

# Short-term Survival in Renal Transplantation from Brain-Death Donors: Focusing on Recipients with Diabetes Background

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**Purpose:** Our aim was to evaluate short term survival rates in renal transplant recipients from deceased donors, while focusing on recipients with diabetes mellitus background.

**Materials and Methods:** This is a longitudinal follow-up study based on national registry of recipients in Ministry of Health and Medical Education in Iran from 2010-11. Five hundred fifty-five recipients, 226 (40.8%) females and 328 (59.2%) males, were included in the study. Mean ( $\pm$  SD) age of the recipients was  $39 \pm 14$  years. Of donors 18.4% were females and 81.6% were males. Age of the donors was  $33 \pm 14$  years. All allograft recipients from deceased donors enrolled in the study. Short-term graft survival (1 year) was determined. Data regarding age, gender, background disease and cold ischemic time of recipients and donors were collected from the organ procurement units.

**Results:** Allografts were functioning in 499 (90.1%) of recipients after one year. Of recipients 38 (6.9%) died and rejection of transplanted kidney occurred in 17 (3.1%) cases. So, in 55 (9.9%) cases, allografts were not functioning. There were significant relationships between short term graft survival of donors' gender, age of recipients, cold ischemic time and level of clearance of creatinine of recipients.

**Conclusion:** In addition to cold ischemic time, graft survival can be affected by recipients' age. There are some other considerations and implications regarding the short term graft survival in renal transplantation from cadaver donors which are discussed in this paper.

**Keywords:** graft survival; kidney transplantation; tissue and organ procurement; survival rate; renal diabetes mellitus.

## INTRODUCTION

Chronic renal failure is defined as glomerular filtration rate > 60 mL per minute for 1.73 square meters of body surface area for more than 3 months, which can lead to advanced kidney disease.<sup>(1)</sup> The first kidney transplant in Iran was performed in Shiraz in 1967 and now the number of kidney transplants in Iran is 30 transplants per 1 million people in each year, of which 25% is from brain death.

According to the report of the Department of Transplantation and Specific Diseases at the Ministry of Health and Medical Education (MOHME) in Iran in 2011, the number of new cases diagnosed with end-stage renal disease (ESRD) was 4864 [64 per million population (pmp)] and the number of kidney transplantations from all sources (living related, living unrelated, deceased donors) was 2273 (30 pmp).<sup>(2)</sup> The common methods of treating patients with ESRD include hemodialysis, peritoneal dialysis and kidney transplantation. Kidney transplantation is considered the most effective treatment strategy to increase the quality of life for recipients.<sup>(3)</sup> Graft sources include family living, non-family living and dead. One of the main goals of transplant programs is providing a suitable graft for each patient who requires it. Nowadays, the inadequate number of volunteer donors is considered the biggest obstacle to achieve this goal.<sup>(4)</sup> Kidney transplantation from cadaver is one of the important sources of getting a kidney transplant in treating patients with ESRD. The number of kidney transplants from living donor and cadaver is considerably various across different countries and is related to various factors including specific legal, cultural and religious restrictions.<sup>(5)</sup>

The purpose of renal transplant is to prolong and maintain a good quality of life for recipients with ESRD;<sup>(6)</sup> it is more cost effective and it allows return to a more normal lifestyle than does maintenance dialysis therapy.<sup>(7-9)</sup> In industrialized countries, the majority of organs come from deceased donors whereas in countries with lower incomes, the majority of cases are from living donors.<sup>(10)</sup> In both groups, the introduction of new immunosuppressive agents in the past 20 years, along with improvements achieved in infection prophylaxis strategies, have resulted in a remarkable improvement in both recipients and graft survival rates. These factors have made kidney transplantation as the treatment choice for recipients

with ESRD.<sup>(11,12)</sup> However, other factors such as age and gender of recipients and donors, background diseases and cold ischemic time can affect graft survival rate too.<sup>(13-15)</sup> Therefore, we aimed to evaluate the short term graft survival rates in renal transplantation from deceased donors based on data in MOHME registry in Iran. We investigated the survival rates of kidney transplants (graft survival rates) from brain-death cases from 2010 to 2011 in Iran.

## MATERIALS AND METHOD

This is a longitudinal follow-up study that was done based on MOHME registry in 2010 and 2011. All recipients who had registered in the above mentioned registry and had received kidney allografts from brain-death donors were included in the study and followed-up for a whole year. The following data were collected regarding donors and recipients; short term graft survival (1 year), age of recipients and donors, gender of recipients and donors, their background diseases and cold ischemic time. The exact time of transplantation is considered as the primary event, and the onset of dialysis of the recipients because of rejection as well as the death of the recipients are considered as the final event.

