

Abstract Submitter: Doctor DePuey, E. Gordon - gdepuey@chpnet.org
Event: ICNC 9 (Barcelona - Spain)
Title: Gated Myocardial Perfusion SPECT with Quarter-time Wide Beam Reconstruction
Evaluation Topic: 00.28 - Instrumentation, software and image processing
Acronym Abbreviation:
Acronym:
On Behalf of:
Options: No

Abstract Authors

[Edit Authors](#)

G. Depuey¹, S. Bommireddipalli¹, J. Clark¹, L. Thompson¹, A. Leykekhman¹, M. Friedman¹, H. Kermany² - (1) St. Luke's-Roosevelt Hospital, New York, United States of America (2) UltraSPECT Ltd., Haifa, Israel

Abstract Content

86%

[Edit Content](#)

Objectives: Compared to standard iterative reconstruction (OSEM), wide beam reconstruction (WBR) incorporates resolution recovery and models noise in the reconstruction process. Previously we reported that WBR half-time acquisitions yield post-stress myocardial perfusion SPECT gated images of equivalent or superior quality to those acquired with full-time OSEM. Now, using a WBR algorithm modified to even further model Poisson noise, we postulate that quarter-time gated perfusion SPECT is feasible.

Methods: Following the IV administration of 1182 MBq of Tc-99m sestamibi, post-stress 8-frame/cardiac cycle SPECT was acquired using 64 stops with 90°-angled dual-headed detectors equipped with high resolution collimators in 208 patients (117 women, 91 men, mean weight 180 lbs.) first full-time (20 sec/stop) and processed with OSEM, then quarter-time (4 sec/stop) and processed with WBR. By blinded visual analysis, gated image quality was graded: 1 (excellent) – 4 (poor). A 5-wall segment model was used to evaluate regional function, which was graded: 0 (normal) – 4 (dyskinetic). Post-stress EDV, ESV, and EF were calculated for both methods.

Results: Despite the lower count density of quarter-time acquisitions, mean image quality was better (1.4 vs. 1.8), ($p=1.1E-20$) with WBR processing compared to full-time OSEM. There were 171 dysfunctional wall segments. WBR and OSEM demonstrated a similar incidence of hypokinetic (101 vs. 93), akinetic (48 vs. 48), and dyskinetic (22 vs. 21) segments ($\chi^2=0.40$, $p=NS$). Of the 1040 total wall segments, the wall motion score differed by >1 grade in none. There was a good correlation of LVEF, EDV, and ESV determined by WBR vs. OSEM (r 's = 0.92, 0.97, and 0.98). ESV's were consistently higher with WBR (52cc vs. 46cc, $p=2.6E-23$) primarily due to more accurate delineation of the valve plane at end-systole, whereas EDV's were similar (94cc vs. 96cc, $p=NS$). Consequently EF's were lower with WBR (49.1 vs. 57.6, $p=1.6E-48$).

Conclusions: Quarter-time WBR, incorporating resolution recovery and enhanced noise reduction, yields gated SPECT diagnostic quality at least equivalent to full-time OSEM, allowing a significant reduction in SPECT acquisition time and/or administered radiopharmaceutical dose.