

Has Wide Beam Reconstruction technology for myocardial perfusion SPECT any impact on functional cardiac parameters?

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Aim

The Wide Beam Reconstruction(WBR™) technology (UltraSPECT, Israel), is a resolution recovery method based on an accurate modeling of the emission-detection process. This modeling is designed to simultaneously suppress noise and improve image resolution and is optimised specifically for short gated cardiac stress perfusion scans without applying any post-filter. The aim of our study was to compare the quantitative myocardial perfusion(MP) SPECT functional parameters determined based on the image obtained by this new methodology of short acquisition and reconstruction by WBR, with the values calculated on the images obtained through our usual protocol.

Material&Methods

50 patients were randomly selected: 9 women and 41 men, 61±10 years old and weight: 75±12 kg. 13 had history of AMI. After a pharmacological stress test, all patients went through a double stress MP SPECT scan, on the same occasion and on the same gamma camera. The first protocol of acquisition used 30 views with 40 sec/view (2 detectors at 90°) and the images were reconstructed by filtered back projection(FBP). The second protocol used 60 views with 10 sec/view and the images were treated by WBR. All the 100 acquired studies were then processed by the same operator with Cedars-Sinai QGS software. Functional parameters determined were LVEF, EDV, ESV, SMS and STS. Mean and standard deviations were determined. Results were paired for statistical comparison by Student t test and a correlation coefficient(CC) was determined.

Results

The sample size of 100 studies presents a statistical power of 0.80 (for an effect size of 0.6 and an alpha-level of 0.05). Results are shown in the tables below. LVEF and volumes of the two paired groups show no statistically significant difference and a very strong correlation. Summed scores show a statistically significant difference, but with a good CC and with no clinically significant mean differences.

Conclusion

The very good results obtained confirm that this new technology with half of the scan time doesn't influence the main functional parameters obtained in MP SPECT scans (LVEF and volumes). The statistical differences shown for motion and thickening scores don't seem to be clinically relevant, since means and SD differences aren't clinically significant. Therefore, we feel confident in adopting the state-of-the-art WBR for MP SPECT scans, as a strong tool that allows shorter procedures for the patient's welfare, with no compromise on the main cardiac functional parameters.

LVEF, EDV & ESV - Paired FBP & WBR stats		
	T-test	CC
LVEF	< 0.005	0.91
EDV	< 0.005	0.97
ESV	< 0.00001	0.98

SMS & STS - Paired FBP & WBR stats		
	T-test	CC
SMS	0.24	0.87
STS	0.87	0.80

LVEF, EDV & ESV - Mean & SD		
	FBP (mean&SD)	WBR (mean&SD)
LVEF	57.52±10.46	55.62±9.88
EDV	102.34±30.81	105.9±28.7
ESV	45.88±24.44	49.26±23.39

Scores - Mean & SD		
	FBP	WBR
SMS	5.84±8.67	6.64±9.48
STS	4.86±6.77	5.12±7.17