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EVALUATION OF THE DIASTOLIC PHASE IN ISCHEMIC HEART DISEASE USING S2-GATED EQUILIBRIUM METHOD AMONG RI ANGIOGRAPHY.

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RI angiography using S2-gated equilibrium method reported by authors last year was performed in 12 normal subjects(N group) and 53 ischemic heart diseases(IHD) for evaluating diastolic phase. The patients in A group(gr) had EF≧55%, angina elucidated by ECG during attack and no history of OMI. M1 gr had EF≧55% and the history of OMI. M2 gr had EF<55% with the history of OMI.
EF(ejection fraction), PER(peak ejection rate), mER(mean ejection rate), TPER(time to peak ejection rate), PFR(peak filling rate), mFR(mean filling rate) and TPFR(time to peak filling rate) were calculated from LV volume curve. Except M2 gr(p<0.01), EF, PER and mER were not significant with N gr in A and M1 gr. TPER in M1 gr was significant with N gr(p<0.01). A gr was significant with N gr in PFR, TPFR and PFR/TPFR (p<0.01, 0.01, 0.05). EF had the correlation with PFR(r=0.65, p<0.001). Between the gr which increased EF and the gr which decreased EF during submaximal exercise, the differences were presented statistically in TPFR and PFR/TPFR(p<0.01). The indices as PFR, TPFR and PFR/TPFR were useful in detecting of early disturbance of LV compliance, especially evaluating IHD with normal systolic indices.

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EXAMINATION OF LEFT VENTRICULAR VOLUME WITH SPHEROID PHANTOMS.

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We examined left ventricular volume obtained from the images of System77 with spheroid phantoms. Left ventricular volume was calculated by Single-Plane method. Distance had eight variations from 3cm to 30cm with a horizontal plane of major axis and major axis angle were changed from 0° to 45°. In order to consider the scattering factor by the chest thickness, we masured phantoms in water. These factors have more than 0.93 correlation ratio with volume. Though the influence of major axis angle to the volume increased with the value of angle, other factors decreased with the value of distance and depth in water. But the influence of angle and chest thickness was smaller than that of distance, the distance factor did not have to correct when the distance was less than 13cm. Then we concluded that the distance from left ventricule to gamma camera had to kept about 10cm when we calculated left ventricular volume from the images of radionuclide angiocardiography.

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EVALUATION OF LEFT VENTRICULAR END-DIASTOLIC VOLUME USING AREA-LENGTH METHOD

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Left ventricular end-diastolic volume (LVEDV) was measured routinely in contrast left ventriculography. We studied to measure LVEDV using first-pass radionuclide angiocardiography with Baired Atomic System 77 in 40 patients with ischemic heart diseases. Calculation formula was EDV=0.849A /L (A=regional ejection fraction, L=long axis). Changing several isocount level (25%, 30%, 35%,40%), LVEDV were claculated using single plane area-length method. Agreement between LVEDV of radionuclide angiocardiography and contrast left ventriculography was good (r=0.70, 0.70, 0.70, 0.64 respectively). But regression formulas were not suitable for daily use. This result shows to involve many considerations from various angles, i.e. bolus injection background correction etc .

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AREA-LENGTH-VOLUME METHOD FOR DETERMING CHAMBER VOLUME IN RADIONUCLIDE ANGIOGRAPHY.

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We have investigated the feasibility of quantitating left ventricular end-diastolic volume(EDV) using the area-length method. The EDV's were determined in 31 patients from both multiple gated cardiac blood pool images and contrast ventriculograms(LVG) performed within two weeks. The tracer EDV was calculated from light pen outline of the end-diastolic image in the anterior and LAO 45°(Method 1) or the LPO 30° and LAO 45°(Method 2). Calibration of the image field was obtained using a bar phantom. A correlation between EDV by scan(Method 1) and by LVG was 0.84. Interobserver error(1SD) between the mean volumes for each pair of observers were 49ml(Method 1), 36ml(Method 2) and 30ml(LVG). We applied this area-length method to 71 patients with acute myocardial infarction(MI). RI ventriculograms were recorded within 24 hours following the onset of acute MI(AC), at 10 days(10D) and 3 months (3M). LV end-systolic volume(ESV) was calculated from (1-EF)×EDV. The EDV and ESV were significantly larger in anterior MI than that of INF MI from AC to 3M except EDV at 10D. These results suggested that anterior MI had greater impact on contractile function compared to inferior MI as reflected in ESV.