Combined study with I-123 fatty acid and thallium-201 to assess ischemic myocardium: Comparison with thallium redistribution and glucose metabolism

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To assess the clinical value of combined SPECT imaging with I-123-15-(p-iodophenyl)-3-methyl pentadecanoyl acid (BMIPP) and thallium-201 (TI), the findings were compared with those obtained in a stress TI study and positron emission tomography (PET) with fluorine-18-fluorodeoxyglucose (FDG) in 22 patients with myocardial infarction.

In 20 patients who underwent a stress TI study, among 75 hypoperfused segments, 27 segments exhibited less BMIPP uptake than TI (discordant segments), and the remaining 48 segments showed a similar decrease in BMIPP uptake (concordant segments). Twenty-two of 27 discordant segments (81%) exhibited redistribution on stress TI study. On the other hand, only one of the 48 concordant segments had redistribution ($p < 0.001$).

In 10 patients who underwent a FDG PET study, among 33 hypoperfused segments, seven segments were discordant segments, and the remaining 25 segments were concordant segments. Seven of the eight discordant segments (88%) demonstrated an increase in FDG uptake. In contrast, only five of 25 concordant segments (20%) showed increase in FDG uptake ($p < 0.01$).

Thus, the segments showing discordant BMIPP uptake are considered to be ischemic but viable myocardium. We conclude that combined imaging with BMIPP and TI is a useful mean for evaluating tissue viability in patients with coronary artery disease, but it may underestimate the extent of tissue viability, compared with FDG PET imaging.

Key words: single photon emission computed tomography, I-123 BMIPP, thallium-201, myocardial infarction, fluorine-18-fluorodeoxyglucose