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## ABSTRACT

**Background:** Left ventricular relaxation abnormalities are one of the earliest manifestations of cardiac dysfunction and usually precede systolic dysfunction in many cardiac diseases. Equilibrium Radionuclide Angiography (ERNA) is an established gold standard for the assessment of left ventricular diastolic function in nuclear cardiology. The aim of this study was to determine the feasibility of assessing the left ventricular diastolic function parameters by edge detection method with ECG-gated single photon emission tomography (SPECT) data and comparison of these parameters with the ERNA.

**Material and Methods:** Twenty-four patients undergone gated SPECT and ERNA at 32 frames per cardiac cycle on two consecutive days. All patients were having EF > 45% and normal sinus rhythm on ECG. 925MBq <sup>99m</sup>Tc Sestamibi was injected for gated myocardial SPECT rest study at 32 frame rate after 30-60 minutes of injection. The LV volumes for each frame calculated from QGS software and 5 and 8 harmonics of Fourier series were retained for the analysis of LV volume curve. From this fitted curve and its fitted curve we derived the diastolic function parameters i.e. peak filling rate (PFR) and time to peak filling rate (TPFR). All patients underwent ERNA at same frame rate after labeling of RBCs with 925 MBq of Pertechnetate (TcO<sub>4</sub>).

**Results:** Good correlation noted for PFR and TPFR at both 8 (r =0.85, p <0.0001 and r = 0.87, p <0.0001) and 5 harmonic (r =0.847, p <0.0001 and r =0.848, p <0.0001) Fourier fitting by both the ERNA and Gated myocardial SPECT. Paired Student *t* test showed that two techniques are not significantly different. Bland Altman plots did not reveal any significant degree of direction bias at same harmonics for both parameters.

**Conclusion:** Left ventricular diastolic functional parameters obtained from 32-frame myocardial gated SPECT correlate closely with those determined with the ERNA at same frame rate and same conditions. Five harmonic Fourier fitting of time activity curve is optimal for calculation of diastolic function parameters.