



## Slow Progression of Aortic Calcification Is a Potential Benefit of Pre-emptive Kidney Transplantation

H. Mursawa<sup>a</sup>, S. Hatakeyama<sup>a,\*</sup>, H. Yamamoto<sup>a</sup>, Y. Tanaka<sup>a</sup>, O. Soma<sup>a</sup>, T. Matsumoto<sup>a</sup>, T. Yoneyama<sup>a</sup>, Y. Hashimoto<sup>b</sup>, T. Koie<sup>a</sup>, T. Fujita<sup>c</sup>, R. Murakami<sup>c</sup>, H. Saitoh<sup>d</sup>, T. Suzuki<sup>d</sup>, S. Narumi<sup>e</sup>, and C. Ohyama<sup>a,b</sup>

<sup>a</sup>Department of Urology, Hirosaki University Graduate School of Medicine, Hirosaki, Japan; <sup>b</sup>Department of Advanced Transplant and Regenerative Medicine, Hirosaki University Graduate School of Medicine, Hirosaki, Japan; <sup>c</sup>Departments of Cardiology, Respiratory Medicine, and Nephrology, Hirosaki University Graduate School of Medicine, Hirosaki, Japan; <sup>d</sup>Department of Urology, Oyokyo Kidney Research Institute, Hirosaki, Japan; and <sup>e</sup>Department of Transplant Surgery, Nagoya Daini Red Cross Hospital, Nagoya, Japan

---

### ABSTRACT

**Purpose.** Pre-emptive kidney transplantation (PKT) is expected to improve graft and cardiovascular event-free survival compared with standard kidney transplantation. Aortic calcification is reported to be closely associated with renal dysfunction and cardiovascular events; however, its implication in PKT recipients remains incompletely explored. This aim of this study was to evaluate whether PKT confers a protective effect on aortic calcification, renal function, graft survival, and cardiovascular event-free survival.

**Methods.** One hundred adult patients who underwent renal transplantation between January 1996 and March 2016 at Hirosaki University Hospital and Oyokyo Kidney Research Institute were included. Among them, 19 underwent PKT and 81 patients underwent pretransplant dialysis. We retrospectively compared pretransplant and post-transplant aortic calcification index (ACI), renal function (estimated glomerular filtration rate [eGFR]), and graft and cardiovascular event-free survivals between the 2 groups.

**Results.** The median age of this cohort was 45 years. Preoperative ACI was significantly lower in PKT recipients. There were no significant differences between the 2 groups regarding postoperative eGFR, graft survival, and cardiovascular event-free survival. However, the ACI progression rate ( $\Delta$ ACI/y) was significantly lower in PKT recipients than in those who underwent pretransplant dialysis. Higher ACI was significantly associated with poor cardiovascular event-free survival.

**Conclusions.** PKT is beneficial in that it contributes to the slow progression of after transplantation. Although we could not observe significant differences in graft and cardiovascular event-free survivals between the 2 groups, slow progression of aortic calcification showed a potential to decrease cardiovascular events in PKT recipients during long-term follow-up.

---

**K**IDNEY transplantation is the gold standard treatment strategy for patients with end-stage renal disease [1]. Pre-emptive kidney transplantation (PKT), is defined as transplantation before dialysis initiation and is considered the ideal renal replacement therapy for end-stage renal disease [2]. PKT is associated with fewer health risks and improved patient and graft survivals [3] and better quality of life [4], as compared with transplantation after dialysis initiation. In addition, accelerated atherosclerosis and

---

This work was supported by a Grant-in-Aid for Scientific Research (No. 15H02563 15K15579, 17K11118, 17K11119, 17K16768, 17K16770, and 17K16771) from the Japan Society for the Promotion of Science.

\*Address correspondence to Shingo Hatakeyama, MD, PhD, Department of Urology, Hirosaki University Graduate School of Medicine, 5 Zaifu-chou, Hirosaki 036-8562, Japan. Tel: 81-172-39-5091; Fax: 881-172-39-5092. E-mail: [shingoh@hirosaki-u.ac.jp](mailto:shingoh@hirosaki-u.ac.jp)

**Table 1. Baseline Characteristics of Patients**

	Non-PKT (n = 81)	PKT (n = 19)	P Value
Age (years)	47 (36–56)	38 (34–42)	.044
Gender (M/F)	51/39	11/8	.432
DM, n (%)	10 (12%)	0 (0%)	.200
Living KT	52 (64%)	19 (100%)	.001
ABO incompatible	17%	32%	.097
Dialysis vintage (mo)	22 (9–85)	0	<.001
Median follow-up (mo)	56 (31–93)	30 (12–46)	<.001
Preoperative ACI	11.1 (0.4–45.8)	0.0 (0.0–1.3)	<.001
Graft loss	8 (10%)	1 (5%)	>.999
Cardiovascular events	5 (6%)	0 (0%)	.580

Abbreviations: ACI, aortic calcification index; DM, diabetes mellitus; KT, kidney transplantation; PKT, pre-emptive kidney transplantation.

vascular calcification, which were strongly associated with dialysis vintage [5,6], may be avoided with PKT. In our previous study, we investigated the implication of aortic calcification in renal transplant recipients and identified a high pretransplant aortic calcification index (ACI) as a risk factor for decreased post-transplant renal function and increased incidence of cardiovascular events [7]. However, its implication in PKT recipients has not been well examined. Therefore, we hypothesized that PKT can improve progression of aortic degradation compared with standard techniques. In the present study, we investigated the relationship between PKT, aortic calcification, renal function, and graft and cardiovascular event-free survivals in renal transplant recipients.

