Osteoprotegerin is Associated with Development of Coronary Artery Calcification But Not Severity and Progression in Non-dialysis Chronic Kidney Disease: results from the KNOW CKD study

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Objectives: Coronary artery calcifications (CAC) are recognized as a predictor of all-cause and cardiovascular mortality in chronic kidney disease (CKD). Osteoprotegerin (OPG) could be a marker of vascular calcification presence and extent. The purpose of this study was to evaluate relationships between OPG levels and presence/severity/progression of CAC score in nondialysis CKD patients.

Methods: We prospectively enrolled 1974 CKD patients (1180 male/794 female, mean age: 53.2 years) who had OPG and electron beam computed tomography (CT) or multi-detector CT for CAC scoring at baseline. A CAC score of > 400 Agatston unit (AU) was used to define severe CAC. In term of definition for CAC progression: among those with no baseline CAC, incidence was defined as an annual increase in CAC score ≥ 5 AUs. Among those with baseline CAC, progression was defined as 15% annual increase.

Results: Mean serum concentrations of OPG amounted to 6.79 ± 3.53 pmol/L. Among 1974 patients, 1011 (51.2 %) had CAC score >0 and 209 (10.6 %) had scores > 400. Higher OPG levels were associated with the present CAC but not severe CAC at baseline. [LnOPG, presence: OR =1.832, P <0.001; severe CAC: OR =1.700, P =0.070]. Among 872 patients with 4-year follow up CAC scores, 22 (4.9%) participants without CAC at baseline had incident CAC and 243 (63.8%) participants with CAC at baseline had CAC progression. Among subjects without CAC at baseline, higher OPG levels were associated with incident CAC (LnOPG, OR = 4.800, P = 0.024). However, OPG were not associated with CAC progression among participants with CAC at baseline or in total.

Conclusions: Our results indicated that higher serum OPG levels are associated with the presence and development of CAC non-dialyzed CKD patients. However, OPG does not seem to be involved in severity and progression of CAC.