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Serum calcium level has a differential effect on the progression of coronary artery calcification depending on renal function, but not phosphorus or calcium × phosphorus product.

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Objectives: The relationships between serum levels of calcium, phosphorus, and calcium × phosphorus product (Ca × P product) and coronary calcification in the patients without prior atherosclerotic vascular diseases, and whether these relationships differ significantly according to renal function have not been clearly defined to date. Hence, we aimed to determine their relationships.

Methods: A total of 5,990 individuals without prior atherosclerotic vascular diseases were included. All the participants underwent multidetector computed tomography for the evaluation of coronary artery calcification (CAC) during their health check-ups. Presence and progression of coronary calcification were determined by binary and ordinal logistic regression analysis, respectively. The mean estimated glomerular filtration rate (eGFR) of the subjects was 93.8 ml/min/1.73 m^2 (range: 33.8~157.7 ml/min/1.73 m^2) and the distribution of renal function was as follows: 3,821 (63.8%) have eGFR ≥ 90 ml/min/1.73 m^2; 2,062 (34.4%) have eGFR 60 to 90 ml/min/1.73 m^2; 107 (1.8%) have eGFR < 60 ml/min/1.73 m^2.

Results: After controlling for traditional coronary risk factors and renal function, the 1 unit increase in calcium, phosphorus, and Ca × P product are all significantly related to both presence and progression of coronary calcification independently of renal function. Among them, only serum calcium level has a significant interaction with renal function (P=0.047) and a tendency of significantly higher impact on the progression of coronary calcification as the renal function declines.

Conclusions: Serum levels of calcium, phosphorus, and Ca × P product all have significant relationships with coronary calcification independently of renal function. Among them, only serum calcium level has a significantly differential impact on the progression of coronary calcification depending on renal function; the higher impact on coronary calcification was observed as the renal function declines.