

Oral Presentation by the Author: Monday, June 5 2:50 PM – 3:10 PM Room 6 AB
Part of SNM Continuing Education: Clinical Implementation of Advanced Image Processing Techniques
Poster no. 1124, Scientific Poster Session, Cardiovascular–Clinical Science Posters
Meet the Author II: Sunday, June 4, 6:45 PM – 7:30 PM, Exhibit Hall A

CLINICAL VALIDATION OF THE WIDE BEAM RECONSTRUCTION METHOD FOR SHORTENING SCAN TIME OF GATED CARDIAC SPECT PERFUSION STUDIES

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Objectives: Newly developed reconstruction algorithms enable us to acquire images at half scan times, while maintaining imaging quality. The purpose of this investigation was to clinically evaluate a novel Wide Beam Reconstruction (WBR, UltraSPECT) method for shortening scan time and compare it with filtered back-projection technique (FBP).

Methods: We prospectively studied 50 patients with a mean age of 59 years. All studies were completed using both a standard and a short protocol. The short protocol was performed first on 29/50 patients using eight-frame gated SPECT and low energy high-resolution collimators. Rest TI-201(4.0 mCi) studies were scan for 40 seconds/frame and rest Tc-99m(12 mCi) for 30 seconds/frame. Gated Stress Tc-99m studies (36 mCi) were scanned for 20 seconds/frame. For the short protocols, all parameters remained constant except for the time per frame which was reduced by 50% on Tc-99m studies. All standard scans were processed with FBP and short Tc-99m scans were processed using WBR. The TI-201 rest studies were reprocessed using the WBR algorithm. Distributions including mean, median, and interquartile ranges were examined for all variables. The differences (FBP - WBR) were computed for all variables and were examined using nonparametric signed rank tests to determine if the median difference is zero. The absolute value of the difference was also examined. Spearman rank-order correlation, a nonparametric measure of association, was used for the two methods to determine significant correlations between variables.

Results: Highly significant correlations were observed between WBR and FBP for functional as well as for perfusion variables measured ($p < .0001$). The SSS difference was not statistically different for FBP and WBR, though SRS and SDS were significant. However, further examination of the mean and absolute differences suggests that these were not clinically meaningful differences (absolute differences of 1.58 and 1.70). Left ventricular volumes had a high correlation coefficient but were significantly larger with FBP compared to WBR.(Table)

Conclusions: Based on this sample size, gated cardiac SPECT perfusion studies may potentially be performed with WBR algorithm using half of the scan time, without compromising qualitative or quantitative imaging analysis.

Variable (FBP-WBR)	Mean	Absolute Value-Mean	p-value (signed rank)	Spearman Correlation Coefficient
SSS	0.04	1.88	0.8153	.7559
SRS	-0.86	1.58	0.0103	.7915
SDS	0.90	1.70	0.0120	.5513
Rest Total Defect %	-1.47	4.04	0.2437	.7062
Post Stress EDV	8.54	12.17	0.0001	.9151
Post Stress ESV	3.33	7.16	0.0287	.8327
Post Stress LVEF	0.06	5.98	0.5788	.5925
Stress Total Defect %	-0.94	5.02	0.3556	.7476