

Is Preemptive Kidney Transplantation Preferred? Updated Study

Fatemeh Pour-Reza-Gholi, Mohsen Nafar, Nasser Simforoosh, Behzad Einollahi, Abbas Basiri, Ahmad Firouzan, Behrang Alipour Abedi, Soudabeh Farhangi

Introduction: For eligible patients with end-stage renal disease, the dialysis stage could be bypassed by preemptive kidney transplantation (PKT), when the organ is available. We compared this treatment option with kidney transplantation in patients with pretransplant dialysis (PTD).

Materials and Methods: We retrospectively studied on 300 patients who received PKT between 1992 and 2006 from living donors. They were compared with 300 kidney recipients with PTD matched for the time of transplantation that had been on hemodialysis for at least 6 months. Episodes of rejection, graft function, and graft and patient survivals were compared between the two groups.

Results: No significant differences were noted in the sex of the recipients, age and sex of the donors, donor source, and posttransplant immunosuppressive therapy, but posttransplant follow-up was longer ($P < .001$) and the recipients were older ($P < .001$) in the PTD group. Seventy-one patients (23.7%) in the PKT group and 64 (21.3%) in the PTD had at least 1 rejection ($P = .49$). The kidney allografts were functional in 272 (90.7%) kidney recipients in the PKT group and 278 (92.7%) in the PTD group during their follow-ups ($P = .30$). Five-year graft and patient survival rates were slightly higher in the PTD group, which were not statistically significant ($P = .06$ and $P = .07$, respectively).

Conclusion: In addition to comparable patient and graft survivals with the PKT and kidney transplantations after a period of dialysis, PKT eliminates hemodialysis costs and complications. We recommend PKT as a better choice for transplantation whenever possible.

Keywords: kidney transplantation, dialysis, kidney allograft, survival, acute allograft rejection

Urol J. 2007;4:155-8.
www.uj.unrc.ir

Department of Kidney
Transplantation, Shaheed
Labbafinejad Medical Center and
Urology and Nephrology Research
Center, Shaheed Beheshti Medical
University, Tehran, Iran

Corresponding Author:
Fatemeh Pour-Reza-Gholi, MD
Department of Kidney
Transplantation, Shaheed
Labbafinejad Medical Center, 9th
Boustan St, Pasdaran Ave,
Tehran, Iran
Tel: +98 21 2254 8886
E-mail: poorreza@hotmail.com

Received February 2007
Accepted June 2007

INTRODUCTION

Kidney transplantation is the treatment of choice among several renal replacement therapies at any time for end-stage renal disease (ESRD). Patients usually undergo transplantation after a variable period of dialysis (pretransplant dialysis; PTD). If the allograft organ is available immediately when the patient reaches the last stage of chronic kidney disease, transplantation can be performed without starting on maintenance dialysis (preemptive

kidney transplantation; PKT). In Iran, the waiting list for transplantation is not long and many patients enjoy the opportunity to receive PKT.⁽¹⁾

The potential cost-effectiveness of PKT has encouraged the transplant community to investigate its safety and effectiveness. Graft and patient survival rates have been compared between recipients of PKT and those with PTD in different studies and the outcomes have been shown to be comparable or even better for PKT.⁽²⁻⁴⁾ In this study with a large number of

patients, we compared the results of living donor transplantation in the recipients with PKT and PTD. This report is the update of the previous one from Shaheed Labbafinejad Medical Center in Tehran, Iran.⁽⁵⁾

MATERIALS AND METHODS

Preemptive kidney transplantation is being performed at our center since 1992. We retrospectively studied 300 patients who received PKT between 1992 and 2006 from living donors. They were compared with 300 kidney recipients with PTD matched for the time of transplantation that had been on hemodialysis for at least 6 months. Stratified randomization was used to select the patients for the control group.

Posttransplant immunosuppressive therapy included one of the following regimens: prednisolone, cyclosporine, and azathioprine; prednisolone, cyclosporine, and mycophenolate mofetil; prednisolone, cyclosporine, mycophenolate mofetil, and daclizumab; and prednisolone, cyclosporine, and sirolimus (Table). Diagnosis of acute rejection was made based on elevation of serum levels of creatinine, clinical findings, need for antirejection therapy, cyclosporine trough level, diethylenetriamine pentaacetic acid renography, and kidney biopsy (if required).

In addition to the patients and transplant data,

episodes of rejection, graft function, and graft and patient survivals were compared between the two groups. Quantitative variables were compared by the *t* test. For categorical variables, the chi-square test and the Fisher exact test were used. Patient and graft survival rates were analyzed by Kaplan-Meier method and compared by the log-rank test. *P* values of less than .05 were considered significant.

