

## Left ventricular ejection and filling rate measurement based on the automatic edge detection method of ECG-gated blood pool single-photon emission tomography

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The objective of the present investigation was to determine the feasibility of assessing left ventricular systolic ejection and diastolic filling via the automatic edge detection method employing ECG-gated blood pool single-photon emission tomography (SPET GBP) data. **Methods:** Thirty-five patients, who had undergone both SPET GBP and ECG-gated equilibrium blood pool scintigraphy by the planar method (planar GBP), were enrolled in this study. Planar GBP was performed with a single-headed gamma camera. From the left anterior oblique projection, data were acquired at 24 frames/cardiac cycle with ECG-gating during the equilibrium state. SPET GBP was conducted utilizing a triple-headed gamma camera, with 60 projection views over 360 degrees by 60 sec per view, in 16 frames/cardiac cycle. In each frame, left ventricular volume was determined by automatic edge detection employing a quantitative gated SPET program. Additionally, the time-volume curve was fitted by the 4th harmonics of Fourier transform. Ejection fraction (EF, %), peak ejection rate (PER, /sec), peak filling rate (PFR, /sec) and mean filling rate during the initial one-third of diastolic time (1/3 FRm) were calculated from the fitted curve. These parameters were also calculated with planar GBP data. **Result:** Left ventricular ejection and filling parameters were calculated by SPET GBP with the automatic edge detection program for all patient data. Correlation coefficients of EF, PER, PFR and 1/3 FRm between SPET and planar GBP were 0.91 ( $p < 0.001$ ), 0.82 ( $p < 0.001$ ), 0.78 ( $p < 0.001$ ) and 0.74 ( $p < 0.001$ ), respectively. **Conclusion:** Ejection and filling rates can be calculated using SPET GBP with the edge-detection software. These parameters displayed significant correlations with those values obtained via planar GBP. Additional studies are warranted to determine the reliability of parameters with SPET GBP.

**Key words:** gated SPET, blood pool scintigraphy, ejection fraction, filling rate, ejection rate