ORIGINAL ARTICLE

Eastern Journal of Medicine
East J Med 24(4): 515-519, 2019
DOI: 10.5505/ejm.2019.43760

Detection of Diseases, In Renal Donor Patients, During the Posttransplant Period and Researching Risk Factors

Murat Alay[1*], Taner Kara[2]

[1]Van Yuzuncu Yil University, Medical Facutly, Department of Endocrinology and Metabolism, Van, Turkey
[2]Van Yuzuncu Yil University, Medical Facutly, Department of Internal Medicine, Van, Turkey

ABSTRACT

Kidney donors are followed up periodically for health problems such as chronic renal failure(CRF), hypertension(HT), diabetes mellitus(DM) that may develop after transplantation. The aim of this study was to determine the disease and to investigate the risk factors in renal donors followed in the outpatient clinic of the nephrology.

In this study, 40 patients with renal donors aged between 18-75 years who were admitted to the nephrology clinic were included. From all donors; anamnesis was taken to determine if there was any disease after kidney transplantation and physical examinations were performed.Donors have previously looked at; 24-hour urinary glomerular filtration rate(GFR) and proteinuria measurement, creatinine, alanine aminotransferase(ALT), fasting glucose, hemoglobin A1c(HgbA1c) values were recorded. According to the physical examination and laboratory results of the donors, systemic disease after transplantation and risk factors were evaluated.

Of the 40 donors included in the study, 29(72%) were female and 11(18%) were male. In the post-transplant background; 3(7.5%) had DM, 6(15%) had HT and 1(2.5%) had both DM and HT. The mean GFR was 81.6±21.3 ml/min. The viral markers of the donors were negative for anti-HCV, anti-HIV and HbsAg.

As a result of the study, the incidence of diseases such as DM, HT, CRF in the follow-up of kidney donors admitted to our clinic was found to be the same as in the community. The fact that the incidence of donor diseases after transplantation is the same as the incidence in the community leads to a better option in the treatment of end-stage renal disease.

Key Words: Kidney donor, chronic renal failure, hypertension, diabetes mellitus

Introduction

Chronic renal failure (CRF) is a 3-month or longer period of renal damage, as indicated by the KDIGO guideline, with or without renal biopsy or other parameters (such as proteinuria, abnormal urine sediment, imaging methods) with or without a reduction in glomerular filtration rate (GFR). GFR with or without renal damage is defined as less than 60 mL/min/1.73 m2 (1).The top three reasons for CRF in our country are; diabetes mellitus (DM), hypertension (HT) and chronic glomerulonephritis (2). CRF is classified as 5 stages (1). The stages of CRF are summarized in Table 1.

End stage renal failure (ESRD); It is a life - threatening uremic condition characterized by irreversible loss of renal function. Which makes the United States Renal Data System is the overall prevalence of ESRD in Turkey 868 per million, according to the data. The average prevalence of ESRD in the world is 985.5 per million.

In ESRD, renal replacement therapy (RRT) is there to correct uremia and other metabolic disorders and to perform the kidney's current functions. Hemodialysis (HD), peritoneal dialysis (PD) and renal transplantation. RRT symbols in our country are shown in Table 2 (3).

Transplantation is defined as the transport of an organ or tissue to another individual or to a different site in the same individual. Renal transplantation is one of the best treatment options in terms of morbidity and mortality in ESRD compared to other RRT options (4).

In multicenter studies, there is no report proving that renal transplantation causes a significant change in renal function in donor patients. Gibney EM. et al. followed from 1993 to 2005 172 kidney donors for renal failure. He found that the most developing ones were the African-Americans and that the race could be a risk factor for the development of renal failure after transplantation (5). Fehrman-Ekholm I. et al. reported that only 6 of the 1112 kidney donors

***Corresponding Author:** Dr. Murat Alay, Van Yuzuncu Yıl University, Medical Faculty, Department of Endocrinology and Metabolism, 65000, Van, Turkey
E-mail: dr.muratalay@hotmail.com, Tel: +90 0432 215 0473, Fax: +90 0432 216 7519
Received: 22.08.2019, **Accepted:** 03.10.2019

Table 1. Staging of chronic kidney disease according to glomerular filtration rate

