



Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

MULTICENTER STUDY OF THE ABILITY OF NUCLEAR TECHNOLOGISTS AND AUTOMATED QUANTIFICATION TO DETERMINE THE NEED FOR REST IMAGING IN A STRESS-FIRST MYOCARDIAL PERFUSION IMAGING (MPI) PROTOCOL

Poster Contributions

Poster Hall B1

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Background: Stress-first MPI protocols save time and decrease radiation dose. A limitation is the requirement for physician review of the stress images to determine the need for rest images. This hurdle could be eliminated if an experienced nuclear technologist and/or automated computer quantification could make this determination. In a multicenter study we assessed technologists' and computer generated total perfusion defect size's (TPD) ability to correctly identify stress-first MPI studies requiring rest images.

Methods: Technologists from two academic medical centers, blinded to clinical and stress test data, prospectively completed a data form on consecutive patients who underwent stress-first Tc-99m SPECT MPI. Stress images with attenuation correction (Gd-153 line source or supine and prone imaging) underwent automated quantification of the stress TPD. The technologist's decision on the need for rest imaging and the automated TPD were compared with the gold standard of an assessment of perfusion images by a board certified nuclear cardiologist which included the patient's clinical and stress test data.

Results: Of a total of 250 patients (138 female, age 61 ± 11 years), 83.2% did not require rest images. The technologists correctly classified 91.2% of patient studies compared to the clinical gold standard. Their sensitivity, specificity, and accuracy were 66.7%, 96.2%, and 91.2%, respectively. The positive predictive value (PPV) and negative predictive value (NPV) were 77.8% and 93.5%, respectively. ROC curve analysis demonstrated that an automated stress TPD score ≥ 1.2 was associated with optimal sensitivity and specificity. The computer correctly classified 72.5% of patient studies using this cut-off value. Its sensitivity, specificity, and accuracy were 73.2%, 72.4%, and 72.5% respectively. The PPV and NPV were 35.3% and 92.9%, respectively.

Conclusion: Technologists had a high degree of agreement with the clinical gold standard with a NPV of 93.5%. Automated quantification also had a high NPV, so that utilizing an experienced technologist and automated systems to screen stress-first images would enhance the laboratory workflow as well as lower total tracer dose.