

Review of the waiting list for cadaveric kidney transplant recipients: A single institution study

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Abstract

Aim: The gold standard treatment of end-stage renal failure is kidney transplantation. In western countries, more than 80% of kidney transplants are cadaveric transplants, in Turkey, this ratio is below 25% due to insufficient cadaveric organ supply. In this study, we aimed to give a general assessment of cadaveric kidney transplant of patients on the waiting list of Istanbul University Medical Faculty General Surgery Organ Transplantation Unit.

Material and Methods: Patients waiting for transplantation for a cadaveric kidney on National Organ Waiting List have been evaluated for demographic data, mean duration of dialysis, concomitant diseases, dialysis type, blood groups, end-stage renal failure etiologies, additional diseases that developed during kidney transplant waiting period, and their final status.

Results: Two hundred and forty-four patients were included in the study. There were 122 female and 122 male. The median age was 52 (2-77) years. The most common etiology of renal failure was hypertensive nephrosclerosis. The median waiting time was 89 months (13-390). Though there was no difference between female and male patients according to median age, height and BMI, there was a significant difference according to waiting duration (F/M 113/75 months, $p 0,017$). In the last 1 year, 13 patients died while they were waiting for a kidney transplant and 17 patients lost their chance of kidney transplant due to developing diseases.

Conclusion: To increase Turkey's organ transplantation and cadaveric transplant donation on the waiting list we need to develop donation policy for a shorter period of dialysis and to ensure that patients receive transplantation earlier.

Keywords: Dialysis period; kidney transplantation; cadaveric waiting list.

INTRODUCTION

The gold standard treatment of end-stage renal failure is renal transplantation. In the western countries, more than 80% of the renal transplantations are performed from cadaveric donor whereas in Turkey, approximately 75% of the renal transplantations by organs obtained from healthy living donors (1). Since the cadaveric organ supply is very limited in Turkey, the patients wait for a long time on the waiting list if they do not have a suitable living donor. Prolongation of the duration on the waiting list results in the development of systemic diseases, which may result in ineligibility to transplantation. Furthermore, the developments of concomitant systemic diseases cause an increase in the risk of postoperative mortality and morbidity in patients undergoing renal transplantation.

The present study aims to evaluate the patients on the cadaveric waiting list for renal transplantation in our institution and to give general concepts about cadaveric renal transplantation in Turkey.

MATERIAL and METHODS

Patients and the inclusion/exclusion criteria

Patients who were registered in the national organ waiting list for renal transplantation in Istanbul University Istanbul Medical Faculty Renal Transplantation Unit were analyzed starting from the initial registration to February 2019. Patients registered in the waiting list of our transplant center are evaluated regularly at the outpatient clinic every 6 months to evaluate the preparation of the patients for any possible renal transplantation. Patients who were compliant with the regular follow up program were included in the study. Patients who did not follow the regular surveillance program were excluded from the study. Demographic data, mean duration of dialysis, presence of concomitant diseases, the type of dialysis, blood groups, etiology of end-stage renal disease, the development of new concomitant systemic disease and the current situation of the patients were evaluated in the study.

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354 patients were registered in the national organ registry of our renal transplantation unit. Ninety-seven patients were excluded for not adhering to regular outpatient clinic surveillance. Ten patients were excluded because they were at the initial stages of the registration to the waiting list; three patients were preemptive and their status was passive in the registry. In total 244 patients were included for evaluation in the present study.

The authors of the manuscript have read and signed the Helsinki Declaration of the World Health Organization published in the British Medical Journal on July 18th, 1964. Approval of the local institutional review board was not needed because of the retrospective nature of the present study. Only the patient database was evaluated for study parameters and therefore informed consent was not obtained from the patients.

Statistical analysis

The continuous variables are expressed as median and range. The categorical variables were analyzed using chi-square test and Mann-Whitney U test. Any p-value less than 0.05 were considered as statistically significant. All statistical analyses were performed on Statistical Software Package for Social Sciences version 22 (SPSSv22; IBM, USA).

