Urologic Disorders in Living Renal Donors and Outcomes of Their Recipients

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ABSTRACT

Background. There is an expanding gap between the number of patients listed for kidney transplantation and the number of kidney transplantations performed annually. The use of sensitive imaging methods results in increased discovery of many urologic asymptomatic problems, such as urolithiases, renal cysts, and solid renal masses. This result has brought the question of whether all donors with these urologic disorders should be rejected for donation.

Methods. We retrospectively analyzed donor and recipient records of all living kidney transplantations performed from 2004 to 2014.

Results. Among 251 living-related donor kidney transplantations, 51 donors (20.3%) had urologic disorders. Mean donor age was significantly higher in donors with urologic disorders than in the standard donor group (50 y vs 41 y). The identified disorders were 32 renal cysts, 8 urolithiases, 3 renal tumors, 6 adrenal adenomas, and 2 microscopic hematurias. After nephrectomy, the graft kidneys with cysts were inspected carefully and all of the cortical-peripheral cysts were decorticated. Renal tumors were excised in 3 renal units. Transplantations had proceeded after the confirmation of low malignancy potentials of the lesions with safe surgical margins. Two out of 8 patients had undergone stone removal with ex vivo ureteroscopy and 1 by means of pyelotomy incision because of calix neck stenosis. None of those donors and recipients developed clinically significant renal stone disease with a mean follow-up of 28 months. Neither donors nor recipients of asymptomatic microscopic hematuria patients developed any problem with a mean 28 months' follow-up period.

Conclusions. Asymptomatic urologic problems are very common. The significance of these asymptomatic pathologies is unclear. Our results suggest that in a selected group, at least some of these candidates can be accepted for donation.

THE PREVALENCE of chronic kidney disease in Turkey is 15.7%, and ~62,000 patients are on renal replacement therapy [1]. There is an expanding gap between the number of patients listed for kidney transplantation and the number of kidney transplantations performed annually. With the improvement of minimally invasive donor nephrectomy techniques, and owing to an inadequate number of deceased-donor kidney transplantations, living-donor transplantation tended to increase in the past decade. In Turkey, living-donor kidney transplantations have reached 80% of the total.

On the other hand, with the introduction of new technologies in the field of radiology, conventional angiography has been replaced by a noninvasive method, computerized tomographic (CT) angiography. The use of sensitive imaging methods has led to increased discovery of many urologic asymptomatic problems, such as urolithiasis, that can not be diagnosed by conventional methods [2]. This result has raised the question of whether all donors with these urologic disorders should be rejected for donation.

We retrospectively reviewed living donors with urologic disorders, our criteria for acceptance, and the outcomes of their recipients.

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Table 1. Donor-Recipient Characteristics and Follow-up

Urologic Disorder	*n*	Donor Mean Age, y	Donor Mean Follow-Up, mo (range)	Recipient Mean Follow-Up, mo (range)
Renal cyst	32	51 ± 11.03	68 (8–104)	73 (9–111)
Urolithiasis	8	46 ± 15.16	26 (2–46)	30 (2–50)
Renal tumor	3	58 ± 5.50	18 (8–27)	10 (5–15)
Adrenal adenoma	6	46 ± 7.28	22 (3–76)	36 (4–94)
Microscopic hematuria	2	53 ± 7.77	17 (13–21)	21 (10–32)

MATERIALS AND METHODS

We performed a retrospective chart review of all living-related donors and recipients who underwent renal transplantation surgery from 2004 to 2014. We documented donor and recipient demographics and urologic problems in donors, such as lithiases, renal cysts, renal masses, persistent microscopic hematurias, and adrenal disorders.

RESULTS

Among 251 living-related donor kidney transplantations, we noted 51 donors (20.3%) with urologic disorders. Mean ages of these 51 donors and recipients were 50 years (range, 28–72 y) and 32 years (range, 10–60 y), respectively. Mean ages of the 251 standard donors and recipients were 41 years (range, 21–72 y) and 29 years (range, 6–73 y; Table 1). Mean donor age was significantly higher in donors with urologic disorders.

