

AbstractID: 6732 Title: Estimation of Ejection Fractions by Three Quantitative Gated SPECT Software Packages.

Purpose: To investigate the accuracy of left ventricular ejection fraction (LVEF) estimated from three quantitative gated SPECT software packages, using echocardiography as a gold standard and the reliability of LVEF from ordered subset expectation maximization (OS-EM).

Method and Materials: Seventy patients with suspected coronary artery disease (CAD) were examined with gated ^{99m}Tc -MIBI SPECT (8 frames/cardiac cycle) at stress. The projection datasets were reconstructed using OS-EM with 8 angles/subset. The data were smoothed with Gaussian filter with FWHM of 8 pixel width. The iteration numbers were varied for each software: 3 iterations for quantitative gated SPECT (QGS), 5 iterations for the Emory cardiac toolbox (ECTb), and 4 iterations for 4D-MSPECT. The LVEFs were calculated using these 3 quantitative software packages. To test reliability of LVEF from OS-EM, the same patient data were again reconstructed using filtered backprojection (FBP) with post-filtering of Butterworth 5th order, 0.3 cycles/pixel cutoff frequency. A two tailed pair t-test was used to test the statistically significant difference with p-value < 0.05.

Results: There were no statistically significant differences in LVEFs for all three software packages from echocardiography with $p > 0.05$. The correlation between LVEF in each pair of package was high ($r > 0.9$). The LVEFs from OS-EM were not statistically significantly different from that from FBP ($p > 0.05$) for QGS and 4D-MSPECT, but for ECTb, there was a statistically significant difference. The LVEF from OS-EM correlated well with that from FBP ($r > 0.9$).

Conclusion: The LVEF estimated from each software package had different characteristics and the LVEF from OS-EM was reliable.