ORIGINAL ARTICLE

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Comparison of gated planar Tc-99m tetrofosmin scintigraphy with radionuclide ventriculography and echocardiography in the evaluation of left ventricular wall motion

Fevziye CANBAZ,* Tarik BASOGLU,* Ozcan YILMAZ,** Mustafa YAZICI** and Murathan SAHIN*

*Departments of *Nuclear Medicine and **Cardiology, Ondokuz Mayis University Hospital, Samsun, Turkey*

Assessment of ventricular function is an important diagnostic and prognostic tool in coronary heart disease (CHD). The objective of this study was to compare radionuclide ventriculography (RVG), echocardiography (ECHO) and gated planar tetrofosmin myocardial scintigraphy (GPTF) in patients with CHD. Radionuclide ventriculography in left anterior oblique (LAO) and left lateral (LLT) projections was performed in 44 patients. Two days later, rest tetrofosmin perfusion tomoscintigraphy (SPECT) and rest GPTF in RVG identical parameters and projections were acquired. Within the two following days, the patients underwent two-dimensional ECHO. GPTF studies were processed and interpreted in original (NI-GPTF) and image inverted, RVG like form (I-GPTF). All visual interpretations were evaluated with a semi-quantitative scoring system. Quantitative analysis was performed on parametric images by means of segmental regions of interest. Linear regression and contingency analysis were carried out in overall analysis and on a segmental basis separately by accepting the RVG as the standard for the whole investigation. In overall cine-mode evaluation, NI-GPTF ($r = 0.77$, $p < 0.001$, complete agreement (CA) = 84%) was superior to I-GPTF ($r = 0.73$, $p < 0.001$, CA = 82%) and ECHO ($r = 0.39$, $p < 0.001$, CA = 78%), compared to RVG. On a segmental basis, NI-GPTF showed the best RVG-correlations except for inferoapical, mid-inferior, mid-anterior and anterobasal segments. In visual analysis of functional images, the best RVG-agreement was observed in I-GPTF ($r = 0.72$, $p < 0.001$, CA = 77%). On a segmental basis, I-GPTF showed the best RVG-correlations except for posterolateral, mid-inferior, mid-anterior and anterobasal segments. In overall quantitative evaluation, amplitude values in both I-GPTF ($r = 0.76$, $p < 0.001$) and NI-GPTF ($r = 0.75$, $p < 0.001$) studies were well correlated with RVG amplitude. I-GPTF gave the best RVG-correlation of phase ($r = 0.59$, $p < 0.001$). The mean phase and standard deviation RVG-correlations of I-GPTF were $r = 0.92$, $p < 0.001$ and $r = 0.53$, $p < 0.001$ respectively. In segmental quantification, amplitude values of all segments in I-GPTF were better RVG-correlated than in NI-GPTF. In conclusion, GPTF could be a time saving alternative to ECHO in the evaluation of wall motion by the nuclear medicine physician. Because of differing segmental RVG correlations, NI-GPTF and I-GPTF should be both interpreted to improve the diagnostic value of the method. Cine-mode and parametric image interpretations in GPTF studies should be done simultaneously since the former is more closely correlated to RVG.

Key words: left ventricular wall motion, planar gated scintigraphy, Tc-99m-tetrofosmin