Preemptive Deceased-Donor Renal Transplant in Adults: Single-Center Experience and Outcome

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Abstract

Objectives: **Preemptive renal transplant has been associated with better survival of both the allograft and the recipient than has conventional renal transplant. It remains unclear, however, whether preemptive transplant is optimal for renal replacement therapy. We describe our experience with preemptive renal transplant.**

Materials and Methods: **We retrospectively analyzed 32 preemptive and 132 nonpreemptive deceased-donor renal transplants performed in our center between January 2006 and January 2008.**

Results: **The mean follow-up was 47.44 ± 11.92 months in the preemptive group, compared with 47.49 ± 14.87 months in the nonpreemptive group. The 1-, 3-, and 5-year patient survival rates were 93.8%, 90.6%, and 90.6% in the preemptive group, and 92.4%, 90.9%, and 87.6% in the nonpreemptive group; and the 1-, 3-, and 5-year graft survival rates were 93.8%, 93.8%, and 93.8% in the preemptive, and 89.4%, 85.6%, and 73.8% in the nonpreemptive group. None of these differences was statistically significant. Rates of acute rejection (*P* = .04) and delayed graft function (*P* = .03) were significantly lower in the preemptive group. The mean plasma creatinine levels at 1 day before transplant and at 1 and 12 months after transplant were 715.16 ± 114.92 µmol/L, 113.15 ± 29.17 µmol/L, and 94.59 ± 18.56 µmol/L in the preemptive group, and 772.62 ± 111.38 µmol/L, 118.46 ± 30.94 µmol/L, and 100.78 ± 15.03 µmol/L in the nonpreemptive group. None of these differences was statistically significant.**

Conclusions: **Preemptive transplant can yield outcomes comparable to those of renal transplant after dialysis, and result in better quality of life for patients with end-stage renal disease, as well as reduced cost. Preemptive transplant is a better choice for renal replacement therapy, if possible.**

Key words: *Preemptive renal transplant, Graft survival, Patient survival*

Introduction

Renal replacement therapies in patients with end-stage renal disease include renal transplant and dialysis. Owing to a lack of sufficient donor organs, and the view that transplant is associated with an increased risk of graft loss from rejection in patients who do not experience the immunosuppressive effects of uremia,[1] patients with end-stage renal disease usually undergo a variable time on dialysis before renal transplant (nonpreemptive transplant). A longer time on dialysis, however, has been associated with reduced patient and graft survival rates after renal transplant.[2] Preemptive transplant (in which patients are not started on chronic maintenance dialysis before transplant) has been found to reduce the long-term adverse effects of dialysis, resulting in better allograft survival rates and fewer episodes of acute rejection in recipients of either deceased-donor or live-donor kidneys.[3-5] In contrast, other studies have reported that preemptive transplant had little effect on clinical outcome[6, 7]; and a recent study found that dialysis for more than 10 years did not have any negative effects on posttransplant patient and graft survival.[8] We describe our experiences with preemptive renal transplant, including patient outcomes.

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Materials and Methods

From January 2006 to January 2008, 32 preemptive and 132 nonpreemptive deceased-donor renal transplants were performed in our center. We excluded patients who underwent retransplant or multiple organ transplants, as well as patients who underwent no preemptive renal transplant after at least 6 months of dialysis. Posttransplant immunosuppressive therapy included calcineurin inhibitors, an antiproliferative agent, and prednisolone. The detailed clinical characteristics of the recipients are shown in Table 1.

Episodes of acute rejection, graft function, incidence of delayed graft function and patient and graft survival rates were compared between the 2 groups. Serum creatinine concentrations were measured 1 day before, and 1 and 12 months after the transplant. Acute rejection was diagnosed by clinical manifestations and increased serum creatinine concentrations and confirmed by graft biopsies. Delayed graft function was defined as initiation of dialysis within 1 week after transplant. Graft failure was defined as the initiation of long-term dialysis therapy after transplant.

Quantitative variables were compared using the *t* test, and categorical variables with the chi-square test. Recipient and graft survival rates were analyzed by the Kaplan-Meier method and compared by the log-rank test. *P* values less than .05 were considered statistically significant.

