DIAGNOSTIC PERFORMANCE OF LOW-DOSE ATTENUATION-CORRECTED REST/STRESS Tc-99m TETROFOSMIN MYOCARDIAL PERFUSION SPECT USING THE DNM530C CZT CAMERA (QUANTITATIVE VERSUS EXPERT VISUAL ANALYSIS)

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**Objective**
To compare the diagnostic performance of quantitative analysis (QA) against visual analysis (VA) on rest/stress attenuation correction (AC) Tc-99m tetrofosmin myocardial perfusion SPECT using the DNM530C CZT camera.

**Background**
The DNM 530c SPECT system has a unique design with 19 CZT detectors, each equipped with pinhole collimation, arranged in three rows surrounding the patient in a 180° RAO to RPO arc. During acquisition, the detectors are stationary with the central row of (9) in line with the patient’s heart and rows above and below the heart (5 each) providing views in a more longitudinal direction. Compared to standard SPECT systems, this multiple pinhole design provides very high sensitivity and allows for shorter imaging times and lower radiation doses.1

The unique detector also produces differences in attenuation patterns compared to conventional SPECT. In a study that compared DNM 530c-SPECT to conventional SPECT, some patients with breast attenuation noted in the anterior wall on conventional SPECT had no loss of counts on D530c SPECT. Instead some of these patients had a mild count loss in the inferior wall. Attenuation correction may be performed on the DNM 530c by registering the SPECT scan with a separately acquired CT scan, converting the CT Hounsfield units to 129mTc attenuation coefficients, and incorporating attenuation correction into the MLEM reconstruction. A routine procedure in the clinic where this work was performed, care is taken to position each patient on the CT scanner in the same manner as they are positioned for SPECT.

**Methods**

**Example**

**Stress**
Low dose CT scan acquired on a Discovery NM 530c System Design.

**Results**

**Combined Male/Female**

**Stress/Rest oblique slices and ECTb polar plots for non-AC (for comparison, on the left) and AC. Blackout regions of the polar plots are determined by comparison to the normal database using the abnormality criteria.

**Normal Database Development**
ECTb software was used for processing and interpretation. Forty patients with low (<5%) likelihood (LLK) of coronary artery disease (CAD) were used to define the normal count distribution. An expert reader scored a pilot group of 150 patients using the 17-segment LV model on a 5-point scale (0-4).

**Optimum criteria for abnormality were determined by ROC curve analysis for each of 7 myocardial segments. Abnormality criteria were prospectively validated in 45 CT patients who had coronary angiography within 2 months of the SPECT and in 40 patients with LLK of CAD. Obstructive CAD was defined as a 70% luminal stenosis in at least one major coronary artery.

**DISCLOSURE**
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**Conclusions**
This overall diagnostic performance of quantitative attenuation correction is comparable to that of visual analysis in low-dose Tc-99m tetrofosmin myocardial perfusion SPECT with the DNM530c CZT camera. Quantitative analysis may increase physican’s confidence in image interpretation and can be particularly useful to cardiac readers unfamiliar with the DNM530c camera.