

Diagnostic Performance of High-Speed Myocardial Perfusion Imaging: Correlation with Coronary Angiography

Arik Wolak¹, Di Carli Marcelo², Jack Ziffer³, William Martin⁴, Sean Hayes⁵, James Gerlach⁵,
Dalia Dickman⁶, Simona Ben-Haim⁸, Tali Sharir⁷, Piotr Slomka⁵, Daniel Berman⁵

¹ *Cardiology Department, Nuclear Cardiology, Soroka University Medical Center, Beer Sheva, Israel,* ² *Radiology Department, Nuclear Medicine, Brigham and Women's Hospital, Boston,* ³ *Radiology Department, Cardiac Imaging, Baptist Hospital of Miami and Baptist Cardiac and Vascular Institute, Miami,* ⁴ *Radiology Department, Vanderbilt University Medical Center, Nashville,* ⁵ *Medicine and Imaging Department, Cedars Sinai Medical Center, Los Angeles, USA,* ⁶ *Spectrum Dynamics, Cesarea,* ⁷ *Nuclear Cardiology Department, Procardia, Maccabi Healthcare Services, Tel Aviv, Israel,* ⁸ *Nuclear Medicine Department, UCL, London, United Kingdom*

Background. Recently, a novel high-speed SPECT technology (D-SPECT) has been shown to detect a similar amount of perfusion abnormality compared with conventional Anger camera SPECT (A-SPECT), also normal limits for quantitative analysis of myocardial perfusion by this technology have been validated in a small patient group. To date the relationship of D-SPECT MPI findings to coronary angiography has not been reported.

Methods. We studied 67 patients from four US and two European medical centers who underwent D-SPECT and invasive coronary angiography (ICA) (50 patients) or coronary CT (CCTA) (17 patients) within < 3 months and with no intervening change in symptoms or coronary event in between. Clinical, angiographic and imaging data were transmitted to a core lab (CSMC) for quality control (QC) of LV contours and automated quantitative perfusion analysis. An experienced technologist blinded to the clinical data and imaging results performed the QC. Summed Stress Scores (SSS) ≥ 4 were considered abnormal. Receiver Operator Characteristics (ROC) areas under curve (AUC) were obtained by Analyze-It (v 2.10) statistical package.

Results. The mean age was 62 ± 13 years, 26 (38.8%) were female, the mean BMI was 29.7 ± 9.3 and the rates of diabetes, hypertension, hypercholesterolemia and smoking was 23.9%, 65.7%, 58.2% and 10.4% respectively. History of myocardial infarction, coronary angioplasty and CABG was present in 12(17.9%), 13(19.4%) and 4(6%) of the patients, respectively. Contours required correction in 14 (20.9%) of the studies. The mean SSS was 8.0 ± 9.5 . The sensitivity, specificity, accuracy and area under the curve for detection of $\geq 50\%$ stenosis were 82%, 73%, 78% and 0.83 ± 0.05 . For detection of $\geq 70\%$ stenosis the values were 85%, 68%, 76% and 0.82 ± 0.05 , respectively. When only ICA correlations were considered, the sensitivity, specificity, accuracy and area under the curve for detection of $\geq 50\%$ stenosis were 88%, 76%, 84% and 0.86 ± 0.06 and for detection of $\geq 70\%$ stenosis the values were 90%, 73%, 84% and 0.85 ± 0.06 , respectively.

Conclusions. In this small study of the initial correlations of D-SPECT MPI with coronary angiography, D-SPECT appears to provide diagnostic performance similar to that reported with conventional Anger cameras.