"False-Positive" Myocardial Perfusion Scintigraphy Findings in Patients with Angiographically Normal Coronary Arteries: Insights from Intravascular Sonography Studies

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Abnormal exercise perfusion findings have been described as false-positive for coronary artery disease in patients with suspected angina and angiographically normal coronary arteries.

Methods: The significance of this finding was further investigated by obtaining intravascular sonograms and Doppler guidewire measurements of at least 2 coronary arteries in 20 consecutive patients who had chest pain, normal coronary angiography findings, and positive stress-rest sestamibi SPECT findings. The summed reversible score was used to describe the extent and severity of reversible perfusion defects. On the basis of scintigraphy findings, vessels were grouped as supplying underperfused myocardial segments (target vessels, n = 20) or normal territories (reference vessels, n = 25). The presence and extension of atherosclerotic disease of the epicardial arteries were assessed by intracoronary sonography. Measurements of plaque area (PA), vessel area (VA), and relative cross-sectional PA (RPA) (RPA = PA/VA) were obtained at the site of maximum plaque concentration. The coronary flow velocity reserve (CFR) was assessed during adenosine-induced hyperemia, and the relative flow reserve was calculated as the target-to-reference coronary reserve ratio.

Results: The median summed reversible score was 3 (range, 1-6). Intracoronary sonography showed occult atherosclerosis in 19 patients (95%), with RPA greater than 40% in 16 patients (80%). Mean RPA was significantly greater in the target vessels (46% ± 14%) than in reference vessels (12% ± 18%; P < 0.0001). Doppler flow velocity measurements showed abnormal vasodilation capacity (CFR < 2.5) in 14 patients (70%). Mean CFR was significantly lower in the target vessels than in the reference vessels (2.3 ± 0.5 versus 3.1 ± 0.6; P < 0.0001). A significant inverse correlation was seen between the summed reversible score and the coronary reserve ratio (y = 9.05x − 9.9; r = 0.70; P < 0.005).

Conclusion: Reversible perfusion defects seen on SPECT images are often associated with angiographically unrecognized occult atherosclerotic changes and an abnormal vasodilation capacity of the coronary circulation. The tendency to dismiss abnormal exercise perfusion findings as false-positive in these patients may be unjustified.