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Low serum intact parathyroid hormone has increased risk of coronary arterial calcification in chronic kidney disease patients: result from the KNOW-CKD study

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Objectives : Impaired parathyroid hormone control and subsequent abnormal calcium phosphate metabolism were commonly observed in CKD patients. Recent studies reported that hypoparathyroidism as well as secondary hyperparathyroidism was significantly associated with cardiovascular mortality and accelerated vascular calcification in dialysis population. We hypothesized that low parathyroid hormone is significantly associated with coronary arterial calcification (CAC) in non-dialyzed CKD patients.

Methods : We examined 621 patients in CKD stage 3 to 5 without dialysis who were enrolled in the KoreaN Cohort Study for Outcome in Patients with Chronic Kidney Disease and measured iPTH at central laboratory. Study patients were categorized into three PTH groups (low, normal, high) according to normal range of iPTH in each stage of CKD from Kidney Disease Outcome Quality Initiative clinical practice guideline 2005. The CAC was calculated using multi-detector computed tomography.

Results : The mean age was 56.4 ± 11.2 years, and 387 (62.3%) were male. The median iPTH was 62.8 (42.3–100.9) pg/mL and 170 (27.4%), 271 (43.6%) and 180 (29.0%) patients were below, within, and above normal range in PTH levels. The average estimated glomerular filtration rate was significantly lower and calcium-phosphate product was significantly higher in low PTH group compared those in normal PTH group ($P = 0.005$). The prevalence rate of CAC was significantly higher in low PTH group (68.8%) compared to other two groups. (vs. normal: 58.1%; $P = 0.04$, vs. high: 56.8%; $P = 0.03$, respectively). In multivariate logistic regression analysis, low PTH was an independent risk

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factor of CAC after adjustment for confounding variables [hazard ratio (HR), 1.78; 95% confidence interval (CI), 1.02–3.13; $P = 0.04$]. This relationship was still persistent after exclusion of patients with advanced CKD (HR, 1.91; 95% CI, 1.06–3.43; $P = 0.03$) or with history of coronary arterial disease (HR, 1.87; 95% CI, 1.06–3.33; $P = 0.03$).

Conclusions : Low serum intact PTH level is independently associated with the presence of coronary arterial calcification in non-dialysis CKD patients.

Keywords : parathyroid hormone, adynamic bone disease, low bone turnover disease, coronary calcification, chronic kidney disease