Myocardial uptake characteristics of three ^{99m}Tc-labeled tracers for myocardial perfusion imaging one hour after rest injection

Agnieszka Manka-Waluch,* Holger Palmedo,* Michael J. Reinhardt,* Alexius Y. Joe,*
Christoph Manka,** Stefan Guhlke,* Hans-Jürgen Biersack* and Jan Bucerius*

*Department of Nuclear Medicine, University of Bonn, Bonn; Germany
**Department of Radiology, University of Bonn, Bonn; Germany

Objective: ^{99m}Tc-tetrofosmin and ^{99m}Tc-sestamibi are approved tracers for myocardial perfusion studies. Recently, a ^{99m}Tc-MIBI preparation from a different manufacturer (^{99m}Tc-cardiospect-MIBI) has been introduced to the market. Therefore, the aim of this study was the evaluation of ^{99m}Tc-tetrofosmin as well as of two different ^{99m}Tc-labeled MIBI tracers with regard to differences in imaging quality under resting conditions. ***Methods:*** Sixty patients (mean age 63.8 years ± 1.25) with known or suspected coronary artery disease but without evidence of rest-ischemia were included. Twenty patients in each group were examined by a two-day-rest-stress protocol using the three ^{99m}Tc-labeled tracers. Visual analysis of all images was performed by two experienced physicians blinded with regard to the applied tracer. Regions of interest (ROI) were defined over the heart, lung and whole body only in the rest imaging in order to calculate heart-to-lung, lung-to-whole body-, and heart-to-whole body-ratios. ***Results:*** The heart-to-lung ratio was statistically significant higher for ^{99m}Tc-cardiospect-MIBI as compared to ^{99m}Tc-sestamibi as well as to ^{99m}Tc-tetrofosmin. Furthermore, a significantly higher heart-to-lung ratio was found for ^{99m}Tc-sestamibi as compared to ^{99m}Tc-tetrofosmin. The heart-to-whole body-ratio and the lung-to-whole body-ratio were equivalent between all tracers. Visual analysis revealed only slight differences regarding image quality between all tracers. ***Conclusions:*** ROI analysis surprisingly revealed a significant higher myocardial uptake and consequently a higher heart-to-lung ratio for ^{99m}Tc-cardiospect-MIBI. Whether this leads to a better visual image quality has to be evaluated in future studies with larger study populations as well as semiquantitative segmental analysis of the myocardial perfusion images.

Key words: ^{99m}Tc-sestamibi, ^{99m}Tc-tetrofosmin, ^{99m}Tc-cardiospect-MIBI, myocardial uptake, pulmonary uptake