

Effect of left ventricular function on diagnostic accuracy of FDG SPECT

Ichiro MATSUNARI,*¹ Jeroen J. BAX,*² Paul K. BLANKSMA,*³ Frans C. VISSER,*⁴ Sugako KANAYAMA,*⁵
Tatsuya YONEYAMA,*⁶ Stephan G. NEKOLLA,*⁷ Norihisa TONAMI*⁶ and Kinichi HISADA*¹

*¹The Medical and Pharmacological Research Center Foundation, Ishikawa, Japan

*²Department of Cardiology, Leiden University Medical Center, The Netherlands

*³University Hospital, Groningen, The Netherlands

*⁴Free University, Amsterdam, The Netherlands

*⁵Department of Cardiology, Kanazawa Medical University, Ishikawa, Japan

*⁶Department of Biotracer Medicine, Kanazawa University School of Medicine, Kanazawa, Japan

*⁷Nuklearmedizinische Klinik und Poliklinik Technische Universität München, Munich, Germany

Objectives: Fluorine-18 fluorodeoxyglucose (FDG) SPECT has emerged as an alternative to dedicated PET imaging. However, it remains uncertain whether FDG SPECT is as accurate for viability assessment as FDG PET in patients with severely reduced left ventricular function. The aim of the study was to assess the diagnostic accuracy of FDG SPECT in a head-to-head comparison with FDG PET, and divide the patients according to the severity of left ventricular dysfunction.

Methods: A total of 47 patients, with a history of myocardial infarction underwent FDG/perfusion (^{99m}Tc-sestamibi or ²⁰¹Tl) SPECT as well as FDG/¹³N-ammonia PET. The patients were divided into 2 subgroups based on the left ventricular ejection fraction (LVEF) (35% cutoff). The left ventricular myocardium was divided into 13 segments, and each segment was classified as viable or scar using a semi-quantitative scoring system based on defect severity and the presence or absence of perfusion-FDG mismatch. **Results:** Of the 47 patients studied, 23 had LVEF < 35% (low LVEF group; mean 25 ± 7%), whereas the remaining 24 had LVEF ≥ 35% (high LVEF group; mean 47 ± 6%). In the low LVEF group, 213 segments (71%) were dysfunctional, as compared to 102 (33%) in the high LVEF group. The agreement for detection of viability between PET and SPECT in the low LVEF group was 82% (kappa 0.63), which was not different from the agreement in the high LVEF group (85%, kappa 0.66, p = 0.42 versus low LVEF group). **Conclusions:** The results indicate that FDG SPECT can be used for tissue viability assessment regardless of the severity of left ventricular dysfunction.

Key words: SPECT, PET, ¹⁸F-FDG, myocardial viability