

**Validation of 4D-MSPECT Analysis Method for Tc99m Gated Blood Pool Tomography: Comparison of LV Ejection Fractions and Volumes to Magnetic Resonance Imaging.**

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**Objective:** A limitation in the development of gated blood-pool tomography (g-BPT) as a clinical tool for measurement of LV volumes and function has been the lack of clinically validated automatic processing software. The aim of this study was to analyze the correlation between LV volumes and ejection fractions (LVEF) derived using 4D-MSPECT software for g-BPT in comparison to cardiac magnetic resonance imaging (MRI).

**Methods:** In 22 patients, 19 with ischemic cardiomyopathy, MRI and g-BPT at rest, were performed. Both examinations were carried out within one week in all cases. EF, EDV and ESV were calculated from MR using previously validated ARGUS software and from g-BPT studies using 4D-MSPECT software. Results were compared using a linear regression method and a correlation coefficient was calculated.

**Results:** Excellent correlations were observed for each of the measured variables. LVEF was calculated by MRI and showed excellent correlation with g-BPT (slope 0.85,  $p < 0.0001$ ; intercept 3.53%;  $r = 0.93$ ) over a broad range (EF mean 34.9%, range 12-74%). For EDV and ESV measurements, 4D-MSPECT analysis of g-BPT showed good correlation with MRI over a broad range (83 – 395ml) of volumes. End diastolic volumes tended to be slightly underestimated using the g-BPT analysis compared to MRI (slope 0.86,  $p < 0.0001$ ; intercept 17.65ml;  $r = 0.92$ ). End-systolic volumes from g-BPT showed a similar trend toward underestimation (slope 0.88,  $p < 0.0001$ ; intercept 9.88ml;  $r = 0.96$ ).

**Conclusion:** Gated blood-pool imaging using the 4D-MSPECT program demonstrated excellent correlations to MRI in the calculation of LV ejection fraction, EDV and ESV across a broad range of LV dimensions.