Effects of Body Mass Index on Kidney Transplant Outcomes in Korea: A Nationwide Cohort Study

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Objectives : The prevalence of obesity is steadily increasing in patients with end-stage kidney. However, it is still debatable whether obesity affects the outcomes after kidney transplantation. This study evaluated the correlation between body mass index (BMI) and posttransplant outcomes in Korean kidney transplant recipients (KTRs).

Methods : We investigated prospective nationwide cohort data from the Korean Organ Transplantation Registry (KOTRY) from 2014 to 2021. KTRs were categorized into 4 groups based on their BMI: underweight (<18.5), normal weight (18.5–23), overweight (23–25), and obesity (≥25). Differences in posttransplant outcomes were compared using Kaplan-Meier curves with the log-rank test. The associations between BMI and posttransplant outcomes including allograft loss, cardiovascular events, and all-cause mortality were evaluated using Cox proportional hazard regression analysis.

Results : A total of 9,130 KTRs were finally analyzed. The mean age was 49.9 ± 11.6 and male ratio was 60.2%. The prevalence of obesity in KTRs was 28.6% and continued to increase (24.8% in 2014 to 32.5% in 2021, P <0.001). Obese KTRs were characterized by male predominance, shorter dialysis vintage, and more diabetes as primary kidney disease. Kaplan-Meier curve showed a significant difference in allograft loss among the groups (P =0.007). The obesity group exhibited the highest risk of allograft loss (adjusted hazard ratio 1.511, 95% confidence interval 1.063–2.148, P =0.021) after adjusting confounding factors. However, BMI was not associated with cardiovascular event and all-cause mortality.

Conclusions : Our study revealed that obesity is an independent risk factor for graft survival in KTRs. Risk stratification with BMI and strategies to prevent obesity should be considered in the preparation for kidney transplantation.
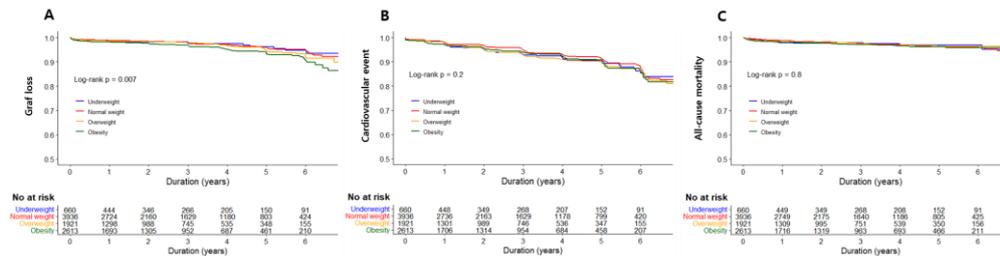
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Table 1. Cox regression analyses of posttransplant outcomes according to BMI categories

	Unadjusted		Adjusted*	
	HR (95% CI)	P value	aHR (95% CI)	P value
Grasft loss				
Underweight	0.802 (0.401–1.606)	0.534	0.986 (0.486–2.002)	0.969
Normal weight	Reference		Reference	
Overweight	1.118 (0.748–1.669)	0.587	1.097 (0.724–1.662)	0.662
Obesity	1.529 (1.097–2.130)	0.012	1.511 (1.063–2.148)	0.021
Cardiovascular events				
Underweight	1.062 (0.716–1.575)	0.765	1.256 (0.839–1.881)	0.268
Normal weight	Reference		Reference	
Overweight	1.212 (0.940–1.561)	0.138	1.146 (0.882–1.487)	0.308
Obesity	1.094 (0.865–1.383)	0.455	1.003 (0.783–1.284)	0.983
All-cause mortality				
Underweight	0.934 (0.464–1.881)	0.849	1.489 (0.735–3.016)	0.269
Normal weight	Reference		Reference	
Overweight	0.968 (0.619–1.515)	0.888	0.805 (0.513–1.263)	0.345
Obesity	1.246 (0.857–1.811)	0.249	1.118(0.762–1.641)	0.569

*Adjusted for age, sex, primary renal disease, number of HLA mismatch (ref 0~3), transplantation type, donor gender, donor body mass index and donor cardiovascular disease.