



TITLE: Correlation between Prediabetes, Coronary Artery Calcification and Cardiovascular Risk Factors: A 5-Year Retrospective Case Study

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ABSTRACT

The objective was to evaluate the correlation between prediabetes, Hemoglobin A1c (HbA1c) 5.7 to 6.4%, cardiovascular risks (determined by Framingham Risk Score: FRS) and the coronary artery calcium score (CACS), by the retrospective analysis of 5-year data documents on PACS, Jan 2015 to Dec 2020.

Method: There were 1,639 eligible cases, reviewed by certified radiologists via Picture Archiving and Communication System (PACS), with an asymptomatic condition in the check-up center, divided into two groups: - (1) the prediabetes group, with 756 cases and (2) the non-diabetes group, with 883 cases. The results of vital signs, BMI, CACS, blood test, HbA1c, fasting blood sugar (FBS), lipid profiles, and serum uric acid of all eligible cases were reviewed. Linear regression, t-test, chi-square, and Adjusted Odd ratio were used analyzed the significance and correlation between variables.

Results: (1) Most of the prediabetes participants (456 cases, 60.31%) had an intermediate risk of Framingham Risk Score (FRS). While most of the non-diabetes participants (665 cases, 75.31%) had a low risk of FRS., with a statistical difference (Chi-square, $P < 0.05$), (2) The prediabetes cases were significantly associated with coronary calcification at 2.38 times to the non-diabetic

cases [Adjusted Odds Ratio = 2.38 [95% CI (1.98 – 14.98)]., (3) The intermediate cardiovascular risk (FRS) was associated with positive coronary artery calcification at 2.36 times to the low cardiovascular risk [Multivariate adjusted OR = 2.36 (95% CI (1.06 – 5.46)]., and (4) The high cardiovascular risk (FRS) was associated with positive coronary artery calcification at 8.64 times to the low cardiovascular risk [Multivariate adjusted OR = 8.64 (95% CI (2.65 – 18.58)]. Moreover, we found a significant higher serum uric acid in the prediabetes group than the non-diabetes group.

Conclusions: Subclinical prediabetes, among 47 to 62-year-old individuals, with an intermediate risk of FRS was significantly associated with positive coronary calcification (atherosclerosis). The combination of CACS screening with a safety low dose radiation protocol and FRS are of complementary together to evaluate the potential risk of Atherosclerotic Cardiovascular Disease (ASCVD). The benefits of combining CACS and FRS are used for decision making of the statin therapy, according to the ACC/AHA primary prevention guidelines (2019). Moreover, a high serum uric acid (UA) is a new challenging ASCVD risk factor in the present that we found it in prediabetes. The association of UA, cardiometabolic disease, and coronary atherosclerosis needs further studies.



Keywords: Prediabetes, Coronary Artery Calcium Score,
Framingham Risk Score

BIOGRAPHY

Thunnawat Wattanaseth has completed his MD and Thai Board of Diagnostic Radiology from Chulalongkorn Hospital University, Thailand. After that he completed a certified comprehensive CTA coronary artery from Lenox Hill Hospital, New York City, since 2007.

On 2020, he completed American Board of Anti-Aging and Regenerative Medicine (ABAARM).

He is the director of Medical Imaging Department of Kasemrad International Hospital, Thailand. He has experienced over 1,600 cases interpretation of coronary artery calcium score (CACs) and CTA coronary artery. He has been serving as a professional membership of American Heart Association (AHA).



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