A new method to evaluate ischemic heart disease: Combined use of rest thallium-201 myocardial SPECT and Tc-99m exercise tetrofosmin first pass and myocardial SPECT

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We developed a new diagnostic method for simultaneously evaluating myocardial ischemia, myocardial viability and ventricular function in less than 90 minutes by combined use of rest thallium-201 (Tl) SPECT and exercise Tc-99m tetrofosmin (TF) first pass and SPECT. The subjects were 9 healthy controls, 19 angina pectoris patients, and 19 old myocardial infarction patients, in all of whom coronary angiography had been performed. Rest Tl myocardial SPECT was performed first, and was followed by exercise TF myocardial SPECT. We also performed first pass radionuclide angiography by TF during maximum exercise on a bicycle ergometer to assess the left ventricular ejection fraction (LVEF). The total examination time was less than 90 minutes. SPECT diagnosis was performed by semi-quantitative analysis. LVEF below 55% was regarded as abnormal. In the patients with angina pectoris, analysis according to the coronary artery showed that the diagnostic accuracy of SPECT was 85.0% for ischemia in the region of the left anterior descending branch (LAD), 87.5% for the left circumflex branch (LCX) and 77.8% for the right coronary artery (RCA). The accuracy of diagnosis for angina pectoris was 82.1%, as determined by SPECT alone, and rose to 89.3% when the LVEF levels were also taken into consideration. In the patients with old myocardial infarction, the diagnostic accuracy of SPECT was 84.2% for the LAD, 92.3% for the LCX and 85.0% for the RCA. Analysis by patients showed that the accuracy of diagnosis for myocardial infarction was 85.7%, as determined by SPECT alone. The diagnostic accuracy, however, rose to 89.3% when the LVEF levels also were taken into consideration. In conclusion, it was demonstrated that this combined diagnostic method was highly reliable for evaluating ischemic heart disease within a short time.

Key words:　^{201}Tl, ^{99m}Tc-tetrofosmin, myocardial SPECT, exercise radionuclide angiography