



Kidney Transplantation in Korean Patients With End-Stage Renal Disease Aged 65 and Older: A Single-Center Experience

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ABSTRACT

Background. The mean age of patients starting dialysis in Korea has increased to older than 60 years and the proportion of patients aged 65 and older exceeded 40% in 2014. Although the number of elderly dialysis patients is increasing rapidly, percentages of elderly patients undergoing kidney transplantation (KT) are very low.

Methods. We retrospectively reviewed the medical records of patients who underwent KT at Keimyung University Dongsan Medical Center between 1982 and 2016. Elderly patients (≥ 65 years old) were compared with the control group of patients in their early sixties (60–64 years old).

Results. Among a total of 1209 KT patients, those in their early sixties totaled 34 (2.8%) and the elderly totaled only 18 (1.5%). Patient and allograft survival rate showed no significant differences between the elderly and those in their early sixties. Death with a functioning graft accounted for 50% in both groups. However, occurrences of bacterial infection and tuberculosis were higher in the elderly ($P = .011$ and $.047$, respectively). In a multivariate analysis, longer duration of renal replacement therapy before KT and the occurrence of malignancy were independent risk factors for patient death (hazard ratio [HR], 1.027; $P = .014$; HR, 31.934; $P = .016$, respectively). Also, albuminuria at 6 months after KT was an independent risk factor for allograft loss (HR, 51.155; $P = .016$).

Conclusion. The overall survival rate of the elderly was not significantly lower than those in their early sixties. Even in the elderly, KT should not be delayed. In addition, careful surveillance for malignancy and measures to decrease the risk of infection are necessary.

ACCORDING to the recent annual data report of United States Renal Data System (USRDS), the percentage of elderly patients (≥ 65 years old) who underwent renal replacement therapy (RRT) was 38.9% in 2013 [1]. Furthermore, the percentage of elderly patients in incident case of RRT has been steadily increasing to 48.7%. Similarly, the mean age of patients starting dialysis in Korea has increased to 60.3 years old, and the proportion of patients aged 65 and older increased to 40.7% in 2014 [2].

Among RRTs of end-stage renal disease (ESRD) patients, kidney transplantation (KT) is considered primary therapy by providing the best outcomes in patient survival and quality of life [3,4]. Although outcomes of KT in elderly patients were poorer than younger patients, they were better than those receiving dialysis treatments. Nevertheless, the proportion of elderly patients undergoing KT is very low

compared with younger patients. According to USRDS data, the proportions of kidney transplant recipients (KTRs) among total elderly patients with ESRD (18.6%) and newly diagnosed elderly patients with ESRD (1.1%) were lower than those of patients aged 45 to 64 years (33.4% and 3.2%, respectively) [1]. Also, according to the 2015 Korean Network for Organ Sharing (KONOS) annual report, the proportion of elderly patients among total KTRs

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was 5.1% in 2015, which was increased from 1.6% in 2011, but still lower than that of younger patients [5].

In the aging society, the numbers of elderly ESRD patients are increasing continuously, but the proportion of elderly patients undergoing KT is still low. Although the reason for lower rates of KT in elderly patients is not clear, strict selection criteria and lower interest in KT by elderly patients are considered to be one of the reasons [6]. In this study, we investigated the clinical features and outcomes of KT in the elderly and evaluated their adequacy.

METHODS

This study was approved by Institutional Review Board of Keimyung University, Korea (40525-201611-HR-118-01). We retrospectively reviewed the medical records of patients who underwent KT at Keimyung University Dongsan Medical Center between 1982 and 2016. Among a total of 1209 KTRs, 18 patients who were aged 65 or older and underwent KT for the first time were included for analysis and were compared with the control group of 34 patients in their early sixties (60–64 years old). The recipient variables included age, gender, cause of ESRD, history of diabetes mellitus, hypertension, methods and durations of RRT before KT, use of induction therapy, and maintenance therapy. In addition, donor variables included age, gender, donor type, and number of mismatched human leukocyte antigens (HLA). Complications were evaluated, including delayed graft function (DGF) and surgical and medical complications. DGF was defined as need for dialysis in the first week after KT. Finally, survival rates of allograft and patient and their risk factors were evaluated.

