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### Comparison between Filtered Back Projection SPECT Reconstruction and a New Iterative Reconstruction

#### Algorithm: An Anthropomorphic Cardiac Phantom Study

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**Background.** A new iterative reconstruction algorithm (WBR™) has been recently proposed for cardiac SPECT. The WBR™ technology, based on accurate modelling of the emission-detection process, was designed to reduce noise improving lesion detectability without affecting the image resolution. Few data exist on the comparison between filtered back-projection (FBP) and this new algorithm.

**Aim.** The aim of this study was to compare the performance of FBP and WBR™.

**Methods.** An anthropomorphic phantom was acquired with a dual-head@90° camera, equipped with a LEHR collimator. A solution of 99mTcO<sub>4</sub><sup>-</sup> was used to fill the different regions of the phantom: 2 MBq for both right ventricles and heart cavity. Two different activities were used to fill the heart wall: 20.3 MBq (comparable to the activity usually obtained in clinical setting; standard dose) and 10.1 MBq (half-dose). A cold lesion was simulated in anterior, septal, posterior, and lateral region with a 5 cubic cm cold disk inserted in the cardiac wall. For each wall activity and the different lesions, two sets of acquisitions were recorded: one at 20sec/frames (standard time) and one at 10sec/frame (half time). Each SPECT was reconstructed with conventional FBP (Butterworth, 0.4, 10) and with WBR™; a circular ROI was drawn on the short-axis slice better displaying the lesion. An activity-vs.-angular position histogram (circumferential profile) was obtained and the FWHM was calculated for each lesion.

**Results.** The average FWHM in half-time/standard dose (59.2 degrees) and halfdose/standard time (55.3 degrees) WBR™ SPECT were comparable to that of standard time/standard dose FBP SPECT (60.2 degrees). However, the FWHM in half time/half dose WBR™ SPECT (71.1 degrees) was worse than standard time/standard dose FBP SPECT.

**Conclusions.** The new iterative reconstruction algorithm WBR™ compared well in respect to conventional FBP SPECT, allowing half-time or half-activity studies. However, further studies are needed to verify the potential clinical application of this method.