Prognosis of CRF according to GFR and albuminuria KDIGO 2012				Continuous albuminuria category definition and limits		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				< 30 mg/g <3 mg/mmol	30-300mg/g 3-30mg/mmol	>300mg/g >30mg/mmol
GFR category (ml / min / 1.73m2) definition and limits	G1	Normal or high	≥90	Low risk	Moderately increased risk	High risk
	G2	Mildly decreased	60-89	Low risk	Moderately increased risk	High risk
	G3a	Mildly to moderately decreased	45-59	Moderately increased risk	High risk	Very high risk.
	G3b	Moderately to severely decreased	30-44	High risk	Very high risk.	Very high risk.
	G4	Severely decreased	15-29	Very high risk.	Very high risk.	Very high risk.
	G5	Kidney failure	<15	Very high risk.	Very high risk.	Very high risk.

Table 2. Renal replacement therapy methods used in our country

	n	%
Hemodialysis	9737	85.06
Peritoneal dialysis	969	8.47
Transplantation	741	6.47
Total	11447	100

followed from 1965 to 2000 developed ESRD. This incidence was found to be the same as the risk of developing ESRD in the population (6). In general studies in kidney transplantation the risk of ESRD development in donors and health individuals was observed to be the same. However, there are studies that claim the opposite. In a Norwegian study (HUNT I), a control group of 1901 donors and 32621 healthy subjects was compared for ESRD. It was found that ESRD developed in 9(0.47%) of 1901 donors and ESRD developed in 22(0.07%) of 32621 healthy subjects in the control group. And the risk of developing end-stage renal failure after transplantation in donors was significantly increased (7). In a study conducted in the USA, 98217 donors were compared with 9364 donor candidates.

Although ESRD developed in 99 donors after an average of 8.6 years after renal transplantation, 36 patients in the control group developed end-stage renal failure. When the cumulative incidence of end-stage renal disease was compared in the 15-year period; 30.8/10000 people in donors and 3.9/10 000 people in donor candidates and the incidence of ESRD increased by 26.9/10 000 people (8).

There is limited data on mortality in long-term follow-up of donor patients. In a long-term study, the control group of 80000 living kidney donors and healthy participants were followed up for an average of 6.3 years and compared according to their demographic characteristics. No difference was observed in terms of survival and disease (9). In this study, we investigated the renal function tests and co-morbidity of donors in our region.

Table 3. Demographic and physical examination characteristics of patients

Parameter		Kidney donor patients
Sex	Female (n, %)	29(72%)
	Male (n, %)	11(28%)
Average age (years)		52.0±12.8
Age range (years)		27-74
Average BMI kg/m2		29.6±5.04
Average time after transplantation (months)		57.4±32.9
Whether checked by a specialist after transplantation?	Yes	33(82%)
	No	7(18%)
Disease developing after transplantation (n,%)	DM	3(7.5%)
	HT	6(15%)
	DM ve HT	1(2.5%)
Physical examination findings (average)	Systolic blood pressure(mmHg)	127.1± 16.9
	Diastolic blood pressure(mmHg)	76.3±14.5

Materials and Methods

Forty kidney donors who applied to the internal medicine nephrology clinic between July 2015 and September 2016 were included in this study.All donors were informed about the study and informed consent was obtained. The study was approved by the local ethics committee. The complaints were then listened to. The date of transplantation, whether she had been checked regularly after transplantation and whether new disease had developed after transplantation were also questioned. Blood pressure, pulse, weight and height of the donors were then measured. Blood and urine examinations of the patients were evaluated retrospectively.

Inclusion Criteria: Among all the donors who had previously applied to the nephrology clinic; kidney donors between the ages of 18 and 75, who contacted them, then agreed to come to our outpatient clinic and participate in the study and signed the informed consent form.

Exclusion Criteria: Those who did not want to participate in the study, renal donors younger than 18 years and older than 75 years were excluded.

Follow-up of patients: When the donors applied to our hospital, their history and physical examinations were recorded. According to the blood and urine examinations of the donors; GFR measured in 24-hour urine (GFR: urine creatinine (mg/dl) x urine volume (ml)/Serum creatinine (mg/dl) /1440) proteinuria measurement, hemogram, creatinine, potassium, sodium, chlorine, calcium from peripheral blood Phosphorus, uric acid, albumin, parathormone(PTH), AST, ALT, fasting glucose, HgbA1c and complete urinalysis were recorded. GFR values of the donors were graded according to KDIGO. Among the donors, abnormalities in blood and complete urine disorders were also evaluated.

