For Clinical Practitioners: About Coronary Artery Calcification Scanning and CT Coronary Angiography

Because of the increasing interest in both coronary calcification scanning and CT coronary angiography and uncertainty about their roles in clinical practice, we address here the differences between coronary artery calcification (CAC) scanning and CT coronary angiography and their respective roles in clinical practice.

Risk assessment of asymptomatic patient for the purpose of guiding intensity of medical therapy: ***coronary artery calcification scanning***

Coronary artery calcification (CAC) has been well documented in the literature to provide excellent noninvasive risk assessment for adults over age 40. This test is completely noninvasive, without even requiring an IV. EBCT technology uses a sweeping electron beam, while MDCT scanners use a rotating system.. . EBCT scanners typically use less radiation than MDCT scanners, with EBCT scanners using 0.6-1.3 mSev and MDCT using 0.5 to 2.5 mSev. Note that the average EBCT radiation exposure of 0.8 Msev is is about 3 months of background radiation in Pennsylvania), which is acceptably low for screening purposes. Thus CAC scoring is the preferred modality for the risk assessment of the asymptomatic patient for the purposed of guiding medical therapy. Both EBCT and MDCT can be used for this purpose but the radiation exposure is lower with EBCT.

Evaluation of selected symptomatic patients or patients with abnormal stress tests for the purpose of deciding whether invasive catheterization and angiography is indicated: *CT coronary angiography*

64 slice MDCT scanners can provide excellent coronary angiography when a patient is injected with iodine based IV contrast . CT coronary angiography may be a reasonable choice in selected patients with atypical symptoms and/or a indeterminant stress test as a tool to avoid invasive catheterization. However, this study uses 3 to 7 mSev, occasionally up to 13 mSev of radiation. The significantly higher radiation dose, combined with the IV contrast exposure, means that this study is **not recommended** for asymptomatic screening or risk assessment. According to a recent AHA scientific statement,"For CT angiography, the higher radiation doses prohibit the use of this test as a screening tool for asymptomatic patients. CT coronary angiography is not recommended in asymptomatic persons for the assessment of occult CAD."

In keeping with the different indications for these studies, one should note that coronary artery calcification results are limited to calcification scores for risk assessment, while CT angiography results may or may not provide coronary artery calcification scores, but they do provide other information about cardiac and noncardiac findings in the thoracic cavity. Furthermore, substantially elevated CAC scores pose technical problems in obtaining adequate CT angiography images.

According to the most recent AHA scientific statement on the *Assessment of Coronary Artery Disease by Cardiac Computed Tomography, "*Cardiac CT technology is rapidly evolving. On the basis of the substantial validation data, EBCT remains the reference standard for CAC measurement. MDCT-64 is the current standard for coronary CT angiography."

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