RESULTS

Since 1992, a total of 300 PKTs were performed at our center. Demographic and clinical characteristics of the patients with PKT and the controls with PTD are depicted in the Table. All of the patients in the two groups had received their kidney allografts from living donors. No significant differences were noted in the sex of the recipients, age and sex of the donors, donor source, and posttransplant immunosuppressive therapy. The mean duration of posttransplant follow-up was longer ($P < .001$) and the mean age at transplantation was greater ($P < .001$) in the patients of the control group than those in the PKT recipients.

Seventy-one patients (23.7%) in the PKT group and 64 (21.3%) in the PTD experienced at least 1 rejection ($P = .49$). Of acute rejections, 5.2% (7.2% in PKT and 3.0% in PTD groups) were biopsy proven. The kidney allografts were functional in 272

Recipient and Donor Characteristics*

Characteristics	PKT Group	PTD Group
Recipients' sex		
Male	170 (56.6)	172 (57.3)
Female	130 (43.4)	128 (42.7)
Recipients' mean age (range), y	29.4 ± 17.2 (3 to 75)	34.2 ± 15.5 (4 to 73)
Immunosuppressive therapy		
CSA + PRED + AZA	146 (48.7)	175 (58.3)
CSA + PRED + MMF	128 (42.7)	109 (36.3)
CSA + PRED + MMF + DOC	16 (5.3)	3 (1.0)
CSA + PRED + SIR	10 (3.3)	13 (4.3)
PTD duration (range), mo	0	15.70 ± 14.56 (4 to 106.8)
Donor source		
Living related	275 (91.7)	280 (93.3)
Living unrelated	25 (8.3)	20 (6.7)
Donors' sex		
Male	238 (79.3)	255 (85.0)
Female	62 (20.7)	45 (15.0)
Donors' mean age (range), y	28.3 ± 5.9 (20 to 62)	28.1 ± 5.0 (19 to 53)
Follow-up (range), mo	27.38 ± 24.79 (0 to 92.4)	35.28 ± 25.96 (0.1 to 95.9)

*Values in parentheses are percents unless otherwise indicated. PKT indicates preemptive kidney transplantation; PTD, pretransplant dialysis; CSA, cyclosporine; PRED, prednisolone; MMF, mycophenolate mofetil; AZA, azathioprine; DOC, daclizumab; and SIR, sirolimus.

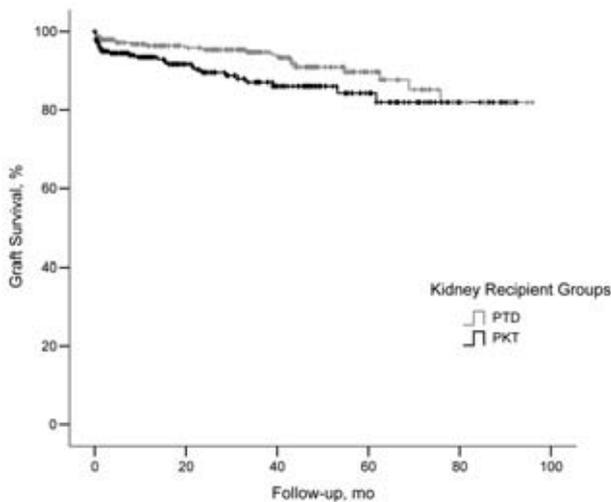


Figure 1. Graft survival curves of the kidney recipients of in the PKT and PTD groups.

(90.7%) kidney recipients in the PKT group and 278 (92.7%) in the PTD group during their follow-ups ($P = .30$).

Figures 1 and 2 depict patient and graft survival curves in the two groups. One-, 2-, 3-, and 5-year graft survival rates were 93.5%, 89.6%, 87.1%, and 84.3% in the PKT group and 96.4%, 95.4%, 94.7%, and 89.7% in the PTD group, respectively ($P = .06$). At the end of the 1st, 2nd, 3rd, and 5th year of transplantation, the rate of patient survival was 96.3%, 95.6%, 94.8%, and 92.7% in the PKT group, and 98.5%, 98.5%, 97.9%, and 97.9% in the PTD group, respectively ($P = .07$).

