

Evaluation of left ventricular wall motion and function in patients with previous myocardial infarction by three-dimensional ^{99m}Tc -HSAD multigated cardiac pool imaging

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To evaluate left ventricular (LV) wall motion stereoscopically from all directions and to calculate the LV volume by three-dimensional (3D) imaging, ^{99m}Tc -DTPA human serum albumin-multigated cardiac pool-single photon emission computed tomography (^{99m}Tc -MUGA-SPECT) was performed. A new data processing program was developed with the Application Visualization System-Medical Viewer (AVS-MV) based on images obtained from ^{99m}Tc -MUGA-SPECT. In patients with previous myocardial infarction, LV function and LV wall motion were evaluated by 3D- ^{99m}Tc -MUGA imaging. The LV end-diastolic volume (LVEDV) and end-systolic volume (LVESV) were obtained from 3D- ^{99m}Tc -MUGA images by the surface rendering method, and the left ventricular ejection fraction (LVEF) was calculated at thresholds of 35% (T1), 40% (T2), 45% (T3), and 50% (T4). There was a strong correlation between the LV volume calculated by 3D- ^{99m}Tc -MUGA imaging at a threshold of 40% and that determined by contrast left ventriculography (LVEDV: 194.7 ± 36.0 ml vs. 198.7 ± 39.1 ml, $r = 0.791$, $p < 0.001$; LVESV: 91.6 ± 44.5 ml vs. 93.3 ± 41.3 ml, $r = 0.953$, $p < 0.001$), respectively. When compared with the LVEF data obtained by left ventriculography, significant correlations were found for 3D images reconstructed at each threshold (T1: $r = 0.966$; T2: $r = 0.962$; T3: $r = 0.958$; and T4: $r = 0.955$). In addition, when LV wall motion obtained by 3D- ^{99m}Tc -MUGA imaging (LAT and LAO views) was compared with the results obtained by left ventriculography (RAO and LAO views), there was good agreement.

3D- ^{99m}Tc -MUGA imaging was superior in allowing evaluation of LV wall motion in all directions and in assessment of LV function, since data acquisition and image reconstruction could be done within a short time with the three-detector imaging system and AVS-MV. This method appears to be very useful for the observation of both LV wall motion and LV function in patients with ischemic heart disease, because it is a noninvasive examination.

Key words: ^{99m}Tc -DTPA human serum albumin, 3D-cardiac pool imaging, left ventricular wall motion, left ventricular volume, myocardial infarction