Risk prediction model for progression of coronary artery calcification in CKD patients

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Background/Aims: Cardiovascular disease (CVD) is the most common cause of mortality in chronic kidney disease (CKD) patients. In previous study, coronary artery calcification (CAC) is known to imply the presence of coronary artery disease and is also used to predict future cardiac events. CAC is highly prevalent in CKD patients. Therefore, this study is aimed to investigate the CAC progression prediction model in CKD patients using multiple risk factors.

Methods: A total of 931 patients were enrolled from the KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD) which is a Korean multicenter prospective cohort. CAC score was calculated based on the Hokanson criterion which is the square-root transformed difference between baseline and follow up CAC scores. [$\sqrt{}$ CAC score (follow-up) $-$ $\sqrt{}$ CAC score (baseline)]. CAC progression was defined as the difference greater than 2.5 to minimize the effect of interscan variability. Multivariate logistic regression analysis and clinical significance were used to determine the risk factors to construct the risk-scoring model.

Results: Among 931 patients, 352(37.8%) patients showed CAC progression. Prediction markers were selected in consideration of significant factors in multivariate logistic analysis and clinical significance. Age, gender, eGFR, baseline CAC score, 24hr urine protein, calcium, phosphate, FGF-23, klotho and history of hypertension, diabetes mellitus, dyslipidemia were selected as prediction markers for CAC progression model. Area under the receiver-operating characteristic curve for prediction of CAC progression at 4 years was 0.864 (95% CI 0.840-0.888).

Conclusions: The CAC progression prediction model derived from the integrative evaluation of CKD patients provided more delicate prediction of CAC progression for non-dialysis CKD patients.

Figure 1
Time-dependent receiver-operating characteristic curve for prediction of CAC progression at 4 years

	AUC	P-value
CAC progression	0.864	<0.001