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IQ-SPECT multifocal collimator myocardial perfusion imaging in clinical practice

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Introduction
High image quality with short acquisition times and/or radiation reduction is possible with new cardiac dedicated solid-state cameras but these are not widely available. Smartzoom multifocal cardio-focused collimation allows half and quarter acquisition times with high quality images using conventional NaI camera SPECT.

Purpose
We aim to assess the performance of IQ SPECT MPI in every day clinical practice.

Methods
We studied 492 consecutive patients (57.3% female, age: 68.2 ± 10.6 years, BMI: 29.8 ± 4.8) for diagnosis or prognostic assessment of coronary artery disease with IQ SPECT MPI on a Symbia Intevo 6 camera using 99mTc-tracers at standard doses. Acquisition parameters were 208º scan arc, 6 angular steps, 17 views/detector, 9 seconds/view, angle between detectors set at 76º and matrix 1282 with a total acquisition time of 5 minutes. Reconstruction included resolution recovery, CT-based attenuation correction (AC) and energy window-based scatter correction. Stress was low-level exercise combined with regadenoson in 356 and adenosine in 136 and patients respectively. Normalcy rate using a low pretest likelihood of disease and LVEF quantification were obtained and compared to that of 461 previous patients (52% male, age: 64.6 ± 11.7 years, BMI: 30.2 ± 7.3) who underwent SPECT using a standard hybrid camera (180º arc, 30 views/detector, 12 seconds/view, 90º angle and matrix 1282) with OSEM-RR reconstruction with CT-AC and total acquisition time 12 minutes, all other procedure parameters identical. One-year cardiac event rate was obtained from the 327 patients with at least one year of follow-up.

Results
Images were of good quality and showed the typical hot apex on uncorrected images and slight apical thinning on CT-AC images. MPI was reported as normal in 44.3%, abnormal in 54.5% and equivocal in 1.2% of patients respectively. Normalcy rate was 61%. In the standard camera group reports were normal in 46.7%, abnormal in 51.3% and equivocal in 2% of patients respectively and the normalcy rate was 57.8%. Mean post-stress LVEF in normal perfusion patients was 64.7% ± 9.5 vs 63.3% ± 11 for the standard SPECT group. In patients with normal perfusion, at one year there were no deaths but one diagonal branch revascularization in a female patient.

Conclusions
IQ SPECT produces ultrafast images of good quality with a characteristic apex pattern to be learned for correct reporting, not to be mistaken on uncorrected images with the "solar map" of apical hypertrophic cardiomyopathy.