RESULTS

Two hundred and forty-four patients were included in the study. Hundred and twenty-two (50%) were male and 122 (50%) were female. The median age of the patients was 52 (2-78) years. Median body mass index (BMI) was 24 (12-41) kg/m². Median duration to cadaveric renal transplantation, which shows the median duration of dialysis, was 89 (13-390) months. The distribution of the blood groups of the patients showed that Group A (n=103, 42.2%) was the most frequent blood type that was observed in the study (Table 1). The most frequent

	n	%
Age	Median: 52 years Range: 2-78 years	
1-18	11	4.5
19-44	72	29.5
45-64	118	48.4
> 65	43	17.6
Gender		
Female	122	50
Male	122	50
Dialysis type		
HD	223	91.4
PD	21	8.6
Blood Group Type		
A	103	42.2
B	31	12.7
AB	19	7.8
O	91	37.2

HD: Hemodialysis, PD: Peritoneal dialysis

cause of end-stage renal disease was hypertension with a frequency of 28.7% (n=7; Table 2). During the waiting period, 17 patients (7%) developed hepatitis C and 3 patients (1.2%) developed Hepatitis B infection. During the waiting period, 20 patients (8.2%) developed ischemic heart disease. Distribution of the co-morbidities in the patients in the waiting list was as follows: hypertension in 142 patients (58.2%), diabetes mellitus in 34 patients (13.9%). Thirty-one patients (12.7%) in the waiting list had undergone previous renal transplantation.

The differences in the study parameters according to gender were evaluated in the study. Although age, height, and BMI did not differ between the male and female; weight and duration on the waiting list were significantly different among them. The median waiting period in the male and female patients were 75 and 113 months; respectively (p=0.017) (Table 3). The pregnancy rate was 64.6% in the female patient group.

In the last one year, 13 patients (5.3%) died during the waiting period and 17 patients (7%) became ineligible for renal transplantation due to newly developing concomitant systemic disease.

DISCUSSION

We evaluated the records of 244 patients on the national organ waiting list registry of our renal transplant center. Ninety percent of the patients were on hemodialysis. The most frequent etiology of end-stage renal disease was hypertensive nephrosclerosis. Diabetic nephropathy and chronic glomerulonephritis were the other more frequent etiologies of renal failure. These results were in accord with the national registry results that have been published previously (2). Due to the shortage of cadaveric donor organ supply, 13 patients died while waiting for a suitable organ and 17 patients became ineligible to transplantation because of newly developed systemic disease.

Renal transplantation is the only curative option for end-stage renal disease. Annually, the number of patients requiring renal transplantation is increasing, however, the organ donation does not show a parallel increase (3). In time, this results in a gradual increase in the number of patients in the national organ registry. In 2017, 2649 (79.3%) living donor and 693 (20.7%) cadaveric donor renal transplantation had been performed. In total 22.397

Etiology	n	%
Hypertension	70	28.70
Chronic Glomerulonephritis	38	15.60
Diabetes Mellitus	28	11.50
Polycystic Renal Disease	20	8.20
Chronic Pyelonephritis	19	7.80
Vesico-ureteral Reflux	17	7.00
Amyloidosis	6	2.50
Miscellaneous	14	5.70
Unknown	32	13.10

Table 3. Comparing the female and male patient groups

	Total (n=244)	Female (n=122)	Male (n=122)	p
Age (years)	52 (2-78)	50 (2-77)	53 (6-78)	0.194
Height (cm)	162 (93-188)	155 (93-178)	170 (94-188)	0.925
BMI (kg/m ²)	23 (12-41)	23 (15-41)	24 (12-38)	0.925
Waiting Period (months)	89 (13-390)	113 (19-390)	75 (13-356)	0.017

