

Clinical application of three-dimensional myocardial imaging: Evaluation of efficacy of medical treatment on myocardial perfusion

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To investigate the clinical applicability of the three-dimensional (3D) myocardial imaging using a newly developed system (the Application Visualization System-Medical Viewer), thallium-201 myocardial single photon emission computed tomography was performed in 19 patients with previous myocardial infarction before and after treatment with nisoldipine. We have developed a new method for automatically reconstructing 3D imaging for the stereoscopic evaluation of myocardial perfusion. The left ventricular myocardial volume with a radioisotope count $\geq 50\%$ of maximum was calculated by using the conventional surface rendering method. With these images, the effect of nisoldipine on myocardial perfusion was assessed and the myocardial volume with a radioisotope count $\geq 50\%$ of maximum was compared. In fifteen (88%) of 19 patients, myocardial perfusion increased in the infarct areas after nisoldipine treatment. Nisoldipine significantly increased the myocardial volume with a radioisotope count $\geq 50\%$ of maximum from 141 ± 17 to 153 ± 18 ml on the stress 3D imagings. These findings indicate that nisoldipine improved myocardial perfusion during exercise. 3D imaging provided stereoscopic assessment of the changes in myocardial perfusion following treatment with nisoldipine and also detected transient enlargement of the left ventricular lumen induced by exercise.

Key words: three-dimensional myocardial imaging, thallium-201 myocardial single photon emission computed tomography, myocardial perfusion, nisoldipine, surface rendering