DISCUSSION

In the present study, we compared 300 kidney recipients with PKT and 300 with PTD. Our findings demonstrated that the graft and patient survival rates at 5 posttransplant years were similar in the two groups with a slight insignificant superiority of those in the PTD group. Clinically, the outcomes are favorable in both groups. This was also seen in acute rejection episodes and graft loss rates among the patients of the PKT and PTD groups. These findings are consistent with the results of previous studies,^(2-4,6,7) but in contrast with our previous results in which we found better outcomes in PKT group within the first posttransplant 2 years.⁽⁵⁾ A higher graft survival with PKT has also been reported in some studies.⁽⁸⁻¹⁰⁾ Roake and colleagues showed better patient and graft survival rates in patients receiving

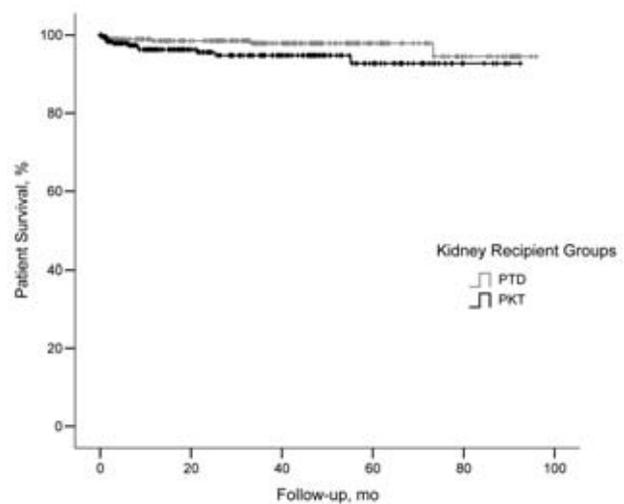


Figure 2. Patient survival curves of the kidney recipients of in the PKT and PTD groups.

PKT from cadaveric donors.⁽¹⁰⁾ An explanation in favor of cadaveric PKT is that the recipients may not experience uremic status before transplantation. However, in a study on the data from the United States Renal Data System, Mange and colleagues noted a reduction in the risk of graft function by PKT from living donors, especially in the long-term.⁽⁹⁾

Our control group consisted of randomly selected kidney recipients mostly from unrelated living donors without matching for human leukocyte antigens that may explain the slight differences from other studies. However, the consensus is that PKT provides favorable transplantation outcomes, and the other advantages such as eliminating dialysis costs and preventing from the low quality of life and reduced daily activity of the patients during dialysis period make PKT a considerable option.⁽⁸⁾

Of other factors that have been studied are delayed graft function and glomerular filtration rate in patients who receive PKT. Debska-Slizien and coworkers reported that delayed graft function was 2 times more frequent in patients with PTD compared to that in PKT recipients, which was confirmed by other researchers.^(2,4) Gill and colleagues reported a slower decline, but of modest clinical significance, in glomerular filtration rate within 6 posttransplant months in PKT recipients.⁽³⁾ These findings should be tested in multivariate analyses on data from larger study groups in order to elucidate the benefit of PKT and its effects on transplantation.

CONCLUSION

Our findings in concert with the previous studies on PKT suggest that it can provide clinically comparable results with kidney transplantation in patients on maintenance dialysis. Furthermore, PKT eliminates hemodialysis costs and arteriovenous fistula formation. Thus, we recommend PKT as a better choice for transplantation whenever it is possible. Cost-effectiveness of PKT is another advantage; however, it should be assessed in national scales to yield precise conclusions. We are continuing our study with further cases and over a longer follow-up period.

CONFLICT OF INTEREST

None declared.

REFERENCES

1. Ghods AJ, Savaj S. Iranian model of paid and regulated living-unrelated kidney donation. *Clin J Am Soc Nephrol.* 2006;1:1136-45.
2. Innocenti GR, Wadei HM, Prieto M, et al. Preemptive living donor kidney transplantation: do the benefits extend to all recipients? *Transplantation.* 2007;83:144-9.
3. Gill JS, Tonelli M, Johnson N, Pereira BJ. Why do preemptive kidney transplant recipients have an allograft survival advantage? *Transplantation.* 2004;78:873-9.
4. Debska-Slizien A, Wolyniec W, Chamienia A, et al. A single center experience in preemptive kidney transplantation. *Transplant Proc.* 2006;38:49-52.
5. Simforoosh N, Basiri A, Pourrezagholi F, et al. Is preemptive renal transplantation preferred? *Transplant Proc.* 2003;35:2598-601.
6. Becker BN, Rush SH, Dykstra DM, Becker YT, Port FK. Preemptive transplantation for patients with diabetes-related kidney disease. *Arch Intern Med.* 2006;166:44-8.
7. Katz SM, Kerman RH, Golden D, et al. Preemptive transplantation--an analysis of benefits and hazards in 85 cases. *Transplantation.* 1991;51:351-5.
8. Abou Ayache R, Bridoux F, Pessione F, et al. Preemptive renal transplantation in adults. *Transplant Proc.* 2005;37:2817-8.
9. Mange KC, Joffe MM, Feldman HI. Effect of the use or nonuse of long-term dialysis on the subsequent survival of renal transplants from living donors. *N Engl J Med.* 2001;344:726-31.
10. Roake JA, Cahill AP, Gray CM, Gray DW, Morris PJ. Preemptive cadaveric renal transplantation--clinical outcome. *Transplantation.* 1996;62:1411-6.