

222

EVALUATION OF LEFT VENTRICULAR RELAXATION USING ECG GATED RADIONUCLIDE CARDIAC POOL SCAN. T.Ikezono, M.Ozaki, T.Yamagishi, T.Shimizu, Y.Matsuda, T.Kumada, R.Kusukawa, A.Arima*, A.Matsuura*, M.Katayama*, Yamaguchi Univ., Ube, Japan. *Yamato Hospital., Kumage gun, Yamaguchi Pref, Japan.

To assess left ventricular(LV) relaxation ECG gated radionuclide cardiac pool study was performed in the LAO-45 view in 78 patients(17 normal(N), 22 angina pectoris(AP), 24 myocardial infarction(MI), 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(T) of LV pressure during isovolumic relaxation was measured in 29 patients by Weiss method. The correlation between %EFV and T was significant($Y=30 + 68/X$, $r=0.69$, $p < 0.001$). Compared with N(11.4 ± 1.2), %EFV was significantly lower($p < 0.001$) in AP(6.1 ± 1.5), MI(6.0 ± 1.5), HCM(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 FRm) now using the index of LV diastolic performance were not correlated with T. In addition, in PFR, 1/3FF and 1/3FRm, above 25% of the diseased heart had overlap with N, on the other hand there was no overlap in %EFV between N and diseased heart. These results indicate that %EFV can reflect LV relaxation and is a sensitive index for evaluating LV early diastolic property.

224

RADIONUCLIDE VENTRICULOGRAPHY USING AN ECG R WAVE AND SECOND HEART SOUND SYNCHRONIZING TECHNIQUE. Y.Ishida, K.Yamamoto, BH.Kim, Y.Tsuneoka, T.Hiraoka, M.Fukushima, M.Matsumoto, M.Inoue, H.Abe, K.Kimura*, Y.Kusumi* and Y.Nakamura* 1st Dept.of Med. & Div. of Nucl.Med.*, Osaka Univ.Med.School, Osaka.

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(R) and second heart sound (S2) as triggering pulses. In this technique the data from gamma camera in the equilibrium RVG were collected in list mode and these pulses and time markers(every 10 msec) were inserted into list 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-AC & LVV increment by atrial contraction/stroke volume-AC/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.

223

FILLING FRACTION AS DIASTOLIC FUNCTION INDEX OBTAINED BY GATED RADIONUCLIDE ANGIOCARDIOGRAPHY. H.Adachi, H.Sugihara, T.Ishizu, O.Shimamura, H.Katsume, M.Ochiai and H.Ijichi, Department of Medicine, Kyoto Prefectural University of Medicine and Kyoto Prefectural Rakuto Hospital, Kyoto.

To evaluate diastolic filling fraction of left ventricle(LV), filling fraction obtained from gated radionuclide angiocardiology (GRNA) was studied in various heart disease. GRNA was performed in modified LAO projection, and LV count curve generated from fixed ROI on LV was analysed. Diastolic phase was divided into three time segments; end-systole to the first one third of diastole(F1), to the second one third(F2) and to end-diastole. Filling fraction(FF) was derived from the filling counts in F1 or F2 divided by stroke counts. Compared with FF1 from normal subjects ($67 \pm 9\%$), FF1 decreased in the patients with old myocardial infarction($38 \pm 16\%$), hypertensive heart disease($35 \pm 10\%$), hypertrophic cardiomyopathy($29 \pm 14\%$) and pericardial disease ($31 \pm 7\%$), although ejection fraction was normal or increased in the latter four disease. There was a good negative correlation between FF1 in the patients with hypertension and the wall thickness(IVST+PWT) of LV measured with M-mode echocardiography. As well as ejection fraction, filling fraction was relatively easy to obtain from GRNA, and an useful index of diastolic LV function.

225

THE DETECTION OF LEFT VENTRICULAR DYSFUNCTION THROUGH ANALYSIS OF LEFT VENTRICULAR DIASTOLIC PERFORMANCE. T.Shiraishi, A.Kobayashi, T.Hasegawa, T.Murata, M.Nakazawa, Y.Tanaka, Y.Watanabe, A.Sakai and M.Inada, Department of Radiology and Internal Medicine, Kansai Medical University. Osaka.

Patients with mild coronary arterial disease (LVEF greater than 50% at rest) were made to exercise and then divided into an EF increase group and EF decrease group. A control group was included and a three way cross comparison made of the left ventricular diastolic performance as follows. An index of the left ventricular diastolic phase was derived, for each of the three groups, from the diastolic volume curve using the second heart sound gated equilibrium method. Each index is made up of the Peak deviation, Peak Time deviation and Shift deviation from sine curve in the rapid filling phase and the Rapid Filling ratio [R/(R+A)]. Cross comparison of these indices yielded the following results. No difference was found in the systolic and diastolic functions between the control and increase groups. Nor was any difference found in the systolic function at rest between the increase and decrease groups. However, a difference was observed between the increase and decrease groups in the systolic function during exercise and the diastolic function at rest. It is thus possible to detect mild left ventricular dysfunction through analysis of left ventricular diastolic performance at rest.