

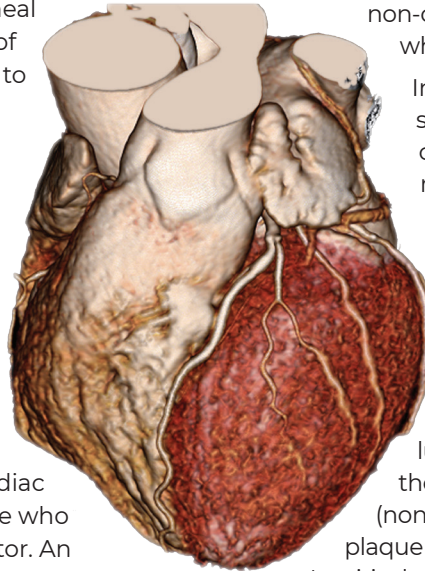
Calcium score and CTCA – which test when?



By Dr Lawrence Dembo, Cardiologist

Coronary atherosclerosis: Atheroma “plaque” occurs with inflammatory changes in the wall of the coronary artery as lipid from within the coronary artery bloodstream is extracted and oxidized. Over time, some of these inflamed “soft” plaques heal by chronic inflammation, a by-product of which, is calcium deposition analogous to a “scar”. Whilst 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.

The coronary calcium score is a powerful risk factor of a future cardiovascular event. Why? Calcium is the end product of coronary artery disease. It is the disease. Standard risk factors are...risks of having the disease. Essentially most people who have a cardiac event have a risk factor, but most people who don't have an event, also have a risk factor. An elderly patient with a full house of risk factors and 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.



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) may be recommended as it will visualise non-calcified soft plaque or coronary artery stenosis. Many practices include a calcium score with a CTCA to help define the total atherosclerotic burden.

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. Intuitively and backed by data, the more plaque seen, the higher the individual's risk of an event secondary to atherosclerosis.

CTCA: How it's acquired. 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 deciding where to refer.

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 CTCA's referred by a Specialist. There is no rebate yet for calcium score.

As at 30 March 2022

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.

Calculating the calcium score: No IV contrast is required. Set up takes under five minutes and CT scan time is only a few seconds with minimal radiation exposure (About 1/10th of a trip from Perth to Melbourne). 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

