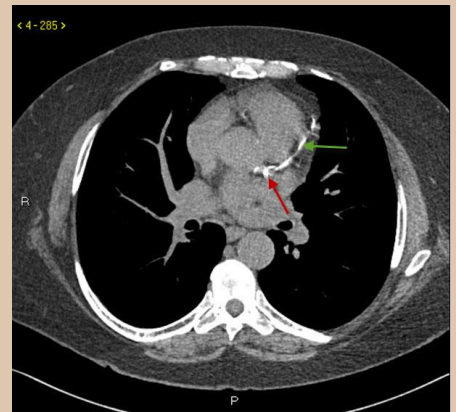# Calcified Artery Risk

Higher calcium score associated with more cardiac events

Coronary artery calcification occurs when calcium builds up in the plaque found in the walls of the coronary arteries, which supply blood to the heart. The presence of coronary artery calcification can be an early sign of coronary artery disease. What do these scores mean? Who should get a heart scan? What is the actual risk to me as an individual? Does a higher score mean a higher likelihood of having a heart attack or sudden death? What can be done if I have a high coronary artery calcium score?

Abstract

Objectives: Sudden cardiac death (SCD) is a common initial manifestation of coronary heart disease (CHD); however, SCD risk prediction remains elusive.

Background: Coronary artery calcium (CAC) is a marker of plaque burden. Whether CAC improves risk stratification for incident SCD beyond atherosclerotic cardiovascular disease (ASCVD) risk factors is unknown.

Methods: We studied 66,636 primary prevention patients from the CAC Consortium. Multivariable competing risks regression and C-statistics were used to assess the association between CAC and SCD, adjusting for demographics and traditional risk factors.

Results: The mean age was 54.4 years, 33% were women, 11% were of non-White ethnicity, and 55% had CAC >0. A total of 211 SCD events (0.3%) were observed during a median follow-up of 10.6 years, 91% occurring among those with baseline CAC >0. Compared with CAC = 0, there was a stepwise higher risk (P trend < 0.001) in SCD for CAC 100 to 399 (subdistribution hazard ratio [SHR]: 2.8; 95% CI: 1.6-5.0), CAC 400 to 999 (SHR: 4.0; 95% CI: 2.2-7.3), and CAC >1,000 (SHR: 4.9; 95% CI: 2.6-9.9). CAC provided incremental improvements in the C-statistic for the prediction of SCD among individuals with a 10-year risk <7.5% (ΔC-statistic = +0.046; P = 0.02) and 7.5% to 20% (ΔC-statistic = +0.069; P = 0.003), which were larger when compared with persons with a 10-year risk >20% (ΔC-statistic = +0.01; P = 0.54).

Conclusions: Higher CAC burden strongly associates with incident SCD beyond traditional risk factors, particularly among primary prevention patients with low-intermediate risk. SCD risk stratification can be useful in the early stages of CHD through the measurement of CAC, identifying patients most likely to benefit from further downstream testing.

I have been recommending coronary artery calcium imaging (heart scan) for many years. Over the past few years, there is more acceptance of the heart scan as an evidence-based tool to assess atherosclerotic cardiovascular disease risk in individuals in a primary prevention setting. This means that this is a tool that is useful before a person has any cardiac symptoms. It is an inexpensive (as low as $49 locally) test that can give good, actionable information.

This paper, from JACC Cardiovascular Imaging, uses a large database of 66,636 primary prevention patients and followed the group for over 10 years to assess the relationship between coronary artery calcium (CAC) scores and sudden cardiac death (SCD). They found a relationship between CAC score and SCD which would be expected as a higher CAC score indicates a likely greater amount of subclinical atherosclerosis (asymptomatic heart disease). The authors found a stepwise higher risk for SCD in patients with CAC scores 0-99 (1.3X risk), 100–399 (2.8X risk), 400–999 (4.0X risk), and CAC scores >1000 (4.9X risk) compared with patients with a CAC score of 0. It is important to note that the absolute SCD risk was still very low even in the highest risk group, which is the main outcome measure of the study. However, the risk of cardiac events (non-fatal heart attacks) was also higher with a higher CAC score and is a much more common outcome clinically. This finding reinforces the idea that a higher CAC score is a good reason to initiate aggressive risk-reduction strategies including nutrition, exercise, optimizing blood pressure and blood glucose, smoking cessation, and medications to lower the overall risk of cardiac events.

Coronary Artery Calcium for Risk Stratification of Sudden Cardiac Death: The Coronary Artery Calcium Consortium
JACC Cardiovasc Imaging 2022 Mar 21;[EPub Ahead of Print].