## METHODS

### Study Design

We conducted a retrospective cohort study of recipients of kidney transplantations at 2 centers. This study was conducted in accordance with the ethical standards of the Declaration of Helsinki and approved by the ethical committee of Hirosaki University Graduate School of Medicine (authorization number: 2017-089). For this type of retrospective study, formal consent was not required.

### Study Population

In this study, we included 100 consecutive kidney transplantation cases that were performed in Hirosaki University Hospital and Oyokyo Kidney Research Institute, Hirosaki, Japan, between January 1996 and March 2016. Among these patients, 19 underwent PKT and 81 patients underwent dialysis before renal transplantation (non-PKT). The PKT group also included patients who underwent a few (1–3) sessions of preoperative hemodialysis.

### Abdominal Computed Tomography and Evaluation of ACI

Patients were eligible for the study if a baseline abdominal computed tomography (CT) had been performed within 12 months prior to transplantation. Follow-up CT was performed every 12 to 24 months after transplantation. ACI was quantitatively measured on abdominal CT (TSX-021B, Toshiba Medical Systems Corp, Ohtawara, Japan) images above the bifurcation of the common iliac artery scanned 10 times at 5-mm intervals, as previously described [5].

### Biochemical Assays

Blood and serum testing, including tests for renal function, were routinely performed every year after transplantation. The estimated glomerular filtration rate (eGFR) was calculated using the Modification of Diet in Renal Disease equation for Japanese patients [7]. eGFR was used to evaluate postoperative renal function of recipients.

### Surgical Procedure in Donors

Donor nephrectomy for living donors was performed by either the open or laparoscopic approach. As we previously reported [8], there were no significant differences in donor outcomes between the procedures.

### Immunosuppression

Our standard immunosuppressive regimen consisted of induction with basiliximab, calcineurin inhibitors, mycophenolate mofetil, and methylprednisolone. In patients who underwent ABO-incompatible renal transplantation, low-dose rituximab (100 mg/m<sup>2</sup>) was administered 3 weeks before the procedure. Maintenance therapy included calcineurin inhibitors, mycophenolate mofetil, and low-dose prednisolone.

### Data Analyses and Statistical Methods

We retrospectively compared pretransplant and post-transplant ACI, renal function (eGFR), graft survival, and cardiovascular event-free survival between the non-PKT and PKT recipients. Statistical analyses of clinical data were performed using SPSS v 22.0 (IBM Corporation, Armonk, NY, United States) and GraphPad Prism v 5.03 (GraphPad Software, San Diego, Calif, United States). Categorical variables were reported as percentages and compared using Fisher exact test. Quantitative data were expressed as medians with quartiles 1 and 3. Differences between the groups were statistically compared using Student *t* test for normally distributed data or the Mann-Whitney *U* test for non-normally distributed data. Optimal cutoff of ACI was calculated by the formula  $(1 - \text{sensitivity})^2 + (1 - \text{specificity})^2$ , with the help of receiver operator characteristics (ROC) curves [9]. The predictive accuracy of ACI for postoperative cardiovascular events was evaluated by an area under the curve derived from an ROC curve. Overall survival and cardiovascular event-free survivals were estimated using the Kaplan-Meier methods and compared with the log-rank test.

## RESULTS

Median age and median follow-up periods of this cohort were 45 years and 52.1 months, respectively. Table 1 lists the clinical characteristics of the patients enrolled in the study. The median age was significantly lower in PKT recipients (47 vs 38 years,  $P = .044$ ). The number of living kidney transplantation was significantly greater in the PKT group. Preoperative eGFR was significantly higher in PKT recipients (Fig 1A). Postoperative eGFR did not significantly differ between the groups (Fig 1B). Preoperative ACI (Fig 1C) and ACI progression rate ( $\Delta\text{ACI}/\text{y}$ ; Fig 1D) was significantly lower in PKT recipients (11.1 vs 0.0,  $P < .001$ , 1.33 vs 0.25,  $P = .025$ , respectively). The number of patients with graft loss in the non-PKT and PKT groups were 8 (10%) and 1 (5%), respectively. The number of patients

Download English Version:

<https://daneshyari.com/en/article/8827376>

Download Persian Version:

<https://daneshyari.com/article/8827376>

[Daneshyari.com](https://daneshyari.com)