Noninvasive identification of left main and three-vessel coronary artery disease by thallium-201 single photon emission computed tomography during adenosine infusion

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Advanced coronary artery disease, defined as left main or three-vessel coronary disease, was identifiable noninvasively by means of adenosine Tl-201 single photon emission tomography. Among 75 consecutive patients with angiographically documented coronary artery disease, there were 11 patients with the presence (group 1) and 64 patients with the absence (group 2) of advanced coronary artery disease. The lung-to-heart ratio (L/H ratio) of Tl-201 uptake was calculated as the fraction of average Tl-201 counts per pixel in the lung divided by those in the myocardium. The left ventricular dilation ratio (LVDR) was determined as a ratio of left ventricular cavity size in the early image to that in the delayed image. The patients in group 1 had more defects (2.3 ± 0.6 seg. vs. 0.9 ± 0.7 seg., $p < 0.001$), a higher L/H ratio ($35 \pm 4\%$ vs. $28 \pm 5\%$, $p < 0.001$) and a higher LVDR (1.13 ± 0.04 vs. 1.06 ± 0.04, $p < 0.001$) than those in group 2. The diagnostic accuracy of the identification of advanced coronary artery disease was 89% by perfusion defects, 68% by L/H ratio and 81% by LVDR. Stepwise discriminant analysis revealed that LVDR ($F = 36.2$, $p < 0.0001$) and perfusion defects ($F = 8.9$, $p < 0.004$) were the significant and independent discriminators of advanced coronary artery disease.

Identification of patients with left main or three-vessel coronary disease was enhanced by additional analysis of cavity dilation of the left ventricle and increased Tl-201 activity in the lung.

Key words: thallium-201, adenosine, coronary artery disease