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The Effect of Cardiovascular Risk Factors on Clinical Outcomes After Kidney Transplantation: A Nationwide Prospective Cohort Study

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Objectives: Cardiovascular disease is an important risk factor for mortality in kidney transplant recipients. We aimed to investigate the effects of post-transplant cardiovascular risk score on the patients' outcomes, especially subsequent kidney function.

Methods: We enrolled a total of 4,865 kidney transplant recipients participated in the prospective Korean Organ Transplantation Registry (KOTRY). Kidney transplant recipients' cardiovascular risk status was assessed using Framingham risk score (FRS). All-cause mortality, major adverse cardiovascular event (MACE), allograft failure, their composites, and estimated glomerular filtration rate (eGFR) were evaluated as patients' outcomes after kidney transplantation. Effects of cardiovascular risk on kidney transplant recipients' clinical outcomes were analysed using multivariable Cox proportional hazard model including donor type, primary renal disease, number of kidney transplantation, body mass index, desensitization, serum phosphorus, donor-specific antibodies. Association between FRS and eGFR was analysed using repeated measure ANOVA.

Results: A total of 101 mortality, 187 MACE, 195 graft failure, and 282 composite events occurred during 23.5 months median follow-up period. In the Kaplan-Meier survival analysis, pre-transplant cardiovascular risk was all associated with post-transplant all-cause mortality, MACE, graft failure, and composite outcomes (P-value < 0.0001, <0.001, 0.005, and <0.001, respectively). In the multivariable analysis, the hazard ratio (4th quartile compared to 1st quartile) for mortality was 7.19 (95% CI, 2.84-18.16, P < 0.001, overall P < 0.001), MACE 4.76 (2.21-4.38, P < 0.001, overall P < 0.001), and composite outcomes 2.98 (2.27-3.93, P < 0.001, overall P = 0.004). There was also a significant association between pre-transplant Framingham risk score and post-transplant GFR (P = 0.031).

Conclusions: Pre-transplant cardiovascular risk assessed by FRS is significantly associated with post-transplant all-cause mortality, MACE, and renal outcomes.