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Impact of Blood Pressure on Kidney Outcomes after Kidney Transplantation

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Objectives: Hypertension has a prevalence of 80% in kidney transplantation (KT) patients and is a major risk factor for graft loss and cardiovascular events after KT. However, the optimal target of blood pressure (BP) remains unclear for KT patients. Therefore, we analyzed the association of BP with kidney outcome in KT patients.

Methods: This study included 903 KT patients between 2012 and 2015 from the KoreaN Cohort Study for Outcomes in Patients With Kidney Transplantation (KNOW-KT). Patients were divided into three groups according to systolic BP (SBP) 1 year after KT: SBP < 110 mmHg (group 1); 110 mmHg ≤ SBP < 140 mmHg (group 2, reference); and SBP ≥ 140 mmHg (group 3). The primary endpoint was composite kidney outcome of ≥ 50% decrease in eGFR from baseline values or graft loss which defined as requiring maintenance dialysis for more than 3 months or re-transplantation.

Results: During a median follow-up of 5.4 years, there were 88 (9.75%) events of ≥ 50% eGFR decline or graft loss. In multivariate Cox regression analysis after adjustment of covariates, lower baseline SBP was associated with higher risk of adverse kidney outcome (hazard ratio (HR), 2.20; 95% confidence interval (CI), 1.16 to 4.18) and higher baseline SBP was also associated with higher risk of adverse kidney outcome (HR, 2.01; 95% CI, 1.04 to 3.86) compared with the well-controlled SBP group. This association was consistent for time-updated Cox regression model, for which the HR for lower SBP was 2.29 (95% CI, 1.02 to 5.13) and for higher SBP was 2.26 (95% CI, 1.24 to 4.10). In addition, similar results were observed in subgroup analysis stratified by age, sex, BMI, and baseline kidney function.

Conclusions: There was "U" curve relationship between SBP and composite kidney outcome after kidney transplantation.

Table 1

Table 1. The composite kidney outcome according to systolic blood pressure (SBP)

Outcomes	SBP categories (mmHg)			Overall
	< 110 mmHg	110-140 mmHg	> 140 mmHg	
No. of participants, n (%)	101 (11.2)	699 (77.4)	103 (11.4)	903 (57.0)
No. of person, years	535.6	3,809.8	544.3	4,889.6
Incidence of outcome, n (%)	17 (16.8)	56 (8.0)	15 (14.6)	88 (9.7)
Incidence rate per 1,000 person-year	31.7	14.7	27.6	18.0

Table 2

Table 2. The hazard ratios for composite kidney outcome according to systolic blood pressure (SBP)

Models	Composite outcome of CKD progression or all-cause mortality		
	Hazard ratio	95% Confidence interval	P value
Baseline SBP			
< 110 mmHg	2.20	1.16-4.18	0.016
110 – 140 mmHg	1.00 (reference)		
≥ 140 mmHg	2.01	1.04-3.86	0.037
Time-updated SBP			
< 110 mmHg	2.29	1.02-5.13	0.044
110 – 140 mmHg	1.00 (reference)		
≥ 140 mmHg	2.26	1.24-4.10	0.007