

Evidence Discussion (CD 4.3-4.5)

Coronary Computed Tomography Angiography (CCTA)

Coronary Computed Tomography Angiography (CCTA) provides non-invasive anatomic coronary imaging with excellent sensitivity for detecting coronary plaques and stenosis. However, artifacts can significantly lower the specificity, which potentially leads to higher healthcare resource utilization. Notwithstanding this concern, the ability to characterize coronary plaques and stenosis on a CCTA proved to be advantageous over functional stress testing, with respect to diagnostic characteristics and prognostication, as demonstrated by high quality evidence, including multiple randomized trials.¹

To ensure a clinically meaningful study, in addition to paying meticulous attention to the scanner functionality and protocol selection, careful patient selection is imperative. Based on the known performance characteristics of CCTA and high quality clinical trials from Europe and North American, there is general agreement between the American and European guidelines to focus CCTA testing on the following general categories²:

- Likely anginal symptoms with no known coronary artery disease (CAD)
- Absence of symptoms or less likely anginal symptoms with no known CAD, when objective evidence of cardiac structure or function abnormality is present.
- Information about specific coronary artery abnormalities, such as left main coronary stent and bypass graft patency, congenital coronary anomaly, non-atherosclerotic coronary disease may potentially alter clinical management decision.
- CCTA will replace conventional invasive coronary angiography when the likelihood of coronary intervention is not high based on clinical assessment

CTA derived fractional flow reserve (FFRct) is one of the value added technologies that have been shown to improve the accuracy of CAD diagnosis over and above CCTA alone. While it modestly adds negative predictive value to CCTA by excluding critical coronary lesion with a FFRct value > 0.8, the positive predictive value is inadequate to confer confidence to locate lesions with significant stenosis. Effective adoption of this technology, therefore is contingent upon ensuring optimal CCTA image quality and a mindful patient selection process, for example, avoid applying FFRct to those with left main coronary disease ≥50% or those with critical triple vessel disease.^{3,4}

References

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3. Gonzalez JA, et al. Meta-Analysis of Diagnostic Performance of Coronary Computed Tomography Angiography, Computed Tomography Perfusion, and Computed Tomography-Fractional Flow Reserve in Functional Myocardial Ischemia Assessment Versus Invasive Fractional Flow Reserve Am J Cardiol. 2015 Nov 1;116(9):1469-78.
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