

## **Validation of a New Fully Automatic Algorithm for Quantification of Gated Blood Pool SPECT: Correlations with Planar Gated Blood Pool and Perfusion SPECT.**

EP Ficaró, RA Quaife, JN Kritzman, JR Corbett.

University of Michigan Health System, Ann Arbor, MI; University of Colorado Health Sciences Center, Denver, CO.

**Objective:** The objective of this study was to develop and validate a new surface detection algorithm for the quantification of LV function from gated blood pool (GBP)SPECT imaging, and compare the results of this analysis with functional results from planar GBP imaging and myocardial perfusion SPECT in the same pt population.

**Methods:** The study consisted of 56 pts (40M, 64±16yrs) who had undergone gated myocardial perfusion SPECT, GBP SPECT and planar GBP imaging. The mean EF in this population was 64±19% (range 16-83%). Planar GBP LVEFs were measured using standard methods from background subtracted end-diastolic and end-systolic ROIs. LV functional analyses of perfusion and GBP SPECT data were performed using the 4D-MSPECT quantitative software package. The surface algorithm, previously validated for perfusion SPECT, was adapted to delineate the GBP LV surface utilizing a combination of gradient and morphologic operations with 2-dimensional weighted splines providing smooth contours throughout the cardiac cycle. From the surface data, LV GBP volumes and LVEFs were estimated. Linear correlations were performed to compare the estimated EFs from the three image data sets.

**Results:** The linear regression analyses from the estimated LVEF data were as follows:

GBP SPECT vs. GBP Planar:  $y = 1.06 * x - 1.58, r = 0.97$

GBP SPECT vs. Perf SPECT:  $y = 0.97 * x + 3.56, r = 0.98$

Perf SPECT vs. GBP Planar:  $y = 1.09 * x - 5.27, r = 0.97$

Overall, each of the correlations was excellent with slope and regression coefficients near unity. Similar results were achieved for the correlations of volume estimates from GBP and perfusion SPECT data.

**Conclusion:** The surface algorithm utilized by the 4D-MSPECT quantitative software package performed very well for both GBP and perfusion SPECT imaging as compared to planar GBP imaging and from the comparison of GBP and perfusion SPECT studies. With the integration of both GBP and perfusion surface algorithms in the same quantitative environment, a more detailed analysis of regional wall motion and the correlation of function and perfusion information for clinical diagnoses should be achieved.