Influence of Attenuation Correction on Left Ventricular Dilation in Myocardial Perfusion Imaging

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Background: The present study aims to assess the effect of attenuation correction (AC) on transient ischemic dilatation of the left ventricle (LV) (TID) threshold values.

Methods and Results: Ninety six patients assessed for known or suspected coronary artery disease (CAD) (mean age 58+11 yrs, women 15%) underwent dual isotope Tl201 rest-Tc-99m Sestamibi stress myocardial perfusion imaging (MPI) with CT-attenuation corrected (AC) SPECT. Thirty eight patients completed exercise and 58 had a pharmacologic dipyridamole stress test. Severe and extensive CAD was defined as the presence of > 90% stenosis either in the left ascending coronary artery (LAD) or in two or three coronary vessels demonstrated non-invasively using CT coronary angiography. The TID ratio was calculated for AC- and non-AC MPI studies as the ratio of the end-diastolic LV volume at stress divided by end-diastolic LV volume at rest. ROC analysis was used to define the threshold that separated best between patients with and without severe and extensive CAD. Angiographically nonsignificant, mild-moderate, severe/extensive CAD was found in 41 (43%), 25 (26%) and 30 (31%) patients, respectively. In the exercise group a non-AC TID threshold of 1.23 had a sensitivity of 61% and specificity of 62% for indicating severe CAD (P=0.3). The AC-TID threshold was 1.39 with a sensitivity and specificity of 30% and 86% respectively for significant CAD (P=0.5). In the dipyridamole group a non-AC TID threshold of 1.46 had a sensitivity and specificity of 49% and 65% respectively, (P=0.8). The AC-TID threshold of 1.19 had a sensitivity and specificity of 28% and 91%, respectively for diagnosis of significant CAD (P=0.9).

Conclusion: The TID index, a parameter for severity of CAD appears to be affected by AC processing with a decrease in sensitivity and an increase in specificity.