

# Calcium score and CTCA – which test when?

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**The coronary calcium score is a powerful risk factor of a future cardiovascular event. Why? Because calcium is direct, visible evidence of coronary artery disease, while the standard risk factors are only risks of atherosclerosis.**

An elderly patient with a full house of risk factors and a calcium score of zero has a very low risk. A young patient with no risk factors and a very high calcium score has an extremely high risk of future coronary artery disease.

Atheroma occurs with inflammatory changes in the wall of the coronary artery. Over time, some of the inflamed 'soft' plaques heal. A by-product of this chronic inflammation is calcium deposition analogous to a 'scar'. While the calcium is inert and not dangerous, the amount of calcium correlates with the total burden of coronary atheroma and the risk of future coronary events.

## Key messages

- Calcium score is a powerful risk prediction tool
- Coronary CT (CTCA) is for diagnosis of equivocal symptoms
- For symptoms, request CTCA not calcium score.

No IV contrast is required. Set-up takes less than five minutes and scan time is only a few seconds with minimal radiation exposure. The amount and density of calcium in the coronary artery walls is measured to derive a calcium score. Importantly, this test only quantifies coronary calcium and does not define any soft plaque or coronary artery narrowing.

In the asymptomatic, a calcium score of zero implies a very low risk in the short-to-medium term and generally provides reassurance, which is additive to standard risk scores.

The risk profile of two thirds of patients will be reclassified from intermediate to low or high risk and may be used to guide the aggressiveness of risk factor management when compared to current risk scores. Up to 15% of intermediate risk patients have non-calcified atheroma despite a zero score which may provide false reassurance.

In symptomatic individuals, a calcium score alone is not indicated. A CT coronary angiogram (CTCA) is recommended as it will visualise non-calcified soft plaque or coronary artery stenosis. Many practices include a calcium score with a CTCA.

CTCA is a diagnostic test allowing visualisation of the coronary artery lumen to rule out stenosis and define the presence of vulnerable, soft (non-calcified) atheroma. The amount of plaque seen is also a strong risk predictor. The more plaque seen, the higher the risk.

After sublingual GTN to dilate the coronary arteries, and IV contrast, ECG-guided CT images are acquired. The engineering of specifically designed cardiac imaging CT scanners is quite extraordinary. To minimise blur due to cardiac motion, scans need to be super-fast. Not all CT scanners are the same (a Toyota is not a Ferrari) with significant differences in spatial and temporal (blur) resolution. It's important to do your homework before referring.

For chest pain that is indeterminate (equivocal chest discomfort) in a patient who is intermediate risk, then the investigation of choice is a CTCA. A normal CTCA effectively rules out coronary artery disease as a cause of the symptoms (specificity - 99.9%) and in 8% of cases, defines another cause for the symptoms e.g. lung cancer, pulmonary embolus, hiatus hernia, pneumonia, etc.

A Medicare rebate exists for some CTCAs referred by a specialist. There is no rebate yet for a calcium score.



*The author works at a practice that performs CTCA and calcium scores.*

