

EJECTION FRACTION OF LEFT VENTRICLE BY GATED BLOOD POOL COUNTING, TIME ACTIVITY CURVE, ECHO AND CONTRAST X-RAY ANGIOGRAPHY

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Purpose: This study has been done to evaluate the different methods of the measurement of the ejection fraction of left ventricle in normal and cardiovascular disease.

Results: The applied three radionuclide techniques are as follows: First transit time activity curve (TAC), gated blood pool counting and gated blood pool planimetry (GBP). The contrast X-ray angiography (CX) and echocardiography (ECHO) were also used in the research.

The EF (TAC) was measured after reduction of background exactly around the left ventricle excluding the aortic orifice. If the background covers thin periventricular layer, the value of EF reveals 86% of correct value and the background includes the aortic orifice, then EF shows 131% of right value.

EF (TAC) was 64% in average in 25 normal subjects and showed 6% lower than EF by gated blood pool counting (GBC).

The correlation index (r) have been measured within each others on about forty patients without severe signs of decompensation.

GBC vs GBP $r = 0.98$ (n 9)

TAC vs GBC $r = 0.95$ (n 39)

TAC vs ECHO $r = 0.38$ (n 40)

GBC vs ECHO $r = 0.48$ (n 40)

TAC vs CX $r = 0.84$ (n 15)

GBC vs CX $r = 0.97$ (n 9)

Summary: EF (GBC) and EF (GBP) correlate highly and also have close relationship with the value of EF (CX).

EF by first transit time activity curve correlates highly with EF (CX) and EF (GBC) and relatively easily measurable in short time. However, the value of EF (TAC) is slightly lower than the value of EF (GBC).

EF (ECHO), on the other hand, correlates in lower level with EF (GBC) and EF (TAC).

CLINICAL APPLICATIONS OF ALTERATION CURVE ON HEART-CAPACITY BY THE USE OF RI-ANGIOCARDIOGRAPHY

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In the present study, we have prepared the alteration-curve of the left ventricular heart-capacity by means of heart-beat interlocking RI-angiocardiology, thus the result was compared with that of surgical tests on cardiac functions by the left ventricular catheterization for the same case.

METHOD

For the preparation of heart-beat interlocking RI-angiocardiology and analysis of data, Scintipack 1200 and Gamma Camera made by Shimazu Mfg. Co., Ltd. were used. For the preparation of RI-angiocardiology ^{99m}Tc -HSA 15mCi was intravenously injected through the vein of the right elbow, and at the same time, ECG of the subject was recorded in the core on the computer. The left ventricular capacity-changing curve was prepared by overlapping 6-8 beats of histogram at the said position of R.O.I. at the diastolic period of the left ventricle. thus the change in RI activity at every 50msec of one cardiac cycle was regarded as the changing curve of the left ventricular capacity. In order to remove the effect of background, the difference of RI-activity between systolic and diastolic time was used.

RESULT

The delay of systolic speed was observed in the cases of systolic load such as hypertension, while the delay of diastolic speed was seen in the cases showing the capacity-load such as aortic valvular insufficiency and mitral insufficiency. As compared with surgical method, blood-pumping rate showed correlation.