Among those 51 donors, 32 (12.7%) had renal cysts, 12 of them bilateral. Autosomal dominant polycystic kidney disease (ADPKD) was ruled out with the use of radiologic diagnostic criteria for ADPKD [3]. After nephrectomy, the graft kidneys were inspected carefully and all of the cortical-peripheral cysts were decorticated. In 2 renal units frozen-section histologic examination was performed and both frozen and definite pathologic reports were benign.

Renal tumors were excised in 3 renal units. Of those only 1 11-mm renal Bosniac type 2F renal cyst was diagnosed preoperatively. The other 2 lesions (5 mm and 6 mm) were noticed on the back table after removing the kidneys laparoscopically. All lesions were excised. Frozen-section pathologic evaluation revealed 1 oncocytic papillary renal cell carcinoma, 1 renal oncocytoma, and 1 renal epithelial neoplasm of low malignant potential. Transplantations had proceeded after the confirmation of low malignancy potentials of the lesions with safe surgical margins. Only with the donor who had Bosniac 2F cyst, our team discussed the risks of renal malignancy for donor and recipient and obtained informed consents. Informed consents were obtained from family members for the other 2 recipient and donor pairs owing to preoperatively unrecognized renal tumors. Recipients had 11, 15, and 5 months of follow-up, respectively, and ultrasonography did not demonstrate any pathology. Donors had 27, 19, and 8 months of follow-up, respectively, also without any radiologic pathology.

A total of 8 patients were donated a kidney with ≥1 stone. Only unilateral kidney stones with normal metabolic parameters were accepted as donors, and stone-bearing kidney were harvested for grafting. The mean stone size of 8 patients was 5 mm (range, 2–16 mm). Two out of 8 patients had undergone stone removal with ex vivo ureteroscopy. In the kidney with a 16-mm stone, lithotripsy was performed via pyelotomy incision owing to calix neck stenosis. The recipient of this kidney required additional retrograde intrarenal surgery 3 months after transplantation for 2 small residue stones. Others who had small stones <3 mm did not undergo any additional procedures. None of those donors and recipients developed clinically significant renal stone disease with a mean follow-up of 28 months (range, 2–50 mo).

Two donors with asymptomatic microscopic hematuria at the ages of 48 and 59 years were evaluated with cystoscopy, cytology, and CT. After malignancy risk was ruled out, renal biopsies were performed. Pathologic examination revealed thin basal membrane disease. After risks were discussed with donor and recipient pairs, transplantation proceeded. Neither donors nor recipients developed any problem with a mean 19 months' follow-up period.

In addition to donor nephrectomy, adrenalectomy was performed in 6 patients with preoperative radiologically benign and nonfunctioning adrenal lesions. Pathology evaluation revealed adrenal adenomas for all adrenalectomies.

With a mean 34 months (range, 1–111 mo) of follow-up, mean serum creatinine level of those recipients was 1.62 ± 1.45 mg/dL. Only 2 patients returned to dialysis, owing to noncompliance and focal segmental glomerulosclerosis recurrence at 49 and 35 months, respectively.

DISCUSSION

Currently at our center, CT angiography is a standard procedure for donor evaluation. The increased sensitivity of CT angiography increases the detection of asymptomatic pathologic conditions [2]. This high sensitivity may cause a higher refusal rate and may decrease the donor pool. On the other hand, the clinical significance of many of these findings is unclear. Identification of some preoperatively unrecognized pathologies during donor surgery is another significant issue. We retrospectively reviewed our data to analyze our clinical attitudes.

In the present series, donors with urologic pathologies constituted 20% of all donors. This rate of urologic disorders would have a significant impact on the living donor pool. Another finding is that the mean age of donors with urologic pathologies was significantly higher than the others and usually >40 years. It is obvious that having a disease such as urolithiasis or renal cyst does not have the same risk for elderly versus young populations. The most common incidental pathologies were renal cysts, urolithiases, and asymptomatic adrenal lesions.

Cystic renal diseases are a common finding in normal population, especially over the age of 50 years, with an incidence ranging from 25% to 40%. After malignancy and autosomal dominant polycystic kidney disease have been ruled out, the use of grafts with renal cysts is universally considered to be acceptable [4].