Table 4. Cadaveric organ allocation scoring system for renal transplantation

Evaluation Criteria	Score
	In case of Full match (2A 2B 2DR match) regardless of the conditions the organ is allocated to the recipient
Tissue Matching	In cases where there is no full match; for every DR antigen 150 points, For B antigen 50 points and for A antigen 25 points are given
The region of the cadaveric donor	1000
The center where the cadaveric donor is present	250
Recipient Age	≤11 years
	12-17 years
	≥18 years
Duration of dialysis	3 points for every three months

patients in the national organ, the registry is waiting for an organ for renal transplantation. In 2017, the national registry showed that 554 (27%) of the 2046 confirmed brain deaths had donated their organs (4). Our country has become one of the high volume centers in the world in terms of the number of renal transplantation performed. However, the majority of the renal transplantations performed in the Western World are performed from cadaveric donors; in our country, the majority of the renal transplantations are from organs obtained from the living donors (1). Currently, the measures of success of the health care system of developed countries are the number or annual cadaveric donations and the number of annual organ transplantations performed (5).

According to the International Registry in Organ Donation and Transplantation (IRODaT), living donor donations in Turkey is 52.01 per million populations, which makes Turkey a global leader in this field. On the contrary cadaveric donation in Turkey is 7.47 per million populations, which is very scarce when compared to developed countries (6). Since the cadaveric organ shortage is a major problem in Turkey; the duration on the waiting list is prolonged which results in prolonged dialysis periods, development of additional systemic disease and increased immunologic burden that results in an increased risk of mortality and morbidity.

In 1979, the article 2238 on "Organ and Tissue Harvesting, Preservation and Transplantation" officially regulated organ transplantation in Turkey. Between 1990 and 2007 organ recipient matching was performed manually. After 2208 Turkish Ministry of Health established a National Organ Coordination and Allocation Center for matching organ and the recipient. A scoring system was formed

in which dialysis duration was an important factor in the allocation of the organ (Table 4) (7).

The median duration on the cadaveric waiting list for our patient was 89 (13-390) months. This is longer than the ones reported by developed countries (8-10). Furthermore, female patients had a longer waiting period than male patients (F / M 113/75 months, p=0.017). This may be since females have antibody formed during pregnancy and childbirth. The pregnancy rate was 64.6% in the female patient group of our study, which also prolongs the duration on the waiting list. We think that pregnancy puts them in an immunologically challenging situation for organ allocation. Besides, we think that the socioeconomic status of the country is also important to determine longer waiting time for the transplantation. In an Irish study, Phelan et al. showed that there is no difference in time waiting on the pool between males and females (11).

According to current cadaveric kidney allocation system, patients should have a dialysis duration of nearly 11 years to obtain an adequate score to obtain a suitable organ. In 11 years, the risk of development of additional systemic disease increases and therefore at the time of operation, the rate of patient co-morbidities is high. This increases the risk of mortality and morbidity in patients. The risk development of new co-morbidities increases as the duration of dialysis increases. In addition to increased risk of operative mortality or morbidity, the co-morbidities may preclude the eligibility of the patient for a transplant operation. In the present study, 17 patients became ineligible for operation due to newly developing co-morbidities and another 13 patients died while waiting for an organ mainly due to additional cardiac morbidities

that developed (10,12).

Renal transplantation is more cost-effective than any other treatment options in end-stage renal disease (13). Furthermore, it increases the quality of life considerably (14). Thirty-one patients (%12.6) in our waiting list had prior renal transplantation. These patients would have to wait 11 years before any organ is allocated. Considering that these patients have graft loss due to rejection, the waiting for a long period would cause an immunologic burden, which would limit the chance of obtaining any organ at all. Therefore, these patients would lose a chance for gold standard treatment because of insufficient organ supply.

CONCLUSION

In conclusion, the results of the present study emphasize that there is an insufficient organ supply in our country and therefore the duration of pre-transplant dialysis increases which increases immunologic burden and co-morbidities. This may result in an increased risk of operative mortality and morbidity or ineligibility to transplantation. Therefore, measures to increase the cadaveric donations should be taken to reduce the duration on the waiting list and to reduce the number of living donor renal transplantations.

Competing interests: This study is a retrospective analysis of the cadaveric waiting list, so there is no need for informed consent of the patient.

Financial Disclosure: There are no financial supports

Ethical approval: E This study is a retrospective analysis of the cadaver waiting list, so there is no need for the approval of the ethics committee.

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