

Half Time Myocardial Perfusion SPECT Acquisition: Effect on Left Ventricular Volume and Ejection Fraction Calculations with the use of Novel Reconstruction Algorithms.

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Introduction: Recently introduced myocardial perfusion SPECT (MPI) reconstruction algorithms such as wide beam reconstruction (WBR, UltraSPECT) allow acquisition of MPI in a reduced amount of time. Since left ventricular ejection fraction (LVEF), end diastolic and **end** systolic volume (EDV, ESV) estimates derived from MPI have patient management implications, it is critical to ensure that the estimates with half time acquisition are as reliable as routine full time acquisition (FTA). Using three different programs (Emory toolbox {ETB}, QGS, and 4DMspect), we prospectively compared LVEF, EDV, ESV estimates obtained with WBR versus routine FTA protocols.

Materials and methods: Forty one patients referred for MPI, male=29 and female=12, mean age=62.82 years (range=35-80) were imaged on a GE Millennium VG Hawkeye gamma camera on FTA (22 minutes acquisition of data) followed by WBR (10 minutes) acquisition protocols. Projection data were processed using routinely accepted methods. The LVEF, EDV and ESV estimates obtained from ETB, QGS, and 4DMspect for both protocols were compared by paired t-test.

Results: The comparison of LVEF by FTA and WBR protocols by paired t-test showed no significant difference in LVEF between routine and half time acquisitions with ETB and QGS (p values .91 and .35 respectively). This suggests that the estimates from the two protocols were comparable and probably interchangeable. However, there was a significant difference with 4DMspect (p value .004). There was also more variation in EDV and ESV data between the two protocols, with statistically different values when ETB and QGS were used (p values 0 to 0.6) but not significantly different with 4DMspect (p values 0.19 and 0.41).

Conclusion: Left ventricular ejection fraction estimates by WBR were comparable to those of FTA with ETB and QGS programs, although not for 4DMspect. The results of our small study suggest that WBR could potentially replace FTA for LVEF estimates. However, larger studies are necessary to clarify the variability in EDV and ESV estimates. Every lab should compare the two protocols and obtain normal thresholds prior to routine use of WBR.