Myocardial viability assessment with [99mTc]Tc-Tetrafosmin SPECT/CT versus [18F]FDG PET/CT

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Background/Introduction: Abnormal myocardial perfusion at rest can be due to scar or hibernating myocardium. Hibernating myocardium is metabolically active and its recognition in patients with severe coronary artery disease and left ventricle dysfunction, who may benefit from aggressive management, is of the utmost importance. Myocardial viability, with technetium agents, may be suggested by the severity of the perfusion defects. On the other hand, cardiac [18F]FDG PET/CT is the gold standard for myocardial viability assessment.

Purpose: To compare myocardial viability assessed by [99mTc]Tc-Tetrafosmin SPECT and [13N]Ammonia/[18F]FDG PET/CT.

Methods: All patients submitted to rest [13N]Ammonia/[18F]FDG PET/CT and rest [99mTc]Tc-Tetrafosmin SPECT/CT in our center were selected. All studies were evaluated according to a semi-quantitative visual scale. Uptake in each individual segment was scored from 0 to 4, 0 denoting normal perfusion or metabolism, and 4 total absence. All [99mTc]Tc-Tetrafosmin SPECT/CT perfusion defects with uptake inferior to 55% of peak activity were classified as nonviable, and those with uptake equal or greater than 55% were considered viable. For PET/CT, the perfusion and metabolic studies were compared and a viability score was calculated. Viability extent percentages were calculated for both methods. Statistical analysis was performed using SPSS.

Results: A total of 51 rest [13N]Ammonia/[18F]FDG PET/CT for viability assessment were performed, however only 22 patients had also been submitted to [99mTc]Tc-Tetrafosmin SPECT/CT during the selected time period (1 woman; 21 men; average age: 64.9±7.8 years). A difference was found in the extent of myocardial viability identified by rest [13N]Ammonia/[18F]FDG PET/CT and [99mTc]Tc-Tetrafosmin SPECT/CT, with median higher percentages for the former (25.9±18.9% vs 15.8±9.3%, respectively). However, probably due to the small sample size, a statistically significant difference was not found (paired samples T-test, p=0.055).

Conclusion(s): [99mTc]Tc-Tetrafosmin SPECT/CT underestimated the extent of viability when compared to [18F]FDG PET/CT, the accepted gold standard, however a statistically significant difference was not found, most likely due to the small sample size.