 11 cm by 5.8 cm. The results of the urinalysis were normal. The blood urea nitrogen and serum creatinine concentrations were 4.8 mmol/L (normal, 2.6-7.3 mmol/L) and 0.05 mmol/L (normal, 0.05-0.11 mmol/L).

The donor underwent a spiral computerized technology (CT) scan with 3-dimensional (3D) reconstruction (Figure 1A). The results revealed a single left renal artery with focal irregularity in the distal portion of the artery, suggestive of low-grade fibromuscular dysplasia (FMD), which was confirmed by renal angiography (Figure 1B). She also underwent a renogram with Tc-99m DTPA, in which the GFR of the left kidney was computed at
64.1 mL/min (57%) and the right kidney was computed at 48.4 mL/min (43%), yielding a total GFR of 112.5 mL/min (Figure 2). The kidney volume was measured by CT scanning with 3D reconstruction, and values for the right and left kidneys were 165 and 202 cm² (Figure 3).

There were no suitable donors for the recipient other than his wife. Therefore, donor nephrectomy was performed on the side with FMD, which had higher GFR than the normal side. Nephrectomy was accomplished using a laparoscopic approach, and the donor was discharged from the hospital on the third postoperative day with serum creatinine level of 0.06 mmol/L and normal blood pressure. The allograft function of the recipient was prompt, and the serum creatinine was 0.07 mmol/L with good blood pressure control at discharge. During follow-up, neither the donor nor the recipient had any hypertension. At 12 months’ follow-up, the serum creatinine levels of the donor and recipient were 0.06 mmol/L and 0.05 mmol/L. Lastly, the donor underwent a renogram with Tc-99m DTPA, in which the GFR of the right kidney was 91.1 mL/min.

Discussion

This is a report of a case of a renal transplant using a kidney with FMD that had higher GFR than the normal side. After renal transplant, hypertension and abnormal serum creatinine did not occur during follow-up in either the donor or the recipient.

Fibromuscular dysplasia is the second most common cause of renovascular hypertension, and is seen in 2.0% to 6.6% of potential donors.4, 5 The most common type of FMD is medial fibroplasia, and because of its benign clinical course, patients with this form of FMD can serve as renal donors.2, 3, 6 The American Society of Transplant Physicians has provided guidelines on the suitability of kidney donors; however, there are no clear guidelines on the suitability of potential live-renal donors with asymptomatic FMD.7

Carefully selected patients with FMD have been used as renal donors. The decision to use a patient with FMD as a donor is based on the extent and severity of the disease.2, 3 Mild FMD is defined as mild irregularity of the artery without significant stenosis, and moderate FMD is defined as arterial irregularity and stenosis less than 50% stenosis. When patients with mild or moderate FMD are used as renal donors, no patients exhibit hypertension, proteinuria, or significant changes in serum creatinine levels throughout a mean follow-up of 4.5 years.2 However, Parasuraman and colleagues reported rapid progression of mild FMD 1 year after a renal transplant, suggesting that mild FMD cannot be considered benign in a potential normotensive renal
donor. Moreover, in some cases, this progression occurred in the early postoperative course. In our case, the patient had mild FMD in the distal portion of the left renal artery, which was not associated with stenosis. Previously, in cases where patients with FMD served as renal donors, nephrectomy was performed on the side with FMD. Initially, we also considered that the affected side for donation; however, the volume and GFR of the affected kidney were higher than the corresponding values of the contralateral side. In general, it is logical and ethical to leave the donor with the better-functioning side. When there is a significant difference (greater than 6 mL/min) in renal function of the kidneys, the kidney with the lower clearance is chosen for transplant. However, in cases where the affected kidney has a higher GFR than the other side—there have been no studies investigating whether using the side with higher GFR for transplant could ensure donor safety.

To select the kidney for transplant, we noted that development of FMD in normal unaffected arteries is an unusual occurrence, and thus far, only 1 such case has been reported; on the other hand, progression of FMD after a renal transplant has been reported. Therefore, considering the safety of the donor, we considered it logical to select the kidney with FMD for donation—so, nephrectomy was performed on this side. Progression of FMD in the recipient and contralateral occurrence of FMD in the donor did not occur during follow-up.

In summary, then, we report a case of successful renal transplant using a kidney with mild FMD, but with higher GFR than the unaffected side with lower GFR. After transplant, hypertension and abnormal serum creatinine did not occur in either the donor or the recipient during 12-months’ follow-up. Therefore, nephrectomy on the side with FMD would be a safe option in cases in which the potential donor with FMD has functional asymmetry.

References