

Patient and Graft Outcome in Related, Unrelated and Deceased Renal Transplant Recipients: Single Center Experience

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Abstract

Background and Aims: Nowadays with the extension and development of renal transplantation centers, the best treatment of the patients with ESRD is renal Transplantation. Renal allografts from deceased donors are being used in our center following the laws passed by the Parliament of the Islamic Republic of Iran. Renal transplantation is evaluated by graft and patient survival. Therefore in this study graft and patient survival of recipients who received kidney from related, unrelated and deceased donors were reviewed.

Methods: Following preoperative examinations and live donor angiography, transplantations were ready to be performed. Renal transplantation was performed in 270 patients who received kidney from unrelated and 44 from related and 125 from deceased donors. Graft and patient survival were measured. Statistical analysis was performed using SPSS soft ware, Caplan – Meyer table, Cox regression and Long rank.

Results: In this study 439 patients were evaluated. Patients' age ranged between 8 and 71 years. There were no statistical differences among 3 groups ($P > 0.1$). One year graft survivals of recipients who received kidney from deceased, unrelated and related donors were 90%, 89% and 93%, respectively. Three year graft survival in the above mentioned groups were 82%, 84% and 91%, respectively and 5 year graft survival were 81%, 90% and 81%, respectively. Statistical analysis showed no significant differences among 3 groups ($P=0.241$). One, three and five year recipient's survival were evaluated in patients who received kidney from deceased, unrelated and related donors. One year recipient survivals in the 3 groups were 95%, 93% and 98%, respectively; three year patient survivals were 94%, 98% and 93%, respectively and finally the 5 year patient survivals were 89%, 93% and 88%, respectively which showed no significant differences ($P = 0.489$).

Conclusions: Although graft and patient survivals are slightly better in recipients who received kidney from related donor, there were no significant differences in 1, 3 and 5 years graft and patient survivals between recipients who received kidney from live (related or unrelated) and deceased donors. Therefore, deceased donors can be used as a valuable source in Iran.

Keywords: Renal Transplantation, Deceased, Graft Survival, Related Donor, Unrelated Donor

Introduction

Renal transplantation is one of the most exciting examples of progression in medicine in the last decades and nowadays it is the treatment of choice for patients with

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ESRD. Renal transplantation in comparison to hemodialysis may improve quality of life and decrease mortality. However, it is not comparable with healthy people since these patients have higher mortality. Thus the most important criterions to evaluate the patients are graft and patient survivals. Many factors affect the survivals like recipient and donor age, type of donors (related, unrelated or deceased), early or delayed graft function and surgical or medical complications. There are comparative studies of graft and patient survivals in centers using all kinds of donors (related, unrelated or deceased) as in renal transplant center of Spain, Catalonia, where graft and patients survival were compared in 1, 5, 10 and 20 years following transplantation (1), but center effect is an important factor which depends on diverse factors and the results may be different in different centers. Renal transplantation has been performed in Imam Reza hospital since 1990 which was based only on live donors (related or unrelated), and transplants from deceased donors has increased since 2003. Therefore we decided to review and compare our results in these 3 groups of recipients.

Materials and Methods

In this study, we reviewed our results of renal transplants between 2003 and 2007. During this period of time, 439 renal transplants were performed by the same team. Following preoperative examinations and live donor renal angiography, transplantation was readily performed. Similar examinations were done for deceased donors except for renal angiography. Renal transplantation was performed in 270 patients from unrelated and 44 from related and 125 from deceased donors. Thirty-four out of 439 recipients were secondary transplants 18 (7%) of which were unrelated and 12 (9%) were cadaveric and 6 (9%) were related group, and one recipient of deceased donor group underwent the third transplant. Grafts were removed by standard methods.