Statistical Analysis: Descriptive statistics for continuous variables in our study; Mean and Standard Deviation; categorical variables were expressed as Number and Percentage. SPSS (IBM SPSS for Windows, ver.23) statistical package program was used for the calculations.

Results

Our study was performed in the internal medicine nephrology clinic. Forty kidney donors admitted to the Internal Medicine Nephrology Clinic between July 2015 and September 2016 were included in the study. Of the 40 donors included in the study, 29 were female and 11 were male. The mean age of the donors was 52.0±12.8 years. The mean time after transplantation was 57.4±32.9 months. Although 33(82%) of the donors underwent routine follow-up after transplantation, 7(18%) were not followed regularly. After transplantation, 3 (7.5%) of the donors were diagnosed with DM, 6(15%) with HT and 1(2.5%) with both DM and HT of donors; mean systolic arterial blood pressure was 127.1±16.9 mmHg, mean diastolic arterial blood pressure was 76.3±14.5 mmhg and mean heart rate was 76.4±12.6/min. The mean body mass index (BMI) of the donors was 29.6±5.04 kg / m2. Demographic and physical examination findings of the patients are given in Table-3.

The mean blood values of the donors were; creatine, uric acid level, calcium, phosphorus albumin, PTH, 25-OH vitamin D levels fasting glucose, HgbA1c,

Table 4. Blood and urine analysis values

Parameter (average)	Values in kidney donors (n:40)
Creatinine (mg/dl)	0.93±0.2
Proteinuria (mg/day)	138.8±72.7
GFR (ml/min)	81.6±21.31
Uric acid (mg/dl)	6.27±1.33
Calcium (mg/dl)	9.4±0.45
Phosphorus (mg/dl)	3.5±0.48
Albumin (g/dl)	4.0±0.26
PTH (pg/ml)	98.0 ± 50.6
25-OH vitamin-D (ng /ml)	14.6± 6.35
Glucose (mg/dl)	95.8± 21.7
HgbA1c (%)	5.80± 1.00
Total Cholesterol (mg/dl)	186.1±28.7
LDL (mg/dl)	107.5±28.7
HDL (mg/dl)	45.8±9.42
Leukocytes count	7502,5±2031.7
Hgb (g/dl)	13.9±1.83
Ferritin (ng/ml)	87.6±21.3
TSH (mIU/L)	1.3±0.97

GFR: Glomerular filtration rate, PTH: Parathormone, TSH:Thyroid-stimulating hormone, LDL: Low-density lipoprotein, HDL: High-density lipoprotein, Hgb: hemoglobin, HgbA1c: hemoglobin A1c

Table 5. parameters for viral and infectious diseases examined

parameter		Renal donors (n:40)
HbsAg	positive (n;%)	0(%0)
	negative(n;%)	40(%100)
Anti-HCV	pozitive(n;%)	0(%0)
	negative(n;%)	40(%100)
Anti-HİV	Pozitive(n;%)	0(%0)
	negative(n;%)	40(%100)

Table 6. Distribution of kidney donors according to CRF stages

CRF phases	GFR level(ml/dk)	Number of kidney donors (n)
G1	≥90	14(35%)
G2	60-89	19(47.5%)
G3a	45-59	5(12.5%)
G3b	30-45	2(5%)
G4	15-29	0
G5	<15	0

total cholesterol, LDL, HDL, ferritin, TSH values were within normal range. Peripheral blood hemogram; mean white cell count, hgb was in normal range. The mean GFR was 81.6±21.3 ml/min and proteinuria was 138.8±72.7 mg/day. Blood and urine demands of the donors were given in Table 4.

There was no anti-HCV, anti-HIV and HbsAg positivity on the viral markers of the donors. The parameters related to viral and infectious diseases are shown in table 5.

The number of donors in stage G1 was 14(%35), the number of donors in stage G2 was 19(%47.5), the number of donors in stage G3a was 5(%12.5), the number of donors in stage G3b was 2(%5) and stage G4, Stage G5 was not seen in the patient. The distribution of our donors according to the CRF

stages published in the KDIGO 2012 guidline is given in table 6.

