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Washout and redistribution between immediate and two-hour myocardial images using technetium-99m sestamibi

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Abstract

The aim of this study was to assess whether a clinically relevant change in myocardial sestamibi activity could be documented within the first 120 min following injection (p.i.). In 17 patients planar anterior imaging of the heart was performed 5 min and 120 min p.i. During this time interval, mean decay-corrected myocardial activity declined to $77.9\% \pm 9.7\%$ after stress and to $85.7\% \pm 7.9\%$ after injection at rest ($P < 0.05$). In 19 patients with angiographically documented coronary artery disease, single-photon emission tomography was performed 5 min and 120 min after injection at maximum stress. For analysis, sestamibi activity was scored semiquantitatively in six left ventricular segments. Furthermore, sestamibi uptake was assessed quantitatively using a circumferential profile method. In 35 of 114 segments the score improved within 120 min p.i. (early fill-in); in these segments relative sestamibi activity rose from $69.9\% \pm 22.5\%$ to $74.5\% \pm 20.8\%$ ($P < 0.01$). In five patients this early fill-in was the only sign of exercise-induced hypoperfusion. In 7 of 114 segments the score deteriorated 120 min p.i. (early tracer washout); in these segments relative sestamibi activity declined from $85.6\% \pm 9.9\%$ to $80.1\% \pm 10.7\%$ ($P < 0.02$). In three of four patients with early tracer washout the corresponding coronary artery was significantly narrowed. In conclusion, a global myocardial sestamibi washout was registered within the first 120 min after injection. A fill-in of initial defects as well as an early tracer loss could be detected in a relevant number of patients with chronic coronary artery disease during the first 2 h p.i. In these patients the extent of detected reversible perfusion abnormality depends on the chosen time interval between injection and imaging. The results of this study suggest that exercise imaging should be started immediately after injection.