Statistical Analysis

Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 18.0 (SPSS Inc., Chicago, Ill, United States). Continuous variables were presented as means \pm standard deviation and categorical variables as frequencies with percentages. Continuous variables were compared using Student *t* test and categorical variables using chi-square or Fisher exact test. Survival rates of kidney allografts and patients were compared using the Kaplan-Meier method and the log-rank test. Independent risk factors for patient death and allograft loss were analyzed using Cox proportional hazards model. A *P* value $<$.05 was considered to be statistically significant.

RESULTS

Baseline Characteristics

Among a total of 1209 KTRs, those in their early sixties were 34 (2.8%) and the elderly were only 18 (1.5%). The number of KTRs aged 60 or older excluded from analysis due to undergoing KT more than twice was 6 (0.5%). The average age was 66.9 ± 2.4 years for the elderly (65–72 years) and 61.7 ± 1.4 years for those in their early sixties (60–64 years). Among the elderly, 10 (55.6%) were men, 4 (22.2%) had diabetes mellitus, and 13 (72.2%) had hypertension. Glomerulonephritis was the most common cause of ESRD in both the elderly (50.0%) and those in their early sixties (55.9%). Hemodialysis was the most common RRT modality in both the elderly (94.4%) and those in their early sixties (70.6%). Although the duration of RRT before KT was shorter in the elderly (63.1 ± 60.1 vs $73.4 \pm$

53.2), there was no statistically significant difference. The proportion of deceased donors was 77.7% in the elderly and 64.7% for those in their early sixties. The average donor age was 53.9 ± 15.0 years for the elderly (33–74 years) and 52.6 ± 15.1 years for those in their early sixties (17–72 years). The numbers of HLA mismatches were 2.7 ± 1.8 in the elderly and 3.7 ± 1.7 for patients in their early sixties (*P* = .052). Baciliximab and thymoglobulin was used as induction therapy in 77.8% and 16.7%, respectively, of the elderly patients and in 61.8% and 20.6%, respectively, of those in their early sixties.

Complications After KT

Complications after KT are presented in Table 1. DGF occurred in 4 patients (22.2%) and surgical complications occurred in 1 patient (5.6%) in the elderly. There was no statistically significant difference between the elderly and those in their early sixties. Among medical complications, occurrence of bacterial infection and tuberculosis were higher in the elderly (*P* = .011 and .047, respectively). Acute rejection occurred in 2 patients (11.1%) in the elderly and 4 patients (11.8%) in their early sixties. A total of 3 KTRs were diagnosed with malignancy. In the elderly, lung cancer occurred in 1 KTR, and, in those in their early sixties, 1 case each of lung cancer and papillary thyroid cancer occurred.

Outcomes of KT in the Elderly and Those in Their Early Sixties

The median duration of follow up was 27.0 months. Patient and allograft survival rate showed no significant differences between the elderly and those in their early sixties (*P* = .498 and .831, respectively). The 1-year and 5-year patient survival rates were $94.1 \pm 5.7\%$ and $94.1 \pm 5.7\%$, respectively,

Table 1. Complications After KT

	The Elderly (n = 18)	Patients in Their Early Sixties (n = 34)	<i>P</i>
DGF (%)	4 (22.2)	4 (11.8)	.320
Surgical Complications	1 (5.6)	4 (11.8)	.470
Urinary leakage	1 (5.6)	0 (0)	.395
Lymphocele	0 (0)	1 (2.9)	
Hemorrhage	0 (0)	2 (5.9)	
Urinary stricture	0 (0)	1 (2.9)	
None	17 (94.4)	30 (88.2)	
Medical complications	16 (88.9)	27 (79.4)	.390
Acute rejection	2 (11.1)	4 (11.8)	.944
Cardiovascular event	1 (5.6)	2 (5.9)	.962
Post-transplantation diabetes mellitus	6 (33.3)	12 (35.3)	.888
Malignancy	1 (5.6)	2 (5.9)	.962
Infection	12 (66.7)	19 (55.9)	.451
Bacterial infection	10 (55.6)	7 (20.6)	.011
Viral infection	12 (66.7)	17 (50.0)	.250
Fungal infection	2 (11.1)	1 (2.9)	.229
Tuberculosis	2 (11.1)	0 (0)	.047
Patient death	2 (11.1)	3 (8.8)	.425
Graft loss	2 (11.1)	4 (11.8)	.632
Death with functioning graft	1 (5.6)	2 (5.9)	.687

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