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The WCC Note™

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A Weekly Guide To Harmonizing Clinical Trial Imaging

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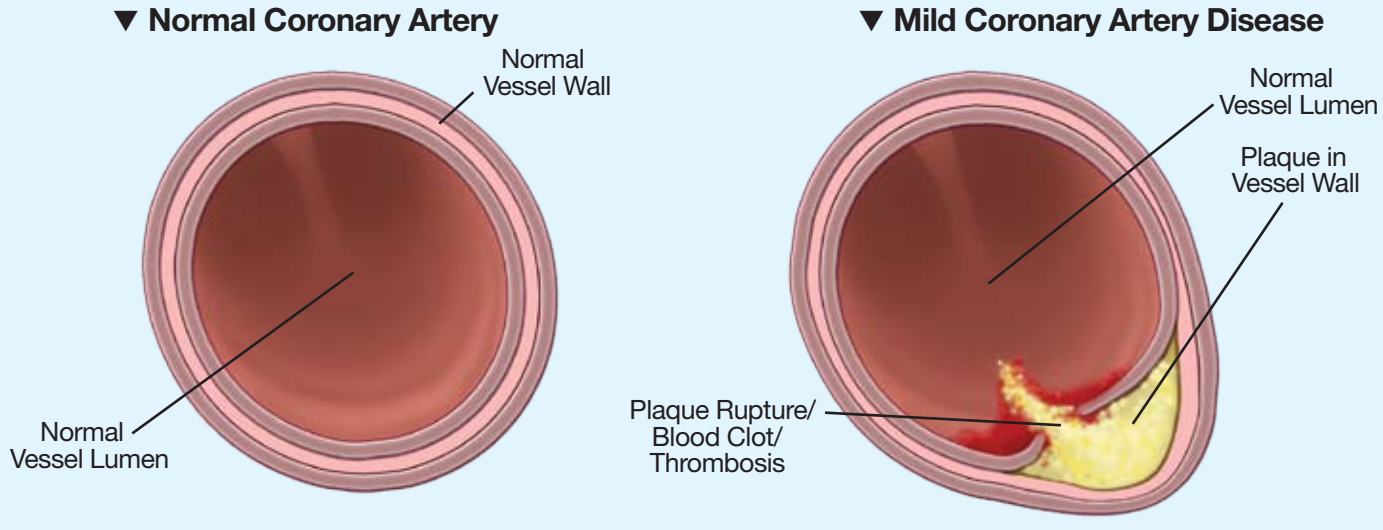
MRI ATHERO-SCLEROSIS

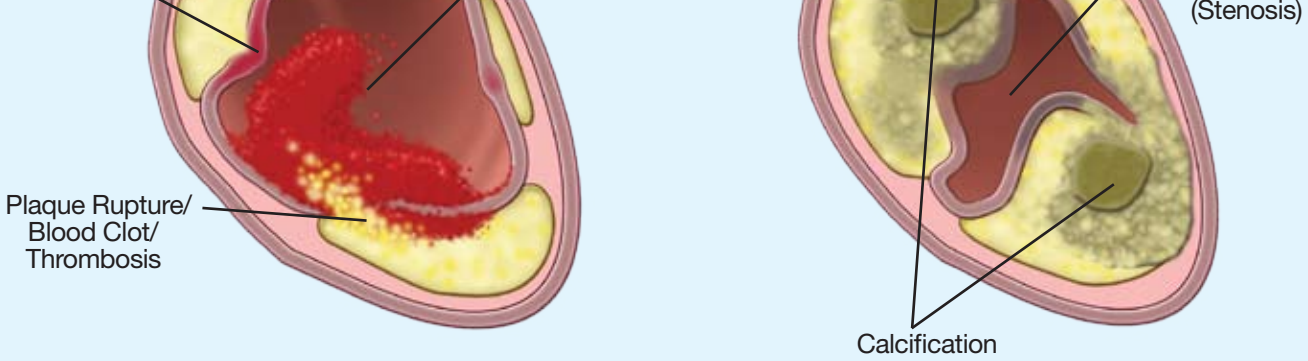
New MRI Technique Detects Response of Atherosclerosis to Treatment

Coronary and carotid artery atherosclerosis treatment traditionally have been based on the degree of stenosis, although vessel inflammation also is known to play in important role (see the box below). In his April 1 presentation at the 2008 American College of Cardiology meeting in Chicago, Dr. Jonathan H. Gillard of Cambridge University discussed his study of high-resolution imaging using USPIO (**U**ltra-**S**mall **P**articles of **I**ron **O**xide) as a contrast agent. This technique allows the radiologist to detect macrophage activity on MRI, which is a sign of inflammation within an atherosclerotic plaque. In this study, 47 patients with carotid artery atherosclerosis were imaged with USPIO-enhanced MRI, then randomized to receive either 10mg (low dose) or 80mg (high dose) of atorvastatin for 12 weeks. Follow-up MRI showed that the high-dose group had significantly less inflammation and emboli than the low-dose group.[1] **Conclusion: USPIO-enhanced MRI shows the response to treatment of inflammation in atherosclerotic plaque.[2]**

THE STAGES OF CORONARY ARTERY DISEASE

Coronary artery disease (CAD) has several components, including atherosclerotic plaques, blood clots, and inflammation. The level of stenosis (narrowing) of the coronary artery, in combination with plaque rupture and inflammation, determines the risk for myocardial ischemia or infarction (a heart attack). Here is a schematic diagram of the levels of coronary artery disease:





MOLECULAR IMAGING

New Molecular Imaging Technique Allows Visualization of Microscopic Tumors

Researchers from Stanford University recently published a study of Raman spectroscopy, a novel technique allowing imaging with a precision of almost one-trillionth of a meter. This technique is based on the Raman effect, a phenomenon in which a laser shined on a substance results in millions of photons scattering. The pattern of scattering is unique to each type of molecule, known as the "spectral fingerprint." Utilizing this laser technique, signals can be measured and localized to the part of the body from which they arise. These signals are strong and long-lived, making them easier to measure. The Stanford researchers tagged gold nanoparticles to specific proteins that localize to different tumor molecules. The microscope could then be used, utilizing the Raman technique, to find the target tumor cells at a scale 1,000 times smaller than what had previously been possible.[3] **Conclusion: Raman spectroscopy may allow the detection of very small areas of malignant tissue within the body.[4]**

SOURCES

1. http://www.acc.org/media/acc_scientific_session_08/press/monday/1pm_ACC_Gillard.pdf (accessed online, April 15, 2008).
2. http://www.healthimaging.com/content/view/10333/89/ (accessed online, April 15, 2008).
3. http://www.healthimaging.com/content/view/10312/157/ (accessed online, April 16, 2008).
4. Keren S, Zavaleta C, Cheng Z, *et al.* "Noninvasive Molecular Imaging of Small Living Subjects Using Raman Spectroscopy." *Proceedings of the National Academy of Sciences,* 105:5844-5849.

NEXT ISSUE: MORE NEWS AND TRENDS IN CLINICAL TRIAL IMAGING

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