
To assess left ventricular (LV) relaxation, ECG gated radionuclide cardiac pool study was performed in the LAO-45 view in 78 patients (11 normal). 22 angulated sectors (AP 24 myocardial infarction, 6 HCM, 9 CCM). The ratio of increment LV volume from minimal volume to 100sec to the enddiastolic LV volume was expressed as early filling volume rate (EFV). The time constant (τ) of LV pressure during isovolumic relaxation was measured in 29 patients by Weiss method. The correlation between EFV and τ was significant (r = 0.70). Compared with N(1.4 ± 1.2), EFV was significantly lower (p < 0.001) in AP (6.0 ± 1.5), MI (4.6 ± 1.1) and CCM (4.7 ± 0.1). The peak filling rate (PFR), the filling fraction during first third of diastole (1/3 FF) and mean first third filling rate (1/3 FMR) now using the index of LV diastolic performance, were used to express the sign of abnormality. In addition, in PFR, 1/3 FFR and 1/3 FPR, above 25% of the diseased heart had overlap with N, in the other hand there was no overlap in EFV between LV and end diastole. These results indicate that EFV can reflect LV relaxation and is a sensitive index for evaluating LV early diastolic property.


In order to improve the reliability in evaluating left ventricular (LV) diastolic performance by radionuclide ventriculography (RVG), we developed a new gating technique using ECG R wave and second heart sound (S2) as triggering pulses. In this technique the data from gamma camera in the equilibrium RVG were collected in 1st mode and these pulses and time markers (every 10 msec) were inserted into 1st data stream. To obtain relative LV volume (LVV) curves, we constructed three types of multiple-gated images by (1) R-synchronized forward formatting for analysis of systolic events (ejection fraction - EF & peak ejection rate - PER), (2) S2-synchronized forward formatting for analysis of early diastolic events (filling fraction - FF & peak filling rate - PFR) and (3) R-synchronized backward formatting for analysis of late diastolic events (peak filling rate - PFR - A0 & LVV increment by atrial contraction/stroke volume - A0/SV). In 10 normals and 17 patients with coronary artery disease (CAD), LV filling process was observed by this method. Consequently, in CAD group this method improved the detection of early impairment in LV rapid filling and of compensatory augmentation in late filling by atrial contraction.