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99mTc-TETROFOSMIN SPECT AND 123I-BMIPP SPECT ARE USEFUL PREDICTORS FOR EVALUATING MYOCARDIAL VIABILITY AFTER REPERFUSION THERAPY FOR ACUTE MYOCARDIAL INFARCTION

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Reperfusion therapy (RT) during the acute stage of myocardial infarction (MI) to relieve the myocardial ischemia and reduce the infarction size has become widespread. Advances in RT have emphasized the importance of assessment of myocardial viability (VI). The method for evaluating VI , however, remains unsettled. Our purpose was to clarify the usefulness of 99mTc-tetrofosmin SPECT (MYO) and 123I-BMIPP SPECT (BM) for evaluating VI after RT. We examined thirteen patients with acute MI (11 males, 2 females, mean age; 56±13 years, LAD/ RCA:10/3). Direct percutaneous transluminal coronary angioplasty significantly decreased the stenosis rate from 99.8 ± 0.4% to 27.7 ± 11.9% and 1 month after angiography confirmed successful revascularization. On BM and MYO, the region of interest (ROY) in the left ventricle was regarded as 1 to 5 segments of the American Heart Association classification on left LVG, and uptake was expressed as the defect score (DS) (1: normal, 2:mild reduction 3: moderate reduction 4: defect). On LVG, wall motion was quantitatively determined by the centerline method to evaluate improvement. Before reperfusion, 38 segments were akinetic. Seventeen of 38 segments (62%), improved wall motion by 1 SD or more on follow-up. Sensitivity, specificity, and accuracy of MYO and BM were 100% and 53%;71% and 90%; 84% and 74%, respectively. The segments with DS 4 on MYO did not improve in wall motion. Mismatches in MYO and BM uptake (BM < MYO) were observed in 12 of 17 segments (71 %). We conclude that MYO and BM are useful predictors of VI.

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ASSESSMENT OF MYOCARDIAL VIABILITY USING Tc-99m TETROFOSMIN SPECT. —COMPARISON TO REST-REDISTRIBUTION THALLIUM SPECT—

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This study examined the ability of Tc-99m tetrofosmin (TF) SPECT to detect myocardial viability, compared with Tl SPECT, in patients with chronic coronary artery disease. Fifty-two patients with regional wall motion (RWM) abnormalities were studied prior to CABG. Each patient underwent resting TF SPECT, including ECG-gated SPECT, and rest-redistribution Tl SPECT. Enddiastolic polar map (EDM) was generated using ECG-gated SPECT and Fourier analysis. Dysfunctional regions were considered to be viable when RWM improved after CABG. Regional myocardial uptake was expressed as percentage of peak myocardial activities. The quantitative analysis demonstrated that TF SPECT could identify viable myocardium as clearly as Tl and that the diagnostic accuracy of TF and ED in the inferior segments was higher than that of Tl (TF:89%, EDM:91% vs Tl:86%). These data suggest that TF and EDM provide more accurate prediction of myocardial viability than Tl in inferior wall.

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A COMPARISON OF REST TECHNETIUM-99M TETROFOSMIN AND REST-REDISTRIBUTION THALLIUM-201 SPECT FOR THE EVALUATION OF MYOCARDIAL VIABILITY.

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We studied 16 patients with old myocardial infarction by rest Tc-99m tetrofosmin and rest-redistribution thallium SPECT imaging. SPECT images were divided into 24 segments, and the relative regional uptake (% uptake) of each segment was obtained. Percent uptake of Tc-99m tetrofosmin image correlated well with % uptake of rest thallium initial image ($y=0.76x+25.6$, $r=0.88$, $p<0.0001$) and rest thallium redistribution image ($y=0.87x+8.8$, $r=0.87$, $p<0.0001$). Percent uptake of Tc-99m tetrofosmin image was higher than % uptake of rest thallium initial image ($p<0.0001$). There was no difference in % uptake between Tc-99m tetrofosmin image and rest thallium redistribution image. These results suggest that rest Tc-99m tetrofosmin SPECT is valuable for the evaluation of myocardial viability as well as rest-redistridution thallium SPECT.

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ESTIMATION OF LEFT VENTRICULAR EJECTION FRACTION ASESSED BY ECG-GATED Tc-99m TETROFOSMIN RADIAL LONG AXIAL MYOCARDIAL SPECT.

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We have developed ECG-gated Tc-99m tetrofosmin(TF) radial long axial myocardial SPECT to assess both myocardial perfusion and ventricular function. The aim of this study is to estimate left ventricular ejection fraction(sEF) assessed by multi-plane method and compare with EF assessed by ECG-gated blood pool SPECT study(pEF). In multi-plane method, EF was measured from 30 radial long axial images using spline method. The result was there was a good correlation between sEF and pEF.
We conclude multi-plane method is useful to estimate EF and contribute to diagnose more accurate myocardial perfusion and function than the conventional methods.

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