Results

The demographic and clinical characteristics of the patients in the 2 groups are presented in Table 1. The mean duration of follow-up was 47.44 ± 11.92 months in the preemptive group and 47.49 ± 14.87 months in the nonpreemptive group. The 2 groups did not differ significantly in mean donor and recipient ages, sex distribution, human leukocyte antigen matching, donor kidney cold ischemia time, and posttransplant immunosuppressive therapy. Before renal transplant, 16 patients in the nonpreemptive group had received blood transfusions, with 3 being panel reactive antibody positive (> 20%).

Acute rejection episodes occurred in 4 patients (12.5%) in the preemptive group, all of whom were successfully treated after transplant with steroids. In comparison, 43 patients in the nonpreemptive group (32.58%) experienced acute rejection episodes (P = .04); most of these patients were treated with steroids, although 16 were treated with antilymphocyte antibodies after transplant. Three of these patients experienced graft rupture resulting from acute rejection, which required graft removal. Graft loss was experienced by 3 patients in the preemptive group, all due to the death of the recipients, with none related to immunologic complications.

Table 1. Definitions of terms used in the current study.

Characteristics	Preemptive group	Nonpreemptive group	*P*
Number	32	132	
Recipient age (y)	41.36 ± 8.87	42.05 ± 10.69	NS
Sex (male/female) (n)	19/13	86/46	NS
Primary disease (n)			
Glomerulonephritis	27	120	NS
Polycystic kidney disease	3	7	NS
Others	2	5	NS
Panel reactive antibodies > 15% (n)	0	3	NS
Donor age (y)	30.52 ± 9.61	32.74 ± 7.53	NS
Kidney cold ischemia time (h)	8.46 ± 3.73	8.15 ± 4.02	NS
Human leukocyte antigen matching (h)	3.37 ± 0.85	3.64 ± 0.79	NS
Duration of dialysis (mo)	0	14.65 ± 7.53	
Length of follow-up (mo)	47.44 ± 11.92	47.49 ± 14.87	NS
Delayed graft function (%)	0	14.64%	.03
Acute rejection (%)	12.5	32.58%	.04
Creatinine levels (μmol/L)			
1 day before transplant	715.16 ± 114.92	772.62 ± 111.38	NS
1 month after transplant	113.15 ± 29.17	118.46 ± 30.94	NS
12 months after transplant	94.59 ± 18.56	100.78 ± 15.03	NS

Abbreviations: NS, not significant

Delayed graft function requiring dialysis occurred in 18 patients (14.64%) in the nonpreemptive group, but in 0 patients in the preemptive group (P = .03). Mean plasma creatinine concentrations 1 day before, and 1 and 12 months after transplant were 715.16 ± 114.92 μmol/L, 113.15 ± 29.17 μmol/L, and 94.59 ± 18.56 μmol/L in the preemptive group; and 772.62 ± 111.38 μmol/L, 118.46 ± 30.94 μmol/L, and 100.78 ± 15.03 μmol/L in the nonpreemptive group. None of these differences was statistically significant.

Using the Kaplan-Meier method, we found that the 1-, 3-, and 5-year patient survival rates were 93.8%, 90.6%, and 90.6% in the preemptive group, and 92.4%, 90.9%, and 87.6% in the nonpreemptive group. The 1-, 3-, and 5-year graft survival rates were 93.8%, 93.8%, and 93.8% in the preemptive group, and 89.4%, 85.6%, and 73.8% in the nonpreemptive group. None of these differences at the ends of 1, 3, and 5 years were statistically significant, nor were the

overall patient (P = .85) and graft survival rates (P = .15) using the log-rank test (Figures 1 and 2).

