A Novel Low-Dose CT Attenuation Correction Device Mounted on a Dedicated Cardiac System for SPECT. One Center Preliminary Study

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Purpose: Attenuation correction (AC) of SPECT MPI is shown to improve diagnostic accuracy in detection of significant CAD. We examined a low-dose CT transmission module for AC mounted on a dedicated cardiac camera. The aim of the study was to evaluate the efficacy of this low-dose CT for AC in SPECT MPI.

Methods: We examined 125 pts who referred for MPI with suspicion or known CAD with gated SPECT protocol on a cardiac camera supporting CT based AC. The inclusion criteria were obese patients ($\geq$ 30 BMI) or pts who have coronary angiography within 4 months of the study or pts with low probability of CAD. One min CT transmission scan having an effective radiation dose of 0.17 mSv was preformed followed each gated SPECT scan. The sum stress score (SSS) and sum rest score (SRS) using 17 segments model with 5-point scale score (0-4) were evaluated with AC and with no attenuation correction (NC).

Results: There were 44 (35%) women and 81 (65%) men (mean age 63.6± 10.6 years). In 84% of the pts, gated SPECT was performed with Tc 99m sestamibi and in 16% of the pts thallium 201 was used. Image quality was improved when AC was applied ($p<0.0001$. The mean SSS of SPECT with AC and NC were 3.8 ± 5.8 and 6.1 ± 7.1 respectively ($p<0.001$). The mean SRS for AC and NC were 2.6 ± 6.3 and 3.9 ± 7.7 respectively ($p<0.001$). Improved diagnostic confidence (using SSS cutoff of 4), was demonstrated in 23% of the studies, and a change in diagnosis (normal, ischemia or MI) was found in 10% of the studies. In men, all inferior wall attenuation artifacts were corrected. In women, 50% of attenuation breast artifacts were corrected and substantially reduced in the remaining 50%. The specificity was improved from 50% to 85% by AC using SSS cutoff of 4.

Conclusions: The low-dose CT for AC mounted on a dedicated cardiac camera was found to correct for attenuation artifacts and improve image quality as well as diagnostic accuracy.