THE BOTTOM LINE

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SGIM Society of General Internal Medicine

Coronary Artery Calcium Testing Accurately Predicts Low Incidence of Cardiovascular Disease in Patients with Moderate to High Calculated ASCVD Risk

QUALITY OF EVIDENCE: MODERATE ⊕⊕⊕◯

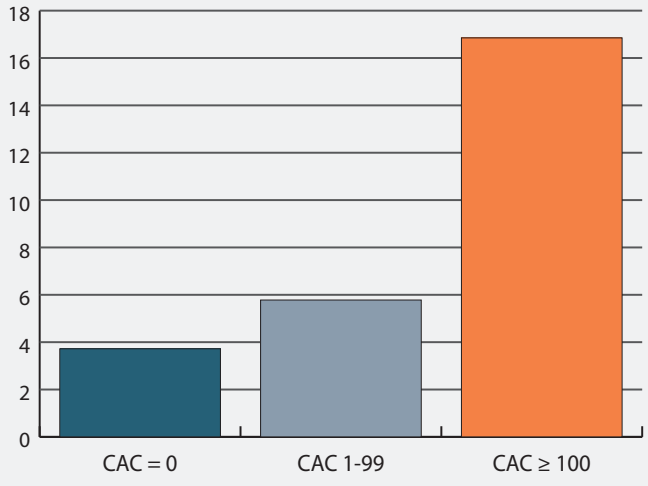
Why is this important?

According to the 2013 American College of Cardiology/American Heart Association guidelines, all individuals with an atherosclerotic cardiovascular disease (ASCVD) risk ≥7.5% should be offered statin treatment for primary prevention. A recent study [1] suggested that a coronary artery calcium (CAC) score of zero predicts a low risk for a cardiovascular event in patients classified as moderate to high risk by ASCVD score calculation.

Facts

- The BioImage study[1] was a prospective observational cohort with 5,805 participants between the ages of 55-80 (60-80 for women) without known ASCVD.
- Participants were assessed for cardiovascular risk factors and evaluated for subclinical atherosclerosis using both non-contrast CT determination of Agatston coronary artery calcium score (CAC) and highly sensitive carotid ultrasound imaging to identify plaque burden (cPB).
- At baseline, 86% of patients had an ASCVD risk ≥7.5% with current guidelines recommending statin therapy. Participants were then reclassified based on their CAC score and cPB. CAC categories were defined as CAC = 0, CAC 1-99, and CAC ≥100. [2]
- At a median follow-up of 2.7 years, 91 participants had coronary heart disease (CHD) including MI, unstable angina, or coronary revascularization. 138 participants had cardiovascular disease (CVD), including coronary heart disease, ischemic stroke, or cardiovascular death.
- For patients with ASCVD risk scores ≥7.5%, risk stratification on the basis of CAC scores significantly improved specificity for incident CHD or CVD compared with the AHA/ACC risk calculator (37% → 15%) while decreasing sensitivity for CVD alone (96% → 88%). Much of the improvement in specificity was attributable to reclassification of patients with CAC of 0.

Cardiovascular Disease Event Rate per 1,000 Person-Years



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Coronary artery calcium scoring can help to better risk stratify patients at high calculated risk for ASCVD. Because patients with CAC scores of 0 had event rates significantly lower than predicted by ASCVD scoring alone, it may be possible to use CAC scoring to limit overtreatment with statin medications. However, the net benefit of excluding this population from statin therapy should be evaluated in a randomized controlled trial prior to widespread adoption.

Quality of Evidence

(Adapted from Guyatt G BMJ, 26 April 2008)
This refers to the degree to which the findings of this study are likely to be free of bias.

⊕⊕⊕⊕	High
⊕⊕⊕◯	Moderate
⊕⊕◯◯	Low
⊕◯◯◯	Very low

Tips for Discussion of Results with Patients

- Between the ages of 63 and 71, all adults will meet ACC/AHA criteria to receive a statin medication to help reduce their risk of CVD. However, statin medications are not without side effects, particularly in the elderly.
- Non-invasive testing for subclinical atherosclerosis with CAC scoring may augment current guidelines and support a decision to start or withhold statin medications in moderate risk patients without known CVD.
- CAC scanning carries a low but demonstrable cancer a risk of between 42 and 62 cases/100,000 patients screened [3] and may lead to downstream testing for incidental findings.
- The decision to use CAC testing to guide statin initiation should be individualized for each patient after a discussion about the benefits of CAC scanning (i.e. additional information about ASCVD risk without definite clinical benefit), the risks of CAC scanning (radiation-induced cancers and incidental findings), and patient preferences for daily statin treatment.
- Patients with CAC scores of 0 are unlikely to derive benefit from statin medications.

References

1. Mortensen MB, Fuster V, Muntendam P, Mehran R, Baber U, Sartori S, et al. A Simple Disease-Guided Approach to Personalize ACC/AHA-Recommended Statin Allocation in Elderly People: The BioImage Study. Journal of the American College of Cardiology. 2016;68(9):881-91.
2. Silverman MG, Harkness JR, Blankstein R, Budoff MJ, Agatston AS, Carr JJ, et al. Baseline Subclinical Atherosclerosis Burden and Distribution are Associated with the Frequency and Mode of Future Coronary Revascularization: Multi-Ethnic Study of Atherosclerosis (MESA). JACC Cardiovascular imaging. 2014;7(5):476-86.
3. Kim KP, Einstein AJ, de Gonzalez AB. Coronary artery calcification screening: estimated radiation dose and cancer risk. Archives of internal medicine. 2009;169(13):1188-1194.

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The Bottom Line summaries reflect the expertise and opinions of the SGIM EBM Task Force as of the date of release of this summary.
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