P0661. Elevated serum uric acid predicts the development of moderate coronary artery calcification

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Introduction

Hyperuricemia was frequently noted in subjects with a high risk of cardiovascular disease (CVD). This study was to elucidate whether serum uric acid (SUA) is associated with development of moderate coronary artery calcification in generally healthy adults.

Methods

A total of 9,297 subjects underwent multidetector CT for the evaluation of CAC at least two times during their annual health examinations. Among them, 4,461 participants who did not have any CVD history and who had no (scores 0) or minimal CAC (scores 1-10) in their first examination were enrolled. The association between SUA as a continuous and categorical variable and development of moderate coronary artery calcification (CAC scores > 100) was assessed by Cox regression analysis. Receiver-operating characteristic (ROC) curves were constructed to investigate the diagnostic efficacy of SUA.

Results

During a median follow-up of 4.3 years, 131 incident case of moderate calcification developed. Baseline SUA concentration was significantly higher in subjects with progression to moderate coronary artery calcification (6.6 ± 1.3 vs 5.8 ± 1.3 mg/dL, $p < 0.001$).

Table 1. Hazard ratios and 95% confidence intervals for moderate CAC development

UA (mg/dl)	Quartile 1 (< 5.0)	Quartile 2 (5.0 – 5.7)	Quartile 3 (5.8 – 6.5)	Quartile 4 (> 6.5)	p for trend
Crude	1	2.5 (1.2-5.4)	4.1 (2.0-8.5)	6.0 (3.0-12.1)	<0.001
Model 1	1	2.6 (1.2-5.5)	4.2 (2.0-8.7)	6.2 (3.1-12.6)	<0.001
Model 2	1	2.4 (1.1-5.1)	3.9 (1.9-8.2)	5.3 (2.6-10.8)	<0.001
Model 3	1	2.4 (1.1-5.1)	3.9 (1.9-8.0)	5.3 (2.6-10.9)	<0.001
Model 4	1	2.6 (1.2-5.6)	4.8 (2.3-10.0)	5.9 (2.9-12.2)	<0.001

Model 1: adjusted for age and sex

Model 2: adjusted for Model 1 plus BMI, SBP, TG, HDL-cholesterol, LDL-cholesterol, eGFR, use of anti-hypertensive medication, use of lipid-lowering drugs, use of aspirin, and current smoking.

Model 3: adjusted for Model 2 plus presence of diabetes.

Model 4: adjusted for Model 3 plus log(baseline CAC score +1)

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Both crude and adjusted models (Models 1-4, Table 1) showed significantly increased risks for development of moderate coronary artery calcification in the highest quartile of SUA compared with in the lowest.

Figure 1. The comparison of area under the curve (AUC) for the development of moderate coronary artery calcification between uric acid and estimated 10-year atherosclerotic cardiovascular disease (ASCVD).

A. Uric acid vs 10-year ASCVD

B. Uric acid + 10-year ASCVD vs 10-year ASCVD

We compared the predictive value of SUA with that of 10-year ASCVD risk. The AUC of SUA was superior to predict development of moderate coronary artery calcification compared to 10-year ASCVD risk in total subjects (Fig. 1A). The cut-off value of SUA was 6.2 mg/dL, with 60.3% of sensitivity and 62.8% of specificity. SUA also showed incremental prognostic value when added to ASCVD risk (Fig. 1B).

Conclusions

Elevated SUA level is a significant predictor for development of moderate coronary artery calcification as examined by Agatston score, regardless of other conventional CVD risk factors.