Effect of Gender Differences on Transplant Kidney Function

T. Yoneda*, Y. Iemura, K. Onishi, S. Hori, Y. Nakai, M. Miyake, S. Anai, K. Torimoto, K. Aoki, T. Saka, N. Tanaka, K. Yoshida, and K. Fujimoto

Department of Urology, Nara Medical University, Nara, Japan

ABSTRACT

Background. Transplant kidney function is thought to be affected by sex differences, such as physical conditions including muscle volume, sex hormones, immune responses, and so forth. We examined the effect of sex differences on transplant kidney function.

Methods. The subjects were selected from kidney transplant recipients, who received kidney transplantation on our hospital between January 2000 and August 2015. Cadaveric donors and parent-child pairs with an age difference were excluded, then we included 47 recipients whose sex was different from the sex of the donor. We compared transplant kidney function between male donors and female recipients group (M→F, n = 20) and female donors and male recipients group (F→M, n = 27).

Results. Nadir creatinine value was higher in the F→M group than in the M→F group (1.09 mg/dL vs 0.76 mg/dL, $P < .0001$). The estimated glomerular filtration rate (eGFR) was significantly higher in the M→F group than in the F→M group (66.6 mL/min/1.73 m^2 vs 50.1 mL/min/1.73 m^2, $P = .002$), and eGFR ratio (recipient to donor) was significantly higher in the M→F group than in the F→M group (1.13 vs 0.57, $P < .0001$). Multiple linear regression analysis showed that the only the sex of the recipient was significant prognostic factor of eGFR after renal transplantation ($P = .037$).

Conclusions. The short-term kidney function of the graft from male to female was better than that of the graft from female to male.

TRANSPLANT kidney function is thought to be affected by sex, owing to the differences in physical conditions including muscle volume, sex hormones, immune responses, and so forth [1]. We examined the effect of sex on transplant kidney function.

Methods

A total of 152 recipients received renal transplantation surgery between January 2000 and August 2015 at Nara Medical University. Among these, cadaveric donors and parent-child pairs with an age difference were excluded. We included 47 recipients whose sex was different from the sex of the donor. We compared transplant kidney function between male donors and female recipients group (M→F, n = 20) and female donors and male recipients group (F→M, n = 27). For evaluation of renal graft function, we used the nadir value of creatinine (Cr) to avoid the influence of rejection, and so forth. Estimated glomerular filtration rate (eGFR) by the Japanese Society of Nephrology, established by the Japanese cohort, was also used for the evaluation [2]. The calculation formula of this eGFR (mL/min/1.73 m^2) is $194 \times \text{serum Cr value}^{(-1.094)} \times \text{Age}^{(-0.287)}$ for males and $0.739 \times 194 \times \text{serum Cr value}^{(-1.094)} \times \text{Age}^{(-0.287)}$ for females. Serum Cr value, eGFR and eGFR ratio (recipient to donor) were compared between F→M group and M→F group using the Mann-Whitney U test. Patient characteristics were compared between eGFR > median value group and eGFR ≦ median value using the Mann-Whitney U test and the chi square test. The prognostic factor of eGFR after renal

*Address correspondence to Tatsuo Yoneda, Nara Medical University, Shijo-cho840, Kashihara, 634-8522, Nara, Japan. E-mail: uro-yone@naramed-u.ac.jp

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Table 1. Patient Characteristics

	Total	M→F	F→M	*P* Value
Age of recipient	53.7 ± 9.1	52.9 ± 10.1	54.4 ± 8.59	.583
Non-DM/DM	38/9	14/6	24/3	.104
PEKT/non-PEKT	13/34	6/14	7/20	.758
Dialysis duration (Mos)	63.9 ± 67.7	34.6 ± 19.4	84.5 ± 82.9	.129
Blood type (compatible/incompatible)	32/15	14/6	18/9	.808
BMI of recipient	22.8 ± 4.7	23.6 ± 5.70	22.3 ± 3.91	.880
Donor (related/unrelated)	6/41	0/20	6/21	.024
Age of donor	54.2 ± 10.1	55.3 ± 12.0	53.4 ± 8.82	.497
BMI of donor	23.7 ± 4.3	23.6 ± 4.12	23.8 ± 4.46	.880
Preoperative Cr of donor	0.69 ± 0.14	0.79 ± 0.11	0.61 ± 0.10	<.0001
Preoperative eGFR of donor	78.0 ± 23.2	60.2 ± 11.1	91.1 ± 21.4	.002
CNI (CYA/FK)	22/25	14/6	8/19	.006

Mann-Whitney *U* test, Chi square test.
The comparison of patient characteristics between the M→F group and the F→M group. Related donor rate was higher in the M→F group. Pre-operative renal function (Cr and eGFR) was better in the F→M group. As calcinulin inhibitor, cyclosporine was more frequently used in the M→F group.
Abbreviations: PEKT, Preemptive kidney transplantation; CNI, Calcinulin inhibitor; CYA, Cyclosporine; FK, Tacrolimus.

transplantation was estimated using a multiple liner regression analysis. A value of $P < .05$ was considered statistically significant.

