

Technetium-99m Sestamibi Cavity/Myocardium Count Ratio in the Detection of Left Ventricular Hypertrophy

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Summary

Background and hypothesis: Left ventricular hypertrophy (LVH) is an independent risk factor for cardiovascular mortality and morbidity. This study was designed to assess whether technetium-99m (^{99m}Tc) sestamibi cavity-to-myocardium count (c/m) ratio would differentiate LVH from normal geometry, and discriminate between the two patterns—concentric and eccentric—of LVH.

Methods: In all, 72 patients including 32 hypertensive patients with both normal ^{99m}Tc sestamibi single-photon emission computed tomography imaging and good-quality echocardiographic recordings were studied retrospectively. Four different patterns of left ventricular (LV) geometry were defined: normal ($n = 47$), concentric remodeling ($n = 3$), eccentric LVH ($n = 13$), and concentric LVH ($n = 9$).

Results: Left ventricular hypertrophy was detected in 22 of 32 hypertensive patients. The c/m ratio calculated on midventricular short-axis slices of dipyridamole-stress ^{99m}Tc sestamibi images was significantly decreased in patients with LVH compared with subjects with normal geometry (0.05 ± 0.02 vs. 0.17 ± 0.08 , $p = 0.001$). A c/m ratio of < 0.124 yielded a sensitivity of 86%, a specificity of 64%, and an overall diagnostic accuracy of 68% for detecting LVH. Negative correlations of c/m ratio were found to LV mass-index ($r = -0.44$, $p = 0.004$), septal width ($r = -0.42$, $p = 0.008$), posterior wall thickness ($r = -0.39$, $p = 0.001$), and relative wall thickness ($r = -0.40$, $p = 0.001$). Multiple linear regression analysis revealed that LV mass index was the single independent predictor of c/m ratio. Although both groups with concentric and eccentric LVH had a significantly lower mean c/m ratio than those with normal geometry ($p = 0.01$ and $p = 0.01$, respectively), no significant difference of c/m ratio was found between the two patterns of LVH.

Conclusion: A new index, c/m ratio on ^{99m}Tc sestamibi images, has a potential to discriminate between LVH and normal geometry in subjects free of myocardial ischemia.

Key words: ^{99m}Tc sestamibi, cavity/myocardium count ratio, left ventricular hypertrophy

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