Renal grafts were placed extraperitoneally except in pediatric patients below 12 kg body weight. In almost all the patients the ureter was anastomosed to the bladder by modified Lich technique with a double J stent insertion. Immunosuppressive drugs included cyclosporine, mycophenolate mofetil and prednisolone. All of the patients were followed from 12 to 60 months (mean 42). In these 3 groups age, gender, rejection rate, graft function, graft and patient survival were measured at 1, 3, 6, 12, 24, 36, 48 months after transplantation.

Statistics

Statistical analysis was performed using SPSS soft ware. All data are presented as mean $\pm$ SD. Qualitative variables were compared using the χ^2 test, or Fisher's exact test. We used analysis of variance (ANOVA) to analyse changes in continuous variables Patient and graft survival curves were calculated according to the Kaplan-Meier method. The curves were compared using the log-rank test. Cox proportional hazards model was used to assess the effect of selected factors (age, sex and type of donors) on patient and graft survival. P value less than 0.05 was considered as statistically significant.

Results

In this study, 439 patients were evaluated. Demographical details of study groups are shown in table 1. Patients' age ranged from 8 to 71 (mean 34) years and there were no statistical differences among 3 groups.

Two hundred and fifty-eight (54%) of the recipients were male and 201 (46%) were female. Two hundred and seventy (61.5 %), 125 (28.5%) and only 10% of the donors were unrelated, related and deceased donors, respectively. Diabetic nephropathy and refractory hypertension were confirmed in 3.5%, 2.8% and 2.3 % of 3 groups of recipient ($P = 0.3$), and refractory hypertension in (1.4 % - 1.2 % and 1.1

%) of the recipients in 3 groups, respectively. Most of the transplants were done in 2005. 15.5% of all grafts rejected in this 5 year period, but there were no significant differences between both sexes (14.3% in men and 15.9% in women). The least rejection rate was revealed in live related donors (9.1%) and then

in deceased donors (15.1%) and the most rejection rate was seen in live unrelated donors (16.7%) but these differences were not significant ($P=0.447$). In this period of time (5 years) 9.3% of the recipients died.

Table 1. Demographical details of study groups

Variable	Unrelated living kidney transplants	Related kidney transplants	Deceased kidney transplants	P-Value
Gender (%M/F)	57.4	54.4	49.5	0.344
Age in years (Mean SD)	36.6 (14.9)	28.6 (11.6)	30.4 (11.4)	0.065
Post Transplant Diabetes (%)	3.5	2.8	2.3	0.3
Refractory Hypertension (%)	1.4	1.2	1.1	0.3
Rejection Rate (%)	16.7	9.1	15.1	0.447

Mortality rate was higher in women than in men (10.9% versus 8%). Mortality rates were 11.1%, 7.2% and 4.5% in recipients of unrelated, deceased and related donors, respectively which were not statistically significant. Rejection rate was more common in mortality groups ($P < 0.01$). Univariate survival analysis for the graft and patient survival

has been done. The results are shown in table 2. Figure 1 shows the Kaplan- Meier cumulative survival curves regarding 1, 3 and 5 year patient survival in the three types of donors.

Statistical analysis showed no significant differences among 3 groups ($P = 0.241$). Figure 2 shows the Kaplan- Meier cumulative survival curves regarding 1, 3

