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ANALYSIS OF LEFT VENTRICULAR TIME-ACTIVITY CURVE OBTAINED FROM FIRST-PASS RADIONUCLIDE ANGIOGRAPHY WITH AUTOFLUOROSCOPE.

M.Senda, N.Tamaki, K.Torizuka, Dep. of Nuclear Med. Kyoto Univ. H.Ito, Y. Saiki, H. Tochio, H. Yamaguchi, K. Ikekubo, H. Kato and J.Yoshikawa, Kobe Central Municipal Hosp.

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), TPE(Time to peak ejection), 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), 1/3FF 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,1/3FF 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.

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THE ANALYSIS OF THE LEFT VENTRICULAR FILLING BY SEQUENTIAL TWO-BEAT LEFT VENTRICULAR VOLUME CURVE OBTAINED BY A NEWLY-DEVISED ECG-GATED EQUILIBRIUM CARDIAC SCINTIGRAPHY.

M.Tani, M.Akaishi, H.Yamazaki, S.Handa, Y. Takagi, K.Ogawa, T.Sanmiya and A.Kubo. School of Med. Keio University. Tokyo.

To assess the left ventricular (LV) filling pattern up to the end-diastole, we obtained sequential two-beat LV volume curve (VC) in 37 patients with various cardiac diseases with normal sinus rhythm. With gate of an odd number of R wave, an every odd one was accumulated on the first beat of LVVC and an every even one was on the second. ECG-gated equilibrium radionuclide angiocardiography was performed in the craniocaudal LAO projection during 15 minutes after injection of 25-30 mCi Tc-99m-albumin. Left ventricular region of interest was semi-automatically (80% threshold) drawn on the end-diastolic image.
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 congestive 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.

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EVALUATION OF CHANGES IN LEFT VENTRICULAR VOLUME DURING EXERCISE BY GATED BLOOD POOL SCAN.

K.Hayashida, T.Nishimura, T.Uehara, and T.Kozuka. Dept. of Radiology, National Cardiovascular Center, Suita.

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 8.73±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 1098±601, those of group B was 1256±576 and those of group C was 391±575.
In group B, without ΔCO data, it may be identified patient with CAD because of increase in EF during exercise of <0.05.
In crement of cardiac output will be a reliable parameter to determine patients with CAD.

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LIMITATION OF THE ATRIAL CONTRIBUTION TO LEFT VENTRICULAR FILLING IN PATIENTS WITH PRIOR MYOCARDIAL INFARCTION.

Y.Ishida, BH. Kim, Y.Tsuneoka, T.Hiraoka, M.Fukushima, M.Matsumoto, M.Inoue, H.Abe, K.Kimura*, K.Kusumi*, Y.Nakamura*. The First Dep't of Med. and the Division of Nucl. Med.*, Osaka University Medical School, Osaka.

To assess the contribution of atrial contraction(AC) to left ventricular(LV) filling in patients(pts) with coronary artery disease(CAD), 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(PFR-RF) and during AC phase(PFR-AC), and LVV increment with AC/stroke volume(AC/SV) 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;>1000IU). The results:

	EF(%)	PFR-RF	PFR-AC	AC/SV(%)
N	59.1±5.0	2.6±0.6	0.9±0.4	15.5±7.5
CAD-1	56.1±7.2	1.8±0.4*	1.2±0.5*	27.2±8.1*
CAD-2	50.4±12.0	1.6±0.4*	1.0±0.4	25.0±7.0*
CAD-3	33.1±9.1*	1.3±0.4*	0.4±0.2	11.0±8.0

* p<0.05 vs N, mean±SD, PFR, EDV/sec

CAD-1 and -2 with the decrease in PFR-RF showed a significant increase in PFR-AC and AC/SV compared with N. However, those in CAD -3 showed no increase in spite of the decrease in PFR-RF. Thus, the atrial contribution to LV filling is limited in pts with large MI.