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Comparing Coronary Artery Calcium Score to Coronary CT Angiography Findings: Is CT Angiography Necessary in All Patients?

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Background: Ischemic Heart Disease (IHD) is the leading cause of death worldwide. The primary pathological process resulting in IHD is coronary artery atherosclerosis. Despite advances in CT scan technology, the Agatson method is still the most popular method for measuring coronary artery calcification. Various studies have shown that determining the degree of calcification using Coronary Artery Calcium Score (CACS) is the most reliable noninvasive method of risk assessment. Coronary CT Angiography (CCTA) might be required following CACS measurements. However, there is no consensus regarding a specific CACS cut-off for determining the need for CCTA.

Objectives: This study aimed to compare the severity of coronary calcification to CTA findings. Methods: This retrospective study was conducted on 261 patients with cardiovascular risk factors or atypical symptoms. An ECG-gated multi-detector CT scan was performed to calculate CACS using the Agatston method. Then, CCTA was performed by injection of the IV contrast agent. The presence of significant coronary artery stenosis was defined as ≥ 50% diameter reduction in CCTA images. Univariate and multivariate analyses were performed using binary logistic regression.

Results: Among the patients, 58.2% had no stenosis and 17.6% had significant stenosis. According to the results of univariate analysis, higher age, hypertension, and lower estimated Glomerular Filtration Rate (eGFR) were associated with a significant increase in coronary artery stenosis. Following multivariate analysis, only GFR was suggested as an independent risk factor, which indicated the important role of GFR as a confounder. Approximately half of the cases (48.6%) had no calcification (CACS = 0), among whom only one patient (0.8%) had significant stenosis on CCTA images. In the minimal subgroup (0 < CACS ≤ 10), one patient (3.1%) showed significant stenosis (P < 0.01). The results revealed a gradual and independent association between higher CAC scores and

increase in the incidence of significant stenosis.

Conclusions: Due to the low prevalence of significant stenosis in patients with CACS ≤ 10, CCTA is not recommended in this group, resulting in less radiation exposure and reduced health system costs. In patients with CACS > 10, the likelihood of significant stenosis requiring invasive treatment increases.

Biography

Dr. Rezvan studied medical at the Qom University of Medical Sciences(Iran) and graduated as MD in 2018. He then entered a radiology residency in 2018 and receive his specialty degree in 2022. He is currently working as a radiology professor at Qom University of Medical Sciences. He has published more than 60 research articles in SCI(E) journals. He has published 8 academic books in other fields of Medicine.

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