

Practical Use of the Calcium Coronary Artery (CAC) Score: About 12 Cases and Review of the Literature

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Abstract

Original Research Article

The coronary artery calcium (CAC) score is a cardiovascular risk feature that is not widely used. It reflects the burden of coronary atherosclerosis of an individual. It is shown in the literature that the use of the CAC score improves the global cardiovascular risk assessment. The CAC score might lead directly to coronarography if it is very high. We report the case of twelve (12) patients that were at risk of chronic coronary disease but were asymptomatic. They could not go through effort test and benefited from CAC score, then coronarography was directly performed. The calcium score was positive for 11 patients (91.7%). One patient (8.3%) had an intermediate score. Nine (09) patients (75%) had significant lesions, three (03) patients (25%) had no significant lesions despite a positive calcium score and one (01) patient (8.3%) had significant coronary lesions with an intermediate calcium score.

Keywords: Coronary artery, calcium score, coronarography, effort test.

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INTRODUCTION

The coronary artery calcium CAC scoring reflects the burden of coronary atherosclerosis of an individual. Guidelines concerning its clinical use were first made available in 1999 [1]. Afterwards, many systematic reviews have been published on CAC score [2-4]. In 2017, an expert consensus statement from the society of cardiovascular computed tomography showed that CAC score more accurately predicts atherosclerotic cardiovascular disease risk than the PCE (Pooled Cohort Equations). Based on our experience, we aim from these case series to show the interest of CAC score in our daily practice for asymptomatic patient at risk of coronary atherosclerosis [5].

PATIENTS AND METHODS

This is a retrospective study covering the period of 3 months from July to September 2020 of twelve patients who were admitted for CAC scoring then coronarography. This study aims to show a practical use of CAC score for patients at risk of ischemic cardiopathy who can't go through an effort test.

Inclusion Criteria: Patients who had an intermediate to high cardiovascular risk, asymptomatic patients, patients who had a contra-indication to effort test such as gonarthrosis, knee prosthesis, presence of bundle branch block.

Exclusion Criteria: Patients who have a low cardiovascular risk, patients who were symptomatic, patients who could perform effort test.

Data Collection: Data from the archives was collected on a table prepared for this purpose. We collected anamnestic data such as age, sex, cardiovascular risk factors, past medical history, the CAC score and the results of the coronarography.

Statistical Analysis

The data collected was entered and calculated in excel.

RESULTS

The twelve (12) patients were asymptomatic, aged from 66 to 85 year. All our patients could not perform an effort test because of electrical criteria, or

physical criteria (presence of right or left bundle branch block, gonarthrosis, knee prosthesis...).

In our study we had 45% diabetic patients, and 30% hypertensive patients, 50% dyslipidemic patients.

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In our study 16.6% of our patients had bypass surgery (double and triple bypass), and 58.3% had active stenting of lesions (mono and bitroconcular) lesions.

	CAC : 0-100	CAC :100-400	CAC : >400
Lesion of the left anterior descending artery	0	1	0
Lesion of the circumflex artery	0	0	2
Lesion of the right coronary artery	0	0	1
Multitruncular lesions	0	0	5
Absence of lesion	0	0	3

DISCUSSION

Coronary artery calcium (CAC) is a highly specific feature of coronary atherosclerosis [6]. Clinical practice guidelines in the united states and Europe consider CAC scoring to be a potentially useful way of improving cardiovascular risk assessment in asymptomatic people and serving a treatment guide [7, 8]. Yeboah and al. using the data of 1330 intermediate risk patients from the MESA cohort, studied the improvement of cardiovascular risk assessment assessment using 6 markers: Calcium score, carotid intima media thickness, Systolic Pressure Index score, Brachial artery flow- mediated dilation, ultra sensitive CRP, family history of coronary heart disease. The addition of the calcium score to the initial assessment model by the Framingham score, allows the most significant improvement in the area under the curve (0.623 versus 0.784, $p < 0,001$) [9, 10]. The EISNER (Early Identification of Subclinical Atherosclerosis by Noninvasive Imaging Research) prospective randomized trial, a study aiming to evaluate the impact of coronary artery calcium on coronary risk factors and downstream testing, found compared with no scanning randomization to CAC, scanning was associated with superior coronary artery disease risk factor control without increasing downstream medical testing [11]. Indeed the awareness of arterial damage associated with a concrete visual representation of the pathology seems to lead to a more active management of risk factors, whether on the medical side or the patient. It is shown that a CAC score of 100-400 corresponds to a relative risk ratio of 4.3 (95% CI: 3.1-6.1); a CAC score of 401 to 999 a risk ratio of 7.2 (95% CI: 5.2 to 9.9); and a CAC score to a risk ratio 1000 of 10.8 (95% CI: 4.2-27.7) [12]. What about the correlation between CAC and coronarography? In a study conducted by V.Humeau, the results show there might be a correlation between CAC and coronarography in the way that a CAC score might lead directly to the coronarography. In this study, 67.8% of patients with calcium score >1000 had at least significant coronary stenosis in coronary angiography. Patients <65 years of age and those with calcium

score >2000 have a significantly greater risk of having at least one significant stenosis and may warrant coronary angiography from the outset without prior ischemia testing. 100% of patients who had a calcium score >2000 and <65 years had at least one significant stenosis. For other patients, a preliminary ischemia test was to be carried out [13]. In summary, the CAC score has a prognosis, diagnosis and therapeutic importance. In our study, the CAC score was applied for patients at risk of chronic coronary disease. They were asymptomatic but could not go through an effort test. Based on the CAC score, we could directly perform coronarography and the results were satisfactory. The use of the CAC score is yet to be generalized and codified. It can help for the diagnosis of chronic coronary disease particularly for patients who are asymptomatic but are at a high risk of developing coronary disease.

CONCLUSION

The CAC score is a parameter that reflects the level of coronary atherosclerosis. Thus, it reflects the risk of developing chronic coronary disease. It is demonstrated to be a more sensitive feature to evaluating the cardiovascular global risk compared to the traditionnal cardiovascular risk scores such as the Framingham score. Moreover, some studies show that the CAC score can be used to perform directly coronarography without fonctionnal ischemia test.

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