RESULTS

Patient Characteristics

Table 1 shows the comparison of patient characteristics between the M→F group and the F→M group. Related donor rate was higher in the F→M group than in the M→F group ($P = .024$). Preoperative Cr value of the donor was lower ($P < .0001$) and preoperative eGFR of the donor was higher ($P = .002$) in F→M group than in the M→F group. In the M→F group, cyclosporine was more frequently used, whereas tacrolimus was more frequently used in the F→M group as a calcineurin inhibitor for the recipients ($P = .006$). Age and body mass index of both the donor and recipient were similar in the two groups. Presence of diabetes mellitus and dialysis duration of the recipient were also similar in both groups. Preemptive transplantation and ABO blood type compatible ratio of the renal transplantation were not different in the two groups.

Comparison of the Graft Function

Serum creatinine value was lower in the M→F group than in the F→M group (0.76 ± 0.19 vs 1.09 ± 0.27 mg/dL, $P < .0001$) (Fig 1). Estimated GFR was higher in the M→F group than in the F→M group (66.6 ± 17.2 vs 50.1 ± 17.8 mL/min/1.73 m^2, $P = .002$) (Fig 2), eGFR ratio of recipient to donor was also higher in the M→F group than in the F→M group (1.13 ± 0.31 vs 0.57 ± 0.23, $P < .0001$) (Fig 3).

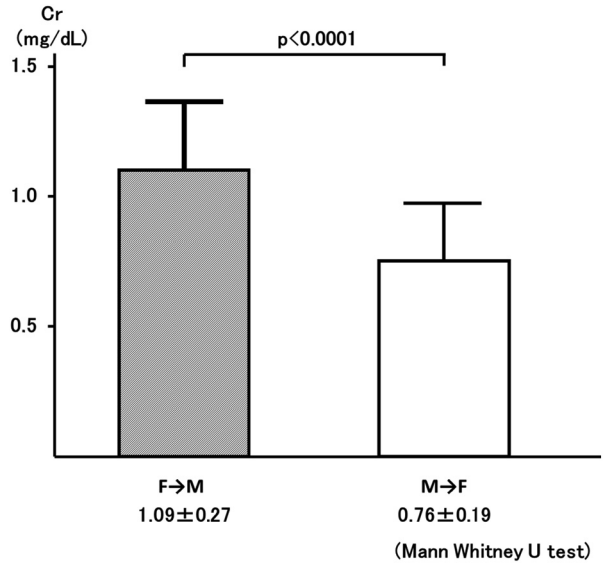

Fig 1. Comparison of Cr between two groups. The serum value of creatinine was significantly lower in the M→F group than in the F→M group ($P < .0001$).

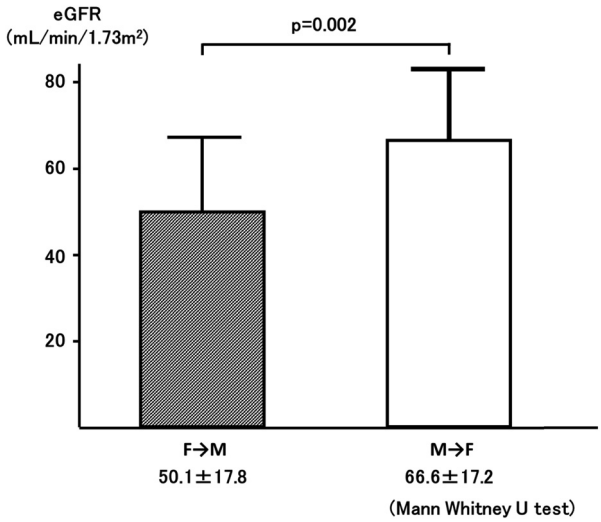

Fig 2. Comparison of eGFR between two groups. eGFR was significantly higher in the M→F group than in the F→M group ($P = .002$).