The determination of the volume, ejection fraction and output volume of the left ventricle based on the dual camera method and by the use of a computer program and by studying various factors that could be induced from this we studied the significance of the three-dimensional analysis method in regard to ventricular function.

Based on the results of 22 normal subjects we investigated the relationship between ventricular volume, various indexes and age, physical types. Furthermore, by comparing the results of heart diseases patients with these results we attempted an analysis of pathology. Under biological conditions the ventricular volume of adults exhibited a direct correlation with body surface area. In similar body type the cardiac minute output showed the best correlation. The cardiac output volume reduction agreed well with the clinical findings.

Thus, the three-dimensional analysis method makes possible the calculation of the absolute amount of the ventricular volume and better observe the biological and pathological conditions of cardiac function we believe the clinical application of this method to be quite important.

The late diastolic phase of left ventricular (LV) volume curve (LVVc, time-activity curve) obtained by conventional listmode ECG-gated equilibrium radionuclide angiocardiogram is distorted and unreliable, even if a minimal variation of R-R interval is present. We developed a new compiling method, in which each cardiac cycle was divided every 20msec interval in two different ways, i.e., backward and forward from R wave, and two LVVc's were constructed and connected to make a "two-beat LVVc". The two-beat LVVc enabled the study of late diastolic phase. To estimate atrial contribution: increment of counts after the beginning of P wave devided by counts corresponding to stroke volume (A(P)/SV) was calculated. This value correlated well with A/SV by cineventriculography (N=11, r=0.76, p<0.01). Determination of ROI (55% or 70% ROI) did not influence the A(P)/SV value (N=14, r=0.99, p<0.001). However, the standard LAO projection tended to underestimate the value compared with the cranio-caudal LAO projection. The A(P)/SV discriminated atrial contributions in myocardial infarction or congestive cardiomyopathy from normal. There was a correlation (N=19, r=-0.76, p<0.01) between EF and A(P)/SV in patients with EF less than 50%.

Assessment of the left ventricular function by the rate of change of left ventricular volume (dV/dt) using ECG gated radionuclide angiocardiography. T. Ikezono, M. Ozaki, T. Yamaegishi, T. Fujii, K. Katayama, F. Yoshino, H. Ogawa, Y. Matsuda, T. Kumatada and K. Kusukawa. The Second Division, Department of Internal Medicine, Yamaguchi University School of Medicine, Ube.

Radioangiogram has been widely used as a non-invasive method to evaluate the cardiac function. This study examined the rate of change of left ventricular (LV) volume (dV/dt) during systole and diastole in 18 normal controls (N) and 71 patients (18 hypertension (HT), 27 ischemic heart disease (IHD) and 30 old myocardial infarction (OMI)). In all cases, the peak rate of the LV systolic ejection devided by end diastolic count (max S dv/dt/EDV) were correlated well with ejection fraction (r=0.85) and mean VCF (r=0.90). These data indicate that max S dv/dt/EDV reflects the LV systolic function.

Comparison with N (3.24 ± 0.50), max S dv/dt/EDV was significantly lower in OMI (2.18 ± 0.27), but not significant in HT (3.25 ± 0.57) and IHD (3.07 ± 0.49). On the other hand, the peak rate of the LV diastolic filling of the LV devided by end diastolic count (max D dv/dt/EDV) were significantly lower in HT (2.40 ± 0.52), IHD (2.20 ± 0.40) and OMI (1.71 ± 0.26 ± 0.52). These data suggest that max D dv/dt/EDV is useful in detecting in early deterioration of LV performance.


Left ventricular volume was estimated by the count method. In the basic experiment, the counts rate of balloon had good correlation (R=0.996) with the measured volume of the balloon from 50ml to 350ml. The left ventricular counts were corrected by counts of 0.1ml blood sampling in order to standardize administered dose of Tc-99m and total blood volume. The corrected LV counts of EDC and ESC had good correlation (R=0.967) with the EDV and ESV estimated by dye dilution method. Subsequently, with the equation of y=40.89 x+0.08 (y=EDV (EDV) by dye dilution method, x=EDV (ESV) by counts method), left ventricular volumes were determined by counts method in our laboratory. Left ventricular volumes estimated by counts method had good correlation (R=0.88) with those by contrast angiography in various heart diseases excluding shunt and regurgitant cases.