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EFFICIENCY MEASUREMENTS OF CARDIAC PUMP FUNCTION BY MEANS OF RADIONUCLIDE VENTRICULOGRAPHY.

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Conventional scintigraphic indices of the cardiac status, describe the ventricle as an isotropic structure. We propose an analysis of the regional volume changes as measured by radionuclide ventriculography, which emphasises the anisotropic character of the ventricular pump function. Three indices (Eff, Ci, Fi) are calculated. The indices are related to the efficiency of the heart defined as the ratio of the work performed by an "ideal" synchroneous pump, to the actual work performed by the asynchroneous ventricle during diastole (Fi), systole (Ci), or the complete cycle (Eff). In patients with proven CAD, all 3 parameters decrease significantly with increasing severity of RWMD as evaluated on contrast ventriculography. There exists only a poor correlation between the decrease in Ci and Fi in the group of patients with localised hypokinesis, where the decrease in Fi is more severe than the decrease of Ci.

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EVALUATION OF LEFT VENTRICULAR FUNCTION BY DOUBLE RADIOISOTOPES.

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We evaluated left ventricular(LV) function by composition of Tl-201 myocardial scintigram and Tc-99m cardiac pool image. The patient was placed in 30° left anterior oblique projection. Data were acquired by using a scintillation camera equipped with a high sensitivity parallel hole collimator and a mini-computer. Myocardial images were sampled for 20min by ECG multi-gated method after injection of 2mCi Tl-201, and cardiac pool images were also acquired for 500sec by same method after 20mCi Tc-99m RBC injection. The myocardial image was subtracted from the cardiac pool image in temporal same phase so that inner edges of myocardium were clarified. These images were finally composed and analyzed for evaluation of LV function. The composed images provide spacial relationship between regional wall motion of LV and Tl-201 distribution in myocardium. While true thickness of myocardium can not be measured due to the worse resolution of the scintillation camera, useful informations about myocardial thickness can be relatively obtained by this method.

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CARDIOFUNCTIONAL ESTIMATION BY DYNAMIC RI HEART ANGIOGRAPHY OBTAINED FROM CONVENTIONAL STUDY WITHOUT COMPUTER SYSTEM.

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Evaluation of cardiac function by RI angiogram has usually been performed using computerized method, such as LV ejection fraction, and dynamic images of RI angiography was almost limited to judge morphologic diagnosis. Then we studied that whether cardiac function using visualizing time of LV image with dynamic study was available. The population for this study was 26 patients with myocardial infarction, angina pectoris, cardiomyopathy and arrhythmias, and examined 28 times. They had been injected 15mCi of Tc-99m RBC, dynamic images obtained every 1.5-2.0sec. interval, and underwent multigated equilibrium cardiac blood imaging studies. The correlation between visualizing time and ejection fraction was significance($r=-0.684$, $p<0.001$). Secondary we studied that visualizing time of LV image compared with NYHA classification about the patient with and without vaivular disease, it was considered that the patient with advanced heart failure tend to prolonge visualizing time of LV image. The inference of cardiac function by RI angiographic visualizing time of LV image, it's favorable point is donnot needed computer system, is easy and useful method.

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USEFULNESS OF DIASTOLIC PHASE INDEX OBTAINED BY GATED BLOOD POOL IMAGING IN PATIENTS WITH LEFT VENTRICULAR HYPERTROPHY.

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The purpose of this study is to evaluate the usefulness of diastolic phase index in patients with left ventricular hypertrophy (LVH). Multi-gated cardiac blood pool imagings were obtained at 40 degree left anterior oblique position after Tc-99m was labeled with RBC in vivo. Twenty normal subjects, 15 patients with hypertrophic cardiomyopathy (HCM) and 7 patients with hypertensive LVH (HT) were examined. From the LV volume curve, following systolic and diastolic indexes were obtained; LVEF and mean first third ejection rate (1/3ERm) as systolic phase indexes, mean filling rate during the first third of diastole (1/3FRm) and maximal filling rate during the whole diastole as diastolic phase indexes.

Systolic phase indexes could not separate LVH from normal subjects. But among diastolic phase indexes, 1/3FRm could separate LVH from normal subjects significantly (Normal 2.24±0.25, HCM 1.46±0.36, HT 1.14±0.58 sec^{-1}). Besides, in patients with HCM, 1/3FRm decreased as functional impairment progressed (NYHA Class I 1.75±0.32, Class II or III 1.21±0.23 sec^{-1}, $p<0.01$). The ratio of 1/3FRm to 1/3ERm correlated well with LV wall thickness which obtained by echocardiographic study ($r=-0.81$). In conclusion, diastolic phase index (1/3FRm) is useful for the evaluation of LVH.

Presented by Medical*Online