Discussion

In the research conducted by Young A. et al. in 2008, it was reported that donor patients do not have any disease related to gender and race after transplantation (10). In the statistical analysis performed in our study; gender was not associated with disease development after transplantation.

In a study performed by Ibrahim HN and colleagues, %80 of the donors reported a GFR value > 60 ml / min and did not increase the incidence of renal failure (11). Only 6 out of 1112 renal donor patients followed by Fehrman-Ekholm I. and colleagues from 1965 to 2000 were reported to have ESRD and were reported to be the same as the incidence of ESRD in the community (6). In contrast, 98217 donors and 9364 donor candidates were compared in a US study. ESRD developed in 99 of the donors and 36 of the donors on average 8.6 years after kidney transplantation (8). 1901 donors and 32621 healthy subjects were compared in terms of ESRD; It was observed that 9(0.47%) of 1901 donors developed ESRD in 22(0.07%) of 32621 healthy subjects. The risk of developing ESRD in donors is reported to be increased (7). In our study, the rate of ESRD development in donors did not increase compared to the normal population.

According to TURDEP-II's largest epidemiology report of DM in 2011, the incidence of DM in our country was reported to be 9% (12). In our study, DM was observed in 4(10%) of the donors. There was no increase in the incidence of DM in the donors.

In a study performed by İbrahim HN et al. with 255 donor patients, 82(%32.1) donors had HT and an increase in HT frequency(11). In Canada, 1278 donor and control groups were followed for an average of 6 (1–16) years. When evaluated in terms of HT; %16.3 of the donors and 11.9% of the control group reported an increase in blood pressure. No statistically significant difference was observed (13). In our study, hypertension was diagnosed in 6(15%) of 40 donors after transplantation. In our study, the frequency of HT in the donors followed up did not increase.

In conclusion, in our study, it was seen that the risk of developing chronic diseases such as DM, HT disease did not increase in the follow-up of kidney donors after transplantation. In our study, the risk of donors developing end-stage renal failure was observed to be the same as that of healthy individuals in the community. Because of the increasing incidence of chronic diseases such as DM and HT which cause renal dysfunction in our age, it is recommended that donors should be followed up regularly.

References

1. National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Am J Kidney Dis 2002; 39: 1-266.
2. Kidney Disease: Improving Global Outcomes. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Volume 3, İssue 1, January 2013; 5-146.
3. Turkish Society of Nephrology and the SBA, "the Turkey Nephrology, Dialysis and Transplantation", Ankara 2013; 1-90.
4. Ministry of Health Statistics Annuals and DYOB data (July 2014)
5. Gibney EM, Parikh CR, Garg AX. Age, gender, race, and associations with kidney failure following living kidney donation. Transplant Proc 2008; 40: 1337-1340.
6. Fehrman-Ekholm I, Nord.n G, Lennerling A, et al. Incidence of end-stage renal disease among live kidney donors. Transplantation 2006; 82: 1646-1648.
7. Mjøen G, Hallan S, Hartmann A, et al. Long-term risks for kidney donors. Kidney Int 2014; 86: 150-162.
8. Muzaale AD, Massie AB, Wang MC, et al. Risk of end-stage renal disease following live kidney donation. JAMA 2014; 311: 570-579.
9. Segev DL, Muzaale AD, Caffo BS, et al. Perioperative mortality and long-term survival following live kidney donation. JAMA 2010; 303: 950-959.
10. Young A, Hodsman AB, Boudville N, et al. Bone and mineral metabolism and fibroblast growth factor 23 levels after kidney donation. Am J Kidney Dis 2012; 59: 740-761.
11. Ibrahim HN, Foley R, Tan L, et al. Long-term consequences of kidneydonation. N Engl J Med 2009; 360: 459-469.
12. Satman I, Omer B, Tutuncu Y, et al; TURDEP-IIV Study Group. Twelve-year trends in the prevalence and risk factors of diabetes and prediabetes in Turkish adults. Eur J Epidemiol. 2013; 28: 169-180.
13. Hypertension risk in living kidney donors: an analysis of health administrative data in Ontario, Canada. Transplantation 2008; 86: 390-399.