Nephrolithiasis is also a very common urologic problem. Use of CT in potential kidney donor evaluation for renal vascular imaging has increased the detection of small asymptomatic kidney stones, which may present up to 5% in donor population undergoing a noncontrast CT scan [5]. Currently, candidates with unilateral urinary calculi with normal metabolic evaluation and older than 40 years can be accepted for donation [4]. A stone-bearing kidney should be removed for donor safety. We don't recommend ex vivo lithotripsy for large stones owing to the chance of stone spillage. Stones <3 mm do not need additional procedures for stone removal. Donors and recipients should be informed about recurrence risks and need close follow-up.

Small renal masses on CT angiography, as well as undetectable lesions of renal parenchyma, are another issue for donation. In the present series, only 1 out of 3 tumoral renal lesions were detected preoperatively. The other 2 were noticed after removal of the kidney. In those, we removed the lesions and transplantations proceeded after the confirmation of low malignancy potentials of the lesions according to frozen-section examination. This is not only an oncologic but also an ethical issue. Informed consents had to be obtained for both donor and recipient from their family members during the operation. Kidneys with small incidental tumors and favorable pathologic characteristics can be considered for transplantation [6]. Both donor and recipient should be informed about risks and benefits and must be followed closely for oncologic issues.

Isolated asymptomatic microscopic hematuria is usually not a benign condition. Many nonglomerular diseases, such as infections tumors, can cause microscopic hematuria; glomerular diseases, such as thin basement membrane disease, hereditary nephritis, and IgA nephropathy, may also be sources of microscopic hematuria. After exclusion of nonglomerular pathologies, all candidates should be biopsied before donation to rule out underlying asymptomatic glomerular pathologies [7]. Our patients' biopsies confirmed thin basal membrane disease. Our patients' ages were 48 and 59 years; risk for progressive renal disease is small at these ages. We discussed with donors the risks and benefits for the recipient and decided to advance to transplantation.

Use of high-sensitivity CT angiography has led to the identification of increasing number of adrenal incidentalomas as well. Surveillance is recommended for nonfunctional and radiologically benign masses. Simultaneous adrenelectomy at the time of laparoscopic live kidney donation is safe and can be undertaken in selected cases [8]. Malign potential of these lesions is insignificant. In the present series, all adrenal masses were reported as benign adenoma. This result suggests that donor candidates with radiologically benign nonfunctioning adrenal lesions can be safely accepted.

In conclusion, asymptomatic urologic disorders are very common. Use of CT angiography may increase detection of incidental pathologies. The significance of these asymptomatic pathologies is unclear. Our results suggest that in a selected group, at least some of these candidates can be accepted for donation. However, the present study has some limitations, such as its retrospective nature and short follow-up period. Further studies with long-term follow-up should be designed to identify the impact of urologic pathologies on donors and their recipients.

REFERENCES

[1] Suleymanlar G, Utas C, Arinsoy T, et al. A population-based survey of Chronic Renal Disease in Turkey—the CREDIT study. Nephrol Dial Transplant 2011;26:1862–71.

[2] Strang AM, Lockhart ME, Kenney PJ, et al. Computerized tomographic angiography for renal donor evaluation leads to a higher exclusion rate. J Urol 2007;177:1826–9.

[3] Ravine D, Gibson RN, Walker RG, et al. Evaluation of ultrasonographic diagnostic criteria for autosomal dominant polycystic kidney disease 1. Lancet 1994;343:824–7.

[4] Delmonico F, Council of the Transplantation Society. A report of the Amsterdam Forum on the Care of the Live Kidney Donor: Data and medical guidelines. Transplantation 2005;79: S53–66.

[5] Olsburgh J, Thomas K, Wong K, et al. Incidental renal stones in potential live kidney donors: prevalence, assessment and donation, including role of ex vivo ureteroscopy. BJU Int 2013;111: 784–92.

[6] Musquera M, Perez M, Peri L, et al. Kidneys from donors with incidental renal tumors: should they be considered acceptable option for transplantation? Transplantation 2013;95: 1129–33.

[7] Kido R, Shibagaki Y, Iwadoh K, et al. Persistent glomerular hematuria in living kidney donors confers a risk of progressive kidney disease in donors after heminephrectomy. Am J Transplant 2010;10:1597–604.

[8] Molmenti EP, Pinto PA, Montgomery RA, et al. Concomitant surgery with laparoscopic live donor nephrectomy. Am J Transplant 2003;3:219–23.