

## Impact of pericoronary inflammation assessed by coronary computed tomography angiography on the progression of aortic valve calcification

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**Background:** Aortic valve calcification (AVC) has been known as an independent predictor for adverse cardiovascular events and all-cause mortality. Previous studies demonstrated that AVC was associated with aortic valve inflammation and atherosclerosis. However, the relationship between the progression of AVC and pericoronary inflammation remains undetermined.

**Purpose:** The purpose of this study was to evaluate the impact of the pericoronary inflammation on the progression of AVC.

**Methods:** A total of 107 patients with suspected or known chronic coronary syndromes who underwent clinically indicated serial 320-slice coronary computed tomography angiography (CTA) at Tsuchiura Kyodo General Hospital from January 2011 to June 2019 were retrospectively studied. Pericoronary inflammation was assessed by pericoronary adipose tissue attenuation (PCATA) defined as the mean CT attenuation value of PCATA (–190 to –30 Hounsfield units [HU]) on proximal 40 mm segments of coronary arteries. AVC was quantified by Agatston score on CTA. The mean aortic attenuation (HU Aorta) and the standard deviation (SD) in the region of interest at the level of the sinotubular junction was measured. AVC was defined as the threshold for calcium detection (mean HU Aorta + 2SD). AVC index was calculated as follows: (follow-up/baseline) AVC divided by

follow-up period. AVC progression was defined as newly-developed AVC at follow-up or an increased AVC index during follow-up. All patients were divided into two groups according to the presence or absence of AVC progression, and clinical characteristics and CT findings were compared between these two groups.

**Results:** AVC progression was observed in 26 patients (24.3%) between 2 serial CT examinations (median, 34 months). There was no significant difference in age, gender and the prevalence of other cardiovascular risk factors between the 2 groups. Patients in AVC progression group were associated with higher prevalence of elevated PCATA-LAD, higher LV mass index at baseline and the initial AVC presence. Receiver-operating characteristic curve analysis revealed that the optimal cut off value of PCATA-LAD for predicting AVC progression was –68.26 HU (area under the curve 0.605; 95% confidence interval [CI], 0.465–0.745). Multivariable logistic regression analysis revealed that baseline PCATA-LAD  $\geq$  –68.26 HU (odds ratio [OR], 3.12; 95% CI, 1.04–9.35,  $p=0.042$ ) and the presence of baseline positive AVC (OR, 6.84; 95% CI, 2.34–20.0,  $p=0.0004$ ) were independent predictors of AVC progression.

**Conclusions:** The increased pericoronary inflammation and the presence of AVC may help identify patients with high risk for future AVC progression.