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Association of Serum Osteoprotegerin with Vascular Calcification or Stiffness and Cardiovascular Outcomes in Kidney Transplant Patients: Results from KNOW-KT Study

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Objectives: Vascular calcification and stiffness contribute to increased cardiovascular morbidity and mortality in patients with chronic kidney disease, and those remains high after successful kidney transplantation. The aim of this study was to investigate the association of serum osteoprotegerin (OPG) level with vascular calcification or stiffness and cardiovascular outcomes in kidney transplant patients.

Methods: The serum OPG levels were measured at baseline and 3 years after transplantation in 1018 kidney transplant patients enrolled in the KNOW-KT study (KoreaN cohort study for Outcome in patients With Kidney Transplantation). The patients were classified into high OPG group and low OPG group according to the median baseline serum OPG levels, and the median follow-up duration was 83.8 months.

Results: The mean age was 45.8 ± 11.7 years and 62.9% were male. The high OPG group had significantly higher baseline and 5-year coronary artery calcium score than the low OPG group (413.7 ± 946.2 vs. 75.2 ± 352.1, P<0.001 and 561.2 ± 1147.6 vs. 135.0 ± 418.1, P<0.001, respectively). Moreover, high OPG group had higher baseline and 5-year brachial-ankle pulse wave velocity (1631.3 ± 335.2 vs. 1463.8 ± 254.0 cm/s, P<0.001 and 1595.3 ± 364.0 vs. 1423.4 ± 247.6 cm/s, P<0.001, respectively). The 3-year serum OPG levels were decreased compared with baseline serum OPG levels (from 11.6 ± 8.9 to 5.7 ± 2.6 pg/mL, P<0.001), and those positively correlated (r = 0.42, P<0.001). In multivariate cox regression analysis, high OPG group was significantly associated with post-transplant cardiovascular events (HR 1.98, 95% CI 1.02-3.84, P=0.043), and old age, diabetes mellitus, and low-density lipoprotein remained independent factors for cardiovascular events.

Conclusions: The serum OPG concentration is highly associated with vascular calcification or stiffness and could be a significant independent marker of cardiovascular outcomes in kidney transplant patients.