



Is the Clinical Outcome Good or Bad in Patients Hospitalized Within 1 Year After Kidney Transplantation?

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ABSTRACT

Background. Although the hospitalization rate at early period of kidney transplantation (KT) is still high, the association between the hospitalization within 1 year after KT and graft survival is unclear. We investigated the incidence and causes of hospitalization and clinical outcome of the patients hospitalized within 1 year after KT.

Methods. We retrospectively analyzed 174 KT recipients (KTRs) hospitalized within 1 year after KT between 2013 and 2015.

Results. Among them, 84 (48%) KTRs were admitted within 1 year after KT, and the number of hospitalizations was 116. The mean time from KT to first hospitalization was 4.2 months. Seventy-eight percent of the patients were hospitalized for medical causes and 22% for surgical causes. The most common cause was cytomegalovirus infection (CMV) (23.3%), followed by acute rejection (11.2%) and urinary tract infection (10.3%). Recipients and donors in the hospitalized group were significantly older than the nonhospitalized group. The proportions of deceased donor KT, acute rejection, more than 50% panel-reactive antibody, and positive donor-specific antibody were significantly higher in the hospitalized group than in the nonhospitalized group. Graft and patient survivals were lower in the hospitalized group than in the nonhospitalized group. Deceased donor KT and acute rejection were independent risk factors for hospitalization.

Conclusion. The incidence of KTRs hospitalized within 1 year after KT was high. Most causes of hospitalization were CMV infection, acute rejection, and urinary tract infection. Therefore, the immunosuppression status of these patients should be closely monitored to reduce the hospitalization rate.

ALTHOUGH kidney transplantation (KT) is the best treatment for end-stage renal disease, the hospitalization rate early after KT is still high [1]. Early hospitalization after KT might have negative impacts on the clinical outcome, and repeated hospitalization after KT incurs a high health cost [2]. However, the association between the hospitalization within 1 year after KT and graft outcome is unclear. The purpose of our study is to present the incidence and causes of hospitalization and the clinical outcome of the patients hospitalized within 1 year after KT.

The present research was conducted by the Research Grant of Kidney Institute, Keimyung University in 2017.

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Table 1. Causes of Hospitalization Within 1 Year After Kidney Transplantation

Causes	Events (n = 116)
Medical causes, n (%)	94 (81)
CMV infection	27 (23.3)
Acute rejection	13 (11.2)
Urinary tract infection	12 (10.3)
Acute kidney injury	8 (6.9)
Vascular disease	6 (5.2)
Pneumonia	5 (4.3)
Herpes zoster	5 (4.3)
BKVAN	3 (2.6)
Electrolyte imbalance	3 (2.6)
Fungal infection	2 (1.7)
Adenovirus infection	1 (0.9)
Tuberculosis	1 (0.9)
Others	8 (6.9)
Surgical causes, n (%)	22 (19)
Lymphocele	3 (2.6)
Parathyroidectomy	3 (2.6)
Small bowel obstruction	2 (1.7)
Hernia	2 (1.7)
Wound discharge	1 (0.9)
Others	11 (9.5)

Abbreviations: CMV, cytomegalovirus; BKVAN, BK virus-associated nephropathy.

PATIENTS AND METHODS

Study Design

We retrospectively analyzed the medical records of the kidney transplant recipients (KTRs) hospitalized within 1 year after KT between January 2013 and December 2015. We investigated the baseline characteristics, causes, and risk factors associated with the hospitalization and graft and patient survivals between hospitalized and nonhospitalized groups.

The Institutional Review Board of Keimyung University Dong-san Medical Center approved this study (2017-12-002).

Demographic and Clinical Data

We investigated donor and recipient age at KT, gender, donor type, the number of KTs, dialysis type before KT, cause of end-stage renal disease, immunosuppressant for induction and maintenance, the number of HLA mismatches, panel reactive antibody (PRA) >50%, positive donor-specific antibody (DSA), the proportion of acute rejection, and delayed graft function. We investigated the incidence and causes of hospitalization and clinical outcome of the patients hospitalized within 1 year after KT.

Statistical Analyses

The Student *t* test was used for continuous variables and the χ^2 or Fisher exact test was used for categorical variables. The Kaplan-Meier analysis with log-rank test was performed for analysis of graft and patient survivals. Logistic regression analysis was done for analysis of risk factors for hospitalization. *P* values less than .05 were considered statistically significant. Statistical analysis was performed using SPSS (version 18.0, SPSS Inc, Chicago, Ill, United States).

RESULTS

Causes of Hospitalization Within 1 Year After Kidney Transplantation

Mean follow-up duration was 27.5 ± 10.9 months. Of the 174 patients who received KT during the study period, 84 (48%) KTRs were admitted within 1 year after KT. Among them, 24 (28.6%) KTRs were admitted more than 2 times within 1 year after KT, and finally the number of hospitalizations was 116. The mean time from KT to first hospitalization was 4.2 ± 2.9 months. Of the 116 hospitalizations, 94 (81.0%) were hospitalized for medical causes and 22 (19.0%) were hospitalized for surgical causes. The most common medical cause was cytomegalovirus (CMV) infection (23.3%), followed by acute rejection (11.2%) and urinary tract infection (10.3%). The surgical causes were lymphocele (2.6%), parathyroidectomy (2.6%) due to uncontrolled hyperparathyroidism, among others (Table 1).

Comparison of Baseline Characteristics Between the Nonhospitalized and Hospitalized Groups Within 1 Year After Kidney Transplantation

Mean age of recipients and donors at KT was significantly higher in the hospitalized group than nonhospitalized group (51 ± 10 years vs 46 ± 11 years, $P = .002$; 47 ± 11 vs 42 ± 14 , $P = .020$). The proportion of deceased donor KT was significantly higher in hospitalized group than nonhospitalized group (72.6% vs 40.0%, $P < .001$). The number of patients with more than 50% PRA or positive DSA was significantly higher in the hospitalized group than nonhospitalized group (32.4% vs 13.2%, $P = .008$; 23.2% vs 8.0%, $P = .019$). The proportion of antithymocyte globulin use for induction immunosuppressant was significantly higher in the hospitalized group than nonhospitalized group (44.0% vs 16.7%, $P < .001$). The proportion of acute rejection was significantly higher in the hospitalized group than nonhospitalized group (15.5% vs 3.3%, $P = .007$) (Table 2).

Comparison of Graft and Patient Survivals Between the Nonhospitalized and Hospitalized Groups Within 1 Year After Kidney Transplantation

In multivariate logistic regression analysis, deceased donor KT and acute rejection were the factors associated with the hospitalization within 1 year after KT after adjusting for the significant variables in the univariate analysis (hazard ratio, 3.904; 95% confidence interval, 1.785–8.537, $P = .001$; hazard ratio, 19.948; 95% confidence interval, 2.323–171.302, $P = .006$) (Table 3).

In Kaplan-Meier analysis, graft and patient survivals tended to be worse in the hospitalized group than in the nonhospitalized group ($P = .070$ and $P = .060$) (Fig 1A and 1B).

DISCUSSION

In our study, the proportion of medical causes of hospitalization was higher in comparison with that of surgical causes of hospitalization (81% vs 19%). In particular, the hospitalization due to infection accounted for 59.6% and depended on

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