There were 595 cases of kidney transplantation in 2010-2011. Out of these, 41 recipients (6.8%) were excluded due to lack of information on their state after transplantation; i.e. it is not clear to us whether the transplanted kidney is still functioning in these recipients or not. The remaining 554 cases who have been transplanted and followed-up in different transplant centers from the beginning of 2010 to the end of 2011 were studied. There are 30 transplant units, 14 organ procurement units and 30 identification units in different hospitals all over the country.

The required data for this study were obtained from MOHME registry. To evaluate the survival rates of recipients from brain-death donors, creatinine level was determined. It should be noted that in this study all ethical standards were observed. The data are presented as simple number (%).

## RESULTS

Of study subjects 226 (40.8%) were females and 328 (59.2%) were males. Mean ( $\pm$  SD) age of the recipients was  $39 \pm 14$  years. The blood groups of the recipients in this study were O+ in 38.4%, A+ in 26.3%, B+ in 21.5%, AB+ in 9.6% and

**Table.** Background diseases in recipients.

Background Disease	Frequency no. (%)
Diabetes mellitus	163 (29.4)
Hypertension	98 (17.6)
Glomerulonephritis	94 (16.9)
Polycystic Kidney	23 (4.1)
Congenital	16 (2.9)
Urological diseases	12 (2.2)
Unknown	148 (26.8)
Total	554 (100)

negative blood groups in 4.2%. The background diseases are shown in Table.

All recipients received organs from brain-death donors. Of donors 18.4% were females and 81.6% were males. Mean age ( $\pm$  SD) of the donors was  $33 \pm 14$  years. Transplanted kidneys were functioning in 499 (90.1%) recipients in 1 year follow-up period. Of recipients 38 (6.9%) died and 17 (3.1%) lost transplanted kidney; therefore in 55 (9.9%) of cases the transplanted kidney was non-functioning.

The recipients who experienced graft loss showed a higher level of creatinine ( $3.8 \pm 2.5$  mg/dL). The cold ischemic time in this study ranged from  $4.4 \pm 1.6$  to  $6.8 \pm 1.3$  hours. Moreover, the age of recipients who suffered from graft loss was greater than the average age, which was  $44.2 \pm 14.7$  years.

It is noteworthy that the number of recipients with diabetes mellitus as background disease (29.4%) is the largest compared to other background diseases. Furthermore, in 30 cases (54.5%) out of 55 where the transplanted kidney was non-functioning, the background disease of the recipients was diabetes mellitus. Thus, we may say that, in this study, diabetes is the most common background disease in ESRD patients and also the largest number of transplantation failures occurred in diabetic patients.

## DISCUSSION

Nowadays, survival rates in renal transplantation, owing to recent advances, appropriate follow-up and the use of immunosuppressive drugs, has increased significantly compared with past decades.<sup>(11,12)</sup> The present study was an attempt to examine short term survival rate in renal transplant recipients

from brain-death donors, with a special focus on recipients with diabetes mellitus. The results of the study showed that in 90.1% of recipients the transplanted kidney was functioning after one year. Similar results were obtained in other studies. For instance, the study by Simforoosh and colleagues showed a similar survival rate.<sup>(16)</sup> They compared short-term survival of transplanted patients from cadaver with transplanted recipients of living people and concluded that we have to increase kidney transplant from cadaver.<sup>(16)</sup> In another study, graft survival from cadaver was 82.1%.<sup>(17)</sup> One of the other findings of the present study was that recipients with graft loss had a higher level of creatinine. In some other studies too, survival rates of recipients after transplantation was associated with higher levels of creatinine.<sup>(18)</sup>

The third finding of this study is that the number of recipients with diabetes mellitus was the largest compared to other background diseases, and in more than 50% of the patients studied, non-functioning kidney transplants belonged to these patients. Similar results were reported in other studies. Gilbertson and colleagues, for instance, have stated that “in western countries, diabetes is the leading single cause of ESRD”.<sup>(19)</sup> In another study in 2006, it was shown that “in many countries such as the United States, more than 50% of patients in renal replacement therapy programs have diabetes mellitus as the major cause of their renal failure”.<sup>(20)</sup>

## CONCLUSION

Most of ESRD patients have diabetes mellitus and encounter problems such as availability of the required organ, constant follow-up, immunosuppressive therapies, mortality and morbidity, and also the burden of the disease. Therefore, it is highly recommended to prevent diabetes mellitus or its complications like diabetic nephropathy.

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## CONFLICT OF INTEREST

None declared.

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