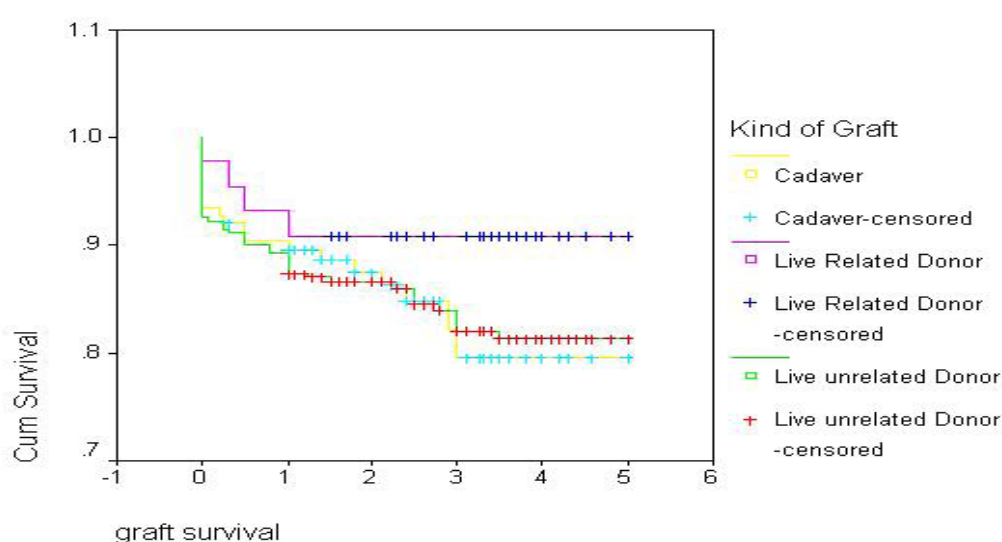


Figure 1. Type of donors (live related, unrelated, cadaveric) and 1, 3 and 5 years graft survival (Caplan- Mayer curve, Log Rank = 0.514)

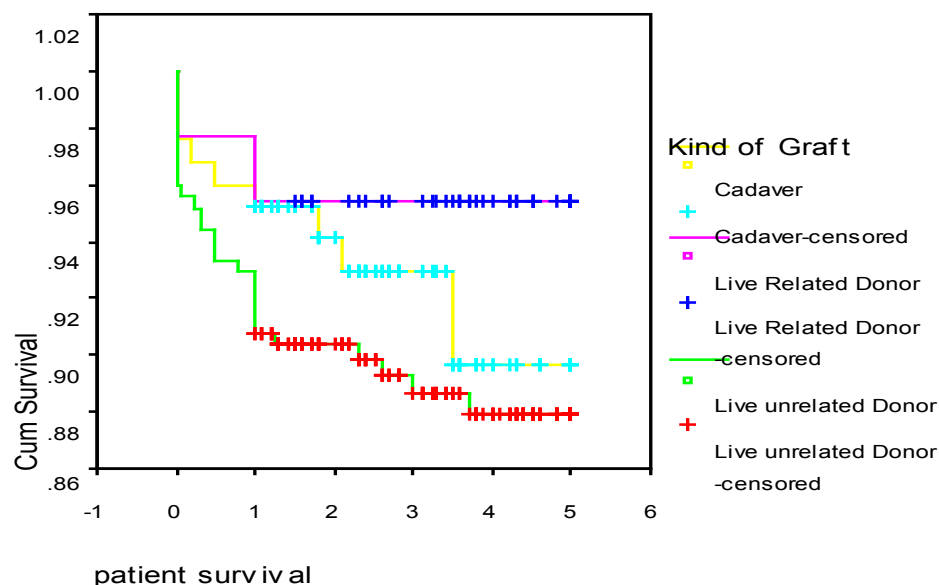


Figure 2. Type of donors (live related, unrelated, cadaveric) and 1, 3, 5 years patients survival (Kaplan-Meier curve, Log Rank = 0.432)

and 5 year patient survival in the three types of donors. There were no statistically significant differences between these 3 groups at 1, 3 and 5 years survivals ($P = 0.489$). Multivariate Cox proportional hazards model showed significant effect of type of kidney transplantation on 3 year graft and patient survival ($P < 0.0001$ and $P = 0.0002$), however, it revealed no significant effect on one and five year graft and patient survival. Moreover, compared with the deceased donor recipients, graft and patient survival rate was improved 66% and 48% in live related donor recipients and live unrelated donor recipients, respectively.

