Regd. No. MH/MR/South - 243/2006-08

Inner Spaces

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Vol. 1 No. 6, Dec. '06

Subscription Price: Rs. 10

Points

- Traditionally, studies such as ECG, treadmill stress test, stress echocardiography and stress thallium have been used in the setting of "to rule out CAD"
- These modalities only test for ischemia and truly do not assess CAD.
- The only way to look for CAD is with the help of a test that allows us to anatomically examine the coronary tree in detail.
- Apart from catheter angiography, which is considered too invasive for this purpose, the only other test that can do so is cardiac CT, which allows us to look at the coronary tree and the presence/ absence of CAD in detail.

Coronary Artery Disease and Ischemic Heart Disease

There is considerable confusion about the concepts of coronary artery disease (anatomic abnormalities) versus ischemic heart disease (functional abnormalities).

Coronary artery disease (CAD) may lead to ischemic heart disease (IHD), but not always. The mere presence of atherosclerotic disease in the form of calcified or non-calcified plaques does not mean that there is significant stenosis. However, the presence of plaques, especially soft, non-calcified plaques, implies that there is atherosclerotic disease, and there is still a need to treat or control this situation; with the help of exercise, diet control and statins.

Until recently, virtually all tests used to detect coronary artery disease, actually detect "IHD". These include, ECG, treadmill stress test, echocardiography with or without stress, stress thallium and stress perfusion CMR. The only test that showed "CAD" was catheter angiography, but this procedure is still considered to be too invasive to be used routinely in the setting of "to rule out coronary artery disease".

With the advent of cardiac CT, we now have a test that reliably tells us whether the coronary tree is normal or abnormal. The ability to predict normality is better than 98%. Also, if the test is abnormal, it can reliably tell us the extent of abnormality. The disease process can range from minor disease (calcified, non-calcified plaques) (Figs. 1) to severe stenoses (Fig. 2) and occlusions (Fig. 3).

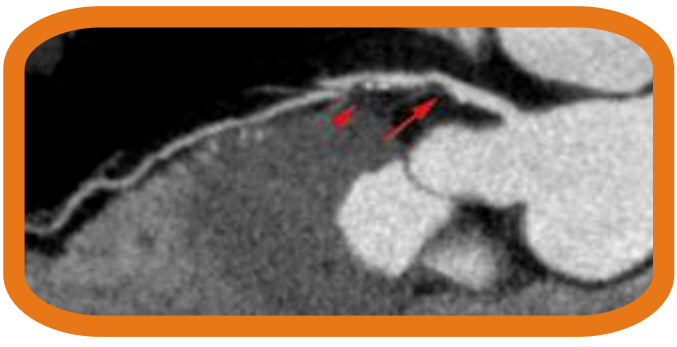

Fig. 1A

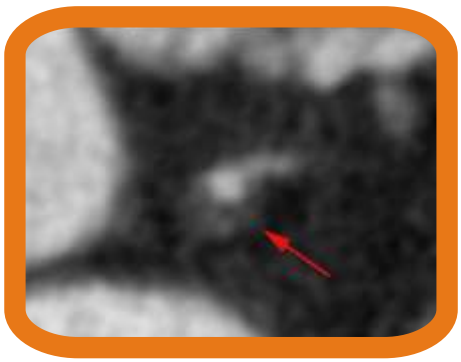

Fig. 1B

Fig. 1 (A, B): The proximal LAD on this MIP image (A) shows eccentric soft (red arrow) and mixed (red arrowhead) plaques without significant stenotic disease. The transaxial MIP image (B) shows the eccentric plaque (red arrow) along the inferior surface of the vessel producing trivial narrowing.

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It is important to realize that though a normal test for ischemia rules out significant CAD, it does not rule out non-obstructive disease, which may still need treatment to prevent a coronary event in the future. As a result, though cardiac CT is a relative newcomer as far as testing for "to rule out CAD" is concerned, it turns out to be the most appropriate test for this purpose. If a cardiac CT turns out to be abnormal and shows stenotic disease of greater than 50%, then a test for detecting IHD can be performed to look for ischemia, prior to therapy.

Clinical screening for "to rule out CAD" with cardiac CT is indicated in these patient groups

- Family h/o coronary artery disease
- High triglyceride levels
- Diabetes
- Atypical chest pain
- Pre-adult congenital heart disease or cardiac tumor surgery
- Pre-major surgery in adults over the age of 50
- Smoking
- Equivocal ECGs, echocardiograms or other stress studies performed as part of an annual health check-up or a pre-employment check-up

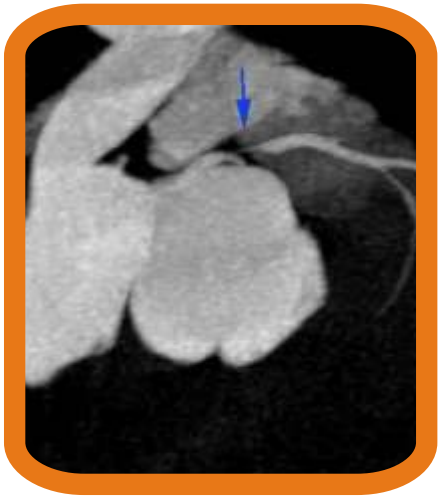

Fig. 2

Fig. 2: The proximal LAD shows severe stenotic disease (blue arrow) on this MIP image.

Fig. 3

Fig. 3: The proximal LAD shows occlusive disease (blue arrow) on this color 3D image.

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Printed at: India Printing House, First Floor, 42, G D Ambekar Marg, Opp. Wadala Post Office, Wadala, Mumbai 400 031

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