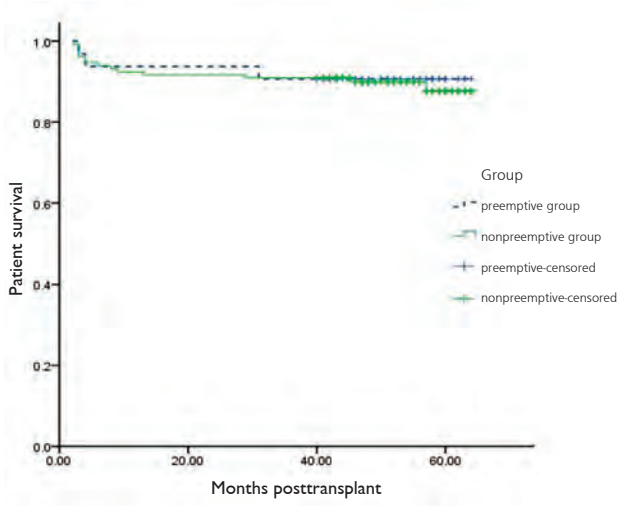

Figure 1. Survival curves of patients in the preemptive and nonpreemptive groups.

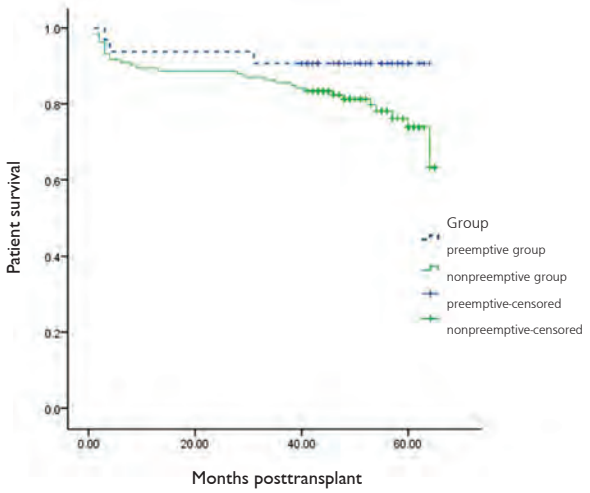

Figure 2. Graft survival rates of patients in the preemptive and nonpreemptive groups.

Discussion

Waiting time is a strong independent risk factor for increased patient mortality and increased graft failure after renal transplant.[5, 9] Because transplants are associated with better long-term survival than dialysis,[10] preemptive transplant may increase survival by reducing dialysis time. Indeed, preemptive transplant has been associated with better patient and allograft survival rates and decreased acute rejection rates, compared with nonpreemptive transplant.[11-13]

We did not observe statistically significant differences in patient and graft survival rates in patients who underwent preemptive and nonpreemptive renal transplant. However, both patient and graft survival rates, especially the latter, tended to be higher in our preemptive than our nonpreemptive group.

The incidence of acute rejection episodes was significantly lower (P = .04), in the preemptive than in the nonpreemptive group. Patients who have not undergone dialysis have a greater degree of impairment of the immune system than patients who have undergone long-term dialysis.[14] Moreover, dialysis can lead to T-cell proliferation.[15] We observed panel reactive antibody-positive patients and those receiving blood transfusions only in our nonpreemptive group, indicating that patients undergoing long-term dialysis were at a higher risk of acute rejection. Because plasma creatinine concentrations were lower in the preemptive than the nonpreemptive group, both before and after transplant, the reduced delayed graft function rate in the preemptive group might have been due to the residual function of the native kidneys. This preservation of native function, however, cannot explain the superior outcomes in patients who underwent preemptive transplant,[16] although a longer period of dialysis before transplant has been associated with a higher incidence of posttransplant delayed graft function.[17]

Noncompliance with immunosuppressive drugs has been shown to contribute to a high rate of acute rejection episodes after preemptive transplant.[6] Patients who have not experienced the symptoms of chronic renal failure or the morbidities associated with dialysis, and dialysis-access procedures, may be less strict about their compliance with immunosuppression after transplant. However, none of the patients in our preemptive group, even those with acute rejection, showed noncompliance with drug treatment. This result was due primarily to patient education, so that these patients recognized the importance of adherence to immunosuppressive medications.

Preemptive transplant can provide results comparable to renal transplant after dialysis and result in better quality of life for patients with end-stage renal disease. Furthermore, preemptive transplant eliminates the costs of dialysis and reduces the use of limited medical resources,

especially in developing countries. Therefore, preemptive transplant may be a better treatment choice for patients with end-stage renal disease.

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