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Imaging

COMPARISON OF AUTOMATED QUANTITATIVE MYOCARDIAL PERFUSION IMAGING UTILIZING THREE SOFTWARE PACKAGES

Poster Contributions

Poster Sessions, Expo North

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Background: Myocardial perfusion imaging (MPI) is widely utilized for assessment of myocardial ischemia and function. This study compared 3 commonly used software programs that quantitate myocardial perfusion defect size (PDS) and left ventricular (LV) volumes and ejection fraction (EF).

Methods: MPI scans of 100 consecutive patients with abnormal perfusion were processed using Quantitative Gated SPECT (QGS), Emory Cardiac Toolbox (ECTb), and 4D-MSPECT (4DM) on a central workstation with automated processing. The following quantitative results were obtained with each software package: LVEF, end-systolic volume, end-diastolic volume, summed stress score (based on 17-segment model), PDS, area of ischemia, and area of scar.

Results: Quantitative data for all programs are shown in Table. LV volumes and EF showed strong correlations between the programs. Assessment of PDS, including areas of ischemia and scar, showed mild-moderate correlations. Bland-Altman analysis revealed systematic errors in the estimation of most parameters with wide, clinically significant, limits of agreement.

Conclusion: Direct comparison of PDS related measurements were only mildly-moderately correlated. When performing serial measurements, it is important to choose a single software package for valid comparisons. All 3 methods have been clinically validated for regional perfusion but should not be used interchangeably.

	Mean Difference	p-value	Spearman's	BA Limits
Left Ventricular Ejection Fraction (%)				
ECTb - 4DM	-0.9 ± 6.6	0.18	0.92	-13.8 - 12.0
ECTb - QGS	3.8 ± 6.6	< 0.0001	0.91	-9.1 - 16.7
QGS - 4DM	-4.7 ± 6.6	< 0.0001	0.92	-17.5 - 8.1
End Diastolic Volume (mL)				
ECTb - 4DM	22.5 ± 22.1	< 0.0001	0.96	-20.6 - 65.7
ECTb - QGS	36.8 ± 27.2	< 0.0001	0.96	-16.2 - 89.7
QGS - 4DM	-14.2 ± 16.2	< 0.0001	0.96	-45.8 - 17.3
End Systolic Volume (mL)				
ECTb - 4DM	12.8 ± 17.5	< 0.0001	0.97	-21.2 - 46.9
ECTb - QGS	14.2 ± 23.1	< 0.0001	0.96	-30.9 - 59.2
QGS - 4DM	-1.3 ± 14	0.35	0.96	-28.7 - 26.0
Left Ventricular Mass (g)				
ECTb - 4DM	2.7 ± 19.2	0.16	0.93	-34.7 - 40.2
ECTb - QGS	-0.5 ± 23.2	0.84	0.90	-45.8 - 44.8
QGS - 4DM	3.2 ± 23.2	0.17	0.84	-42.0 - 48.4
Summed Stress Score				
ECTb - 4DM	-0.4 ± 8.6	0.65	0.45	-17.1 - 16.3
ECTb - QGS	1.1 ± 8.1	0.20	0.46	-14.8 - 16.9
QGS - 4DM	-1.5 ± 7.1	0.04	0.59	-15.2 - 12.3
Perfusion Defect Size (%LV)				
ECTb - 4DM	-5.9 ± 12.1	< 0.0001	0.72	-29.6 - 17.7
ECTb - QGS	3.3 ± 11.3	0.004	0.56	-18.8 - 25.4
QGS - 4DM	-9.2 ± 13.4	< 0.0001	0.56	-35.3 - 16.9
Area of Ischemia (%LV)				
ECTb - 4DM	-5.2 ± 10.4	< 0.0001	0.42	-25.5 - 15.1
ECTb - QGS	-0.02 ± 11.7	0.99	0.18	-22.8 - 22.8
QGS - 4DM	-5.2 ± 11.4	< 0.0001	0.40	-27.4 - 17.1
Area of Scar (%LV)				
ECTb - 4DM	-0.8 ± 12.6	0.54	0.65	-25.4 - 23.8
ECTb - QGS	2.9 ± 13.2	0.03	0.44	-22.8 - 28.6
QGS - 4DM	-3.7 ± 12.6	0.005	0.62	-28.2 - 20.9