First-pass radionuclide angiography was performed at rest with a multicrystal gamma camera in RAO projection at the framing rate of 20 msec. LV time-activity curve was obtained by summing several cardiac beats selected from LV phase. No curve fitting was done. From the curve and its first derivative, following indexes of cardiac performance were calculated: EF (Ejection fraction), PER (Peak ejection rate), PFR (Peak filling rate), TPF (Time to peak filling), 1/3EF and 1/3ER (Ejection fraction and Mean ejection rate of first third of systole respectively, normalized by end-diastolic count), 1/3FP and 1/3FR (Filling fraction and Mean filling rate of first third of diastole respectively, normalized by the count at the end of the first third of diastole).

Patients with myocardial infarction (MI) showed significantly lower PER, 1/3EF, 1/3ER, PFR, 1/3FP and 1/3FR than normal group. Those with angina pectoris had significantly lower PFR than normal group. Some patients with angina or MI had normal EF but lower PFR than normal. Some patients with HCM showed longer TPF than normal.

Gated blood pool scan offers a noninvasive means of assessing left ventricular function at rest and during exercise. The adequacy of left ventricular function during exercise has been proposed as a reliable method for identifying patients with coronary artery disease. Of 30 cases, group A (n=11) showed increase in EF (0.05), group B (n=9) increase in EF < 0.05 and higher LVEF at rest and group C (n=10) increase in EF < 0.05. Then, cardiac output was obtained by standardized stroke volume and heart rate. 

ΔEF (increment of cardiac output) of group A was 8.7±3.14, those of group B was 2.56±1.17 and those of group C was 0.30±3.16. 

ΔCO (increment of cardiac output) of group A was 109±601, those of group B was 1256±576 and those of group C was 31±575. 

In group B, although CO data, it may be identified patient with CAD because of increase in EF during exercise of <0.05. Increment of cardiac output will be a reliable parameter to determine patients with CAD.

The time to peak diastolic dV/dt and the time to 1/3 filling from the onset of LV filling were prolonged in patients with mitral stenosis (MS) or constrictive cardiomyopathy (CCM), compared with normal subjects (N) or constrictive pericarditis (CP). Though LV was filled more than 45% in first third of diastolic period in N or patients with CP, only 30% or less in patients with MS or CCM.

Percent filling of LV within 200 msec, 150 msec or 100 msec before end-diastole was calculated. More than 40% of filling was achieved within 100 msec in patients with CCM, in comparison of 10% in N.

To assess the contribution of atrial contraction (AC) to left ventricular (LV) filling in patients with prior myocardial infarction (MI), LV volume (LVV) changes during rapid filling (RF) phase and AC phase were studied by list-mode radionuclide ventriculography using ECG R wave forward and reverse gated techniques. Ejection fraction (EF), peak filling rate during RF phase (PFRRF) and during AC phase (PFRAC), and LVV increment with AC/stroke volume (ACSV) were determined in 15 normals (N), 19 pts with CAD without prior myocardial infarction (MI) (CAD-1) and 19 pts with MI; 12 with small MI (CAD-2; total CPK released <1000IU) and 7 with large MI (CAD-3; total CPK released >10000IU). The results:

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\text{EF} (\%) = \frac{\text{LVV - LVV_{diast}}}{\text{LVV_{diast}}} \\
\text{PFRRF} = \frac{\text{dLVV/dt}_{RF}}{\text{LVV}_{diast}} \\
\text{PFRAC} = \frac{\text{dLVV/dt}_{AC}}{\text{LVV}_{diast}} \\
\text{ACSV} = \frac{\text{LVV}_{AC} - \text{LVV}_{RF}}{\text{LVV}_{RF}} \\
\]

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\text{CAD-1 and -2 with the decrease in PFRRF showed a significant increase in PFRAC and ACSV compared with N. However, those in CAD-3 showed no increase in spite of the decrease in PFRRF. Thus, the atrial contribution to LV filling is limited in pts with large MI.}
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