

NON-INVASIVE DETECTION AND CHARACTERIZATION OF CORONARY ATHEROSCLEROTIC PLAQUE

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Atherosclerotic plaques that may cause acute coronary events are often described as vulnerable. Retrospective autopsy studies suggest that the most common morphologic features of vulnerable coronary plaques are fibrous caps, thinner than 65 micrometer, and the presence and composition of lipid pools. Major technical advances in multi-detector computed tomography (MDCT) imaging and magnetic resonance imaging (MRI) create the possibility of non-invasive detection and characterization of coronary atherosclerotic plaques. It might therefore be possible, with this approach, to detect and quantify plaque burden, and to identify indices suggesting that a plaque is vulnerable. While intravascular approaches such as intravascular ultrasound (IVUS) and optical coherence tomography (OCT) appear promising, a noninvasive measure to detect and characterize plaque could significantly enhance the management of patients with CAD. MDCT allows acquisition of cardiac images with high spatial and temporal resolution. Retrospectively ECG-gated helical MDCT enables suppression of motion artifacts and provides angiograms of the major coronary arteries in vivo. Initial reports suggest the ability of MDCT to detect atherosclerotic plaque and characterize plaque components. High spatial resolution MR imaging with T1, intermediate, and T2 weighting has the potential to provide two-dimensional images of plaques with qualitative information that may allow the detection of fibrous, lipid and calcified plaque components. Especially T2 weighted imaging in 2T and 3T magnets has been suggested to characterize plaque according to the AHA classification. This review will discuss the newest accomplishments in CT and MR imaging with respect to detect vulnerable plaques as well as clinical implications and limitations.