

Non-invasive coronary artery imaging

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Ischaemic heart disease (IHD) was the ninth commonest cause of premature death in South Africa during 2000.¹ The World Health Report for 2002² cites the increasing prevalence of obesity, hypertension, high cholesterol and tobacco consumption as major risk factors for IHD in both the developed and developing world. A recent WHO report warns of a marked increase in the prevalence of IHD in young women.

Non-invasive imaging of the coronary arteries as a screening procedure to detect and score coronary artery calcification as a marker of disease has been used for a number of years with electron beam CT. Recent developments in multislice CT technology allow excellent spatial resolution of the coronary arteries as thin section maximum intensity projections (MIPs) and multiplanar reconstructions (MPRs). MIPs provide a better overview of the coronary artery and give an accurate impression of the arterial lumen, while MPRs are better suited to assess stented segments, plaque composition and calcified arteries. Volume and surface-shaded displays are useful to display the coronary arteries to referring clinicians. Vessel tracking software allows accurate measurement of the degree of artery stenosis. Comparison of 16 multislice CT with the gold standard of conventional coronary arteriography has demonstrated a 95% specificity and 86% sensitivity of multislice coronary CT angiography for the detection of coronary artery disease.^{3,4}

Potential applications of this technology are the early detection of coronary atherosclerotic disease, the exclusion of coronary artery occlusion prior to patients undergoing major surgery, the exclusion of artery occlusion in patients with chest pain, and the follow-up of patients following coronary stenting or bypass grafting.⁵ Magnetic resonance (MR) of the heart has been demonstrated to be an accurate investigation of cardiac morphology and perfusion.⁶ However, accurate MR coronary angiography remains elusive. Advances in navigator pulse sequences may improve this technology to the level of multislice CT angiography.

How do all these exciting technological developments impact on you the practising radiologist? It means that unless the radiologist takes an active interest in non-invasive cardiac imaging, it will go the same way as angiography and echocardiography went in the 1970s and 80s, into the domain of cardiology and with it vascular imaging. Only by becoming familiar with cardiac anatomy and pathophysiology will the radiologist be able to retain and grow this exciting technology and so provide a valuable service to his or her patients in the future.

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Editor