

Physiologic capacity of well-developed collaterals in patients with isolated left anterior descending artery disease

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To assess the physiologic significance of well-developed collaterals, 34 patients, with isolated left anterior descending artery disease (LAD) and without overt prior myocardial infarction, underwent cardiac catheterization and exercise thallium-201 emission computed tomography. The patients were divided into 3 groups; 11 patients with 90% stenosis of the proximal LAD and without collaterals (group 1), 11 with 99% stenosis of the proximal LAD, and without collaterals (group 2) and 12 with a total occlusion of the proximal LAD which was completely filled by well-developed collaterals (group 3). On left ventriculography, shortening fractions of the anterior wall were significantly reduced in group 2 as compared to group 1 and 3 (group 1 vs group 2: $p < 0.01$, group 2 vs group 3: $p < 0.05$), which reflected the lower ejection fraction of group 2 ($p < 0.01$ and $p < 0.05$, respectively). The perfusion defects of the anterior wall on both the initial and the delayed images were severer in groups 2 and 3 than in group 1 (group 1 vs group 2 and group 1 vs group 3 on the initial image: $p < 0.01$, for both, group 1 vs group 2 and group 1 vs group 3 on the delayed image: $p < 0.05$, for both). However, recovery of the perfusion defects from the initial image to the delayed image was better in group 3 than in groups 1 and 2 (group 1 vs group 2 and group 1 vs group 3: $p < 0.05$, for both). Therefore, coronary blood flow through well-developed collaterals was considered to be comparable to the flow through a diseased vessel with 90% stenosis at rest. During maximal exercise, blood flow through well-developed collaterals was considered to be comparable to the flow through a diseased vessel with 99% stenosis, although the blood flow through well-developed collaterals was considered to be better than that through 99% stenosis during the recovery period. These findings suggest that patients with well-developed collaterals must be treated like those with severe stenosis.

Key words: well-developed collaterals, exercise thallium-201 scintigraphy