

Myocardial viability assessment with gated SPECT Tc-99m tetrofosmin % wall thickening: Comparison with F-18 FDG-PET

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Object: This study was designed to assess the value of gated SPECT Tc-99m-tetrofosmin (TF) wall thickening (WT) in addition to TF exercise (Ex)/rest myocardial SPECT, in comparison with F-18 fluorodeoxyglucose (FDG)-PET. **Methods:** The study population consisted of 33 patients with old myocardial infarction (27 men and 6 women; mean age, 62 ± 8 years old). All patients underwent Ex/rest TF SPECT and glucose loading FDG-PET. Polar map images of Ex/rest TF were generated and divided into 24 segments for further analysis. We classified LV segments according to the exercise-rest perfusion scintigraphy. LV segments with less than 70% of the maximum TF activity on the exercise image were defined as stress-induced defects. Among these, the segments whose TF activity increased by 10% from exercise to rest images or exceeded 70% of the maximum uptake were defined as reversible (viable) defects. The remaining defects on the rest image were irreversible (non-viable) defect segments, and were considered for viability study on the basis of %WT. %WT was calculated according to the standard method: $\{(counts\ ES - counts\ ED)/counts\ ED\} \times 100$. A viable segment on gated SPECT was defined as a segment whose %WT exceeded the lower limit of the normal value (mean – SD). PET viability was defined as FDG uptake exceeding 50% of the maximum count. **Results:** Among the 792 segments evaluated in the 33 patients studied, there were 689 PET viable segments. Of the 689 segments analyzed, 198 (29%) were identified as having defects on Ex images. Among these defects, 55 (8%) were reversible or partially reversible, as evidenced by rest images, and 143 (21%) were irreversible. Of the irreversible segments on Ex/rest images, 106 (15%) demonstrated no apparent WT by gated TF SPECT, whereas 37 (6%) segments with irreversible defects did have apparent WT. Overall, the sensitivity of Ex/rest TF perfusion imaging was 79%. Sensitivity was improved from 79% to 85% by combining %WT and perfusion data, but specificity was reduced from 70% to 56%. **Conclusion:** %WT evaluated from gated TF imaging enhanced myocardial viability assessment in comparison with FDG-PET.

Key words: myocardial viability assessment, gated SPECT, wall thickening, FDG-PET