It was also shown that age significantly affects 3 and 5 year graft survival and ($HR = 1.020$ $P = 0.029$, $HR = 1.011$ $P = 0.0213$) also 1, 3, and 5 year patient survival, respectively ($HR = 1.036$ $P = 0.0033$, $HR = 1.016$ $P = 0.0015$ and $HR = 1.048$ $P < 0.001$). According to age, 1, 3 and 5 year increase in age leads in 1.04, 1.02 and 1.05 increase in mortality rate, respectively. Regarding female hazard ratio, women's one year survival is significantly less than

men (F/M mortality rate: 2.2). However, there were not such effect on 3 and 5 year patient survival. Each 1, 3, and 5 year increase in age leads in 1.04, 1.02, 1.05 increase in mortality rate.

Discussion

In our study there were no significant differences in 1, 3 and 5 year graft and patient survivals between recipients who received kidney from live (related or unrelated) and deceased donors. The study shows that the outcome of kidney transplantation in deceased subjects may be matched by recipients who received kidney from live (related or unrelated) donors, at least on a single-centre level. The first renal transplant was performed in Iran (Shiraz university hospital) 40 years ago. Just 112 transplants were done before Islamic revolution in Iran and at that time, most of the patients who needed renal transplant were referred to foreign countries (2). Following revolution renal transplantation was settled in Labafi-nejad and Hashmi-nejad hospitals (3). By increasing in the

number of renal transplant centers around Iran and using Iranian model we found significant decrease in graft shortage and waiting list (4). The main reason of stagnation in using deceased donors in Iran was the legal issues, but fortunately following legislation of the laws in 2002 by the Islamic Parliament, use of deceased donors increased. Use of deceased donors before the laws was about 1% but since legislation, it has increased to 10% - 40% of all renal transplants in some centers (5).

Most centers revealed that the results of unrelated renal transplantation are better than deceased transplantation. For this reason many transplantation centers suggest to use unrelated donors besides deceased and related donors (6). The main benefit of live transplantation is early graft function and some studies showed that the result of deceased donor transplantation is similar to live transplantation if the graft function would start very early (7). Therefore, early graft function has an important effect on the long term patient survival, meanwhile donor type and age, cold ischemic time and immunologic factors may affect graft and patient survival (8). Using deceased donors has been started in our hospital since 2001 but this group included about 40% of our transplants (49 from 125) in 2006. Our results were comparable with the results of the UNOS Scientific Renal Transplantation Registry. In their report, 1 and 3 year graft survivals were 94% and 82% in related, 82% and 81% in unrelated and 84% and 70% in deceased donor group, respectively (9). In a report from Washington University Hospital, it has been shown that 1 and 5 year grafts survival from unrelated donors are more than deceased donors (85.9% and 93% versus 84.4% and 70.5%) (10). Generally graft procurement from live donors is set up in a foreseen program, therefore warm and cold ischemia would be lower than deceased harvesting and finally graft survival of live donors is more than deceased donors (6, 12, 13). But our results in these 3 groups are similar because harvesting and transplantation are performed in two near operating rooms,

therefore warm and cold ischemia would reach to the lowest level. The recipient age is a paramount factor affecting graft and patient survival. We should take into account that age increase is associated with increased comorbidity, which is also a risk factor for transplant survival.

The limitation of this study is the absence of certain variables which are relevant as prognostic factors for graft and patient survival such as donor's factors and HLA mismatch. We didn't either evaluate impact of early graft function on graft and patient survival, but our center has already found a similar effect of excellent graft function (EGF) and slow graft function (SGF) on kidney graft and patient survival. However, kidney transplant recipients who developed delayed graft function (DGF) showed worse graft survival than those with EGF or SGF (13).

Conclusions

This study was performed on 439 patients. One, three and five year graft survival of recipients who received kidney from related donors are more than unrelated and deceased donors and patient survival of recipients who received grafts from unrelated donors are more than deceased donors. But there are no significant differences in 1, 3 and 5 year graft and patient survivals between recipients who received kidney from live (related or unrelated) and deceased donors. Therefore deceased donors can be used as a valuable source in our country.

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Conflict of Interest

None declared.

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