

Evaluation of left ventricular ejection fraction from radial long-axis tomography: A new reconstruction algorithm for ECG-gated technetium-99m sestamibi SPECT

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Radial long-axis tomography can provide views similar to contrast left ventriculography (LVG) including the basal and apical areas of the left ventricle, not possible in routine short-axis tomography. We applied this method to ECG-gated Tc-99m Sestamibi (MIBI) myocardial SPECT images to estimate the left ventricular ejection fraction (LVEF).

Methods: ECG-gated Tc-99m MIBI SPECT was performed with a temporal resolution of 10 frames per R-R interval. LVEF was calculated on the basis of left ventricular volume estimates at end diastole (ED) and end systole (ES) with using an ellipsoid body model. To validate this method, LVEF's derived from ECG-gated Tc-99m MIBI SPECT were compared with those from LVG in 11 patients with coronary artery disease.

Results: There was a close linear correlation between LVEF values calculated from Tc-99m MIBI SPECT and those from LVG ($r = 0.89$, $p < 0.001$), although the gated SPECT underestimated LVEF compared to LVG. The technique showed excellent reproducibility (intra-observer variability, $r = 0.96$, $p < 0.001$; inter-observer variability, $r = 0.71$, $p < 0.005$).

Conclusion: The radial long-axis tomography technique gives a good estimate of LVEF, in agreement with estimates based on LVG. ECG-gated Tc-99m MIBI SPECT can, therefore, be applicable to assess myocardial perfusion and ventricular function at the same time.

Key words: left ventricular ejection fraction, ECG-gated Tc-99m MIBI SPECT, radial long-axis tomography