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# Left ventricular systolic/diastolic function evaluated by quantitative ECG-gated SPECT: comparison with echocardiography and plasma BNP analysis

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***Objective:*** The aim of this study was to evaluate the left ventricular (LV) functional parameters calculated using quantitative electrocardiography (ECG)-gated myocardial perfusion single photon emission computed tomography (QGS). In addition to LV systolic parameters, diastolic parameters were compared with those by ultrasound echocardiography (UCG) and also with plasma B-type natriuretic peptide (BNP) concentrations. ***Methods:*** We examined 46 patients with various forms of heart disease. By the QGS data with 16 framing data acquisition using technetium (Tc)-99m methoxyisobutylisonitrile (MIBI) perfusion, we calculated the following parameters: LV end-diastolic volume (EDV), end-systolic volume (ESV), ejection fraction (EF), peak filling rate (PFR), filling rate during the first third of the filling time (1/3FR) and first third filling fraction (1/3FF). By UCG, we measured mitral early to atrial (E/A) wave velocity ratio and pulmonary venous inflow systolic/diastolic (S/D) ratio as diastolic functional parameters. Plasma BNP concentrations were also measured. ***Results:*** There was a significant correlation between LVEDV, ESV and EF measured by QGS and UCG (EDV, $r = 0.71$, $p < 0.001$; ESV, $r = 0.82$, $p < 0.001$; EF, $r = 0.75$, $p < 0.001$). The PFR, 1/3FR and 1/3FF obtained by QGS correlated positively with E/A ratio (PFR, $r = 0.54$, $p < 0.001$; 1/3FR, $r = 0.61$, $p < 0.001$; 1/3FF, $r = 0.42$, $p < 0.01$) and negatively with S/D ratio (PFR, $r = –0.40$, $p < 0.01$; 1/3FR, $r = –0.38$, $p < 0.05$; 1/3FF, $r = –0.39$, $p < 0.01$) obtained by UCG. Plasma BNP concentrations in EF < 50% patients were greater than those in EF ≥ 50% patients (335.2 ± 60.2 vs. 101.2 ± 41.3 pg/m*l*, $p < 0.01$, both $n = 17$). Plasma BNP levels were also compared between higher and lower 1/3FF patients matched for LVEF. Plasma BNP concentrations in 1/3FF < 35% patients were significantly greater than those in 1/3FF ≥ 35% patients (312.9 ± 62.5 vs. 120.5 ± 32.8 pg/m*l*, $p < 0.05$, both $n = 14$). ***Conclusions:*** The degree of LV systolic and diastolic dysfunctions evaluated by QGS correlated with that by UCG or BNP. The QGS functional parameters offer useful information regarding cardiac failure.

**Key words:** diastolic function, quantitative ECG-gated SPECT, echocardiography, BNP