Contrast-enhanced three-dimensional dobutamine stress echocardiography: between Scylla and Charybdis?


Abstract
AIMS: Real-time three-dimensional echocardiography (RT3DE) allows quick volumetric scanning of the left ventricle (LV). We evaluated the diagnostic accuracy of contrast-enhanced stress RT3DE for the detection of coronary artery disease (CAD) in comparison with coronary arteriography as the reference technique. METHODS AND RESULTS: Forty-five consecutive patients (age 59 +/- 10, 31 males) referred for coronary angiography were examined by contrast-enhanced RT3DE. Wall motion analysis was performed off-line by dedicated software. New or worsening wall motion abnormalities were detected in 17 of 28 patients with significant CAD (sensitivity 61%), and in two of 17 patients without significant CAD (specificity 88%). The sensitivity for detection of single-vessel CAD was 8/15 patients (53%), for two-vessel CAD 4/6 (67%), and for three-vessel CAD 5/7 (71%). In 35 patients, comparison with conventional RT3DE was available. The image quality index at rest improved from 2.5 +/- 1.2 to 3.2 +/- 1.0 (P < 0.001) with contrast and at peak stress from 2.3 +/- 1.2 to 3.1 +/- 1.0 (P < 0.001). Interobserver agreement on the diagnosis of myocardial ischaemia improved from 26 of 35 studies (74%, kappa = 0.44) with conventional stress RT3DE to 30 of 35 studies (86%, kappa = 0.69) with contrast-enhanced stress RT3DE. Sensitivity increased from 50 to 55% and specificity from 69 to 85% with contrast-enhanced stress RT3DE in this subset of patients. CONCLUSION: Despite some important practical and theoretical benefits, contrast-enhanced stress RT3DE currently has only moderate diagnostic sensitivity due to several technical limitations as temporal and spatial resolution.