We have evaluated left ventricular filling during supine bicycle exercise (Ex) in patients with coronary artery disease (CAD) by radionuclide ventriculography using forward and backward ECG gating technique. Seven normal subjects (N), eight pts (MI) with myocardial infarction and 15 pts (EA) with effort angina were studied. Peak filling rate (PFR) and filling fraction (FF) at the first third of diastole were employed as indices for diastolic filling. In N PFR increased from 2.6 ±0.4 at rest (R) to 4.7±1.0 EDV/sec during Ex (p<0.001). There was no significant difference between FF at R and during Ex (48±8 vs. 49±10, NS). In MI PFR increased from 7.7±0.6 to 3.6±1.0 EDV/sec during Ex (p<0.001). FF in MI were 31±12 at R and 29±14% during Ex (NS). In EA PFR also increased during Ex (2.0±0.5 vs. 3.4±0.4, p<0.05), but the extent of increase in PFR was smaller than that in N. During Ex, FF in EA decreased from 38±9 to 31±9% before the development of chest pain and further decreased to 27±7% during angina. These results indicate that left ventricular diastolic filling seems to be impaired before the appearance of clinical evidence of ischemia.

To evaluate LV functional reserve, we applied nitroglycerin (NTG) drip infusion (DIV) instead of NTG tablet or bolus injection as unloading agent for obtaining a well spatial–resolution image in multigated blood pool imaging. NTG (16.7–100 μg/min) has been injected by DIV to 31 patients which include coronary artery disease (CAD), hypertensive heart disease (HHD), congestive cardiomyopathy (CCM), until the heart rate was increased by at least 5 beats a minute without elevation of their blood pressures, and sublingual tablets were given to the another three cases. Standard deviation of heart rate measured each minute during imaging in sublingual method was significantly larger than that in DIV method (4.9±1.4/min and 2.2±1.3/min, respectively, p<0.005). In 8 patients with CAD, 3 with HHD and 2 with CCM, of which we evaluated LV functional reserve, NTG increased global LV ejection fraction from 51±6±13.2% to 56±6±12.9% (p<0.05) and also significantly improved regional wall motion and radial chord shortening in posterolateral segment. These results suggested that the drip infusion method could be a better approach of NTG unloading rather than the sublingual one for equilibrium multigated blood pool imaging.