ASSESSMENT OF LEFT VENTRICULAR FUNCTION BY A HIGH TEMPORAL RESOLUTION MULTIGATED IMAGING.

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The myocardial muscle volume change of the left ventricle during contraction was measured by a high temporal resolution multigated myocardial imaging and was compared with global and regional ejection fraction(EF) obtained from multigated blood pool imaging. Subjects of this study are 11 normal cases, 12 myocardial infarction, 5 cardiomyopathy, 3 angina pectoris and 2 hyperthyroidism. In 27 cases of 33 cases, multigated blood pool imaging study was performed and EFs were calculated. After IV-injection of 4 mCi of ^{201}Tl, a time-sequential images during contraction were generated with 40 msec. time interval using γ-camera computer system. Collection of radioactivity were performed 1500 cardiac cycles. Three areas of interest, that is, free wall, apex and septum, were selected for an end-diastolic ^{201}Tl image of LV and a time activity curve in each ROI was generated. In several cases, three ROIs were also selected on the end-diastolic ^{99m}Tc-HSA image in the same way as ^{201}Tl scan. Percent wall thickness(PWT) was calculated as (end-systole counts - end-diastole counts)/(end-diastole counts) in each ROI of myocardial image. Regional EF was also calculated in each three ROIs.

In normal cases, free wall showed the smallest change of myocardial volume in spite of the largest regional EF. In the septal area, however, regional EF was smallest in spite of largest change of myocardial volume. In normal and myocardial infarction cases, mean PWT of three ROIs and global EF were fairly well correlated. In hypertrophic cardiomyopathy(HCM), however, lower value of PWT and higher EF was observed compared with normal case. In diseased cases PWT does not always correlate with EF. In the 80% cases of normal cases maximum contraction times were found to occur from septum to apex and ended up at the free wall.

In conclusion, value of multigated myocardial imaging was analyzed for the diagnosis of asynergy and quantitative analysis of regional myocardial volume change.

CLINICAL USE OF FIRST PASS METHOD USING CARDIAC PROBE SYSTEM

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The usefulness of the cardiac probe system was estimated on measurement of left ventricular ejection fraction(LVEF).

The system used in this study is cardiac probe (The Gamma Cor RCG) which is a mobile dual scintillation detector system that can be used for obtaining Radiocardiogram(RCG). The system consists of dual probe that contains a central collimated detector which accepts the gamma rays primarily from the left ventricle and an annular detector collimated to view unwanted back ground activity sorrounding the left ventricle, and can be used to make rapid measurement of LVEF immediately after an injection of a single radionuclide bolus via a peripheral vein. LVEF may be caluculated directly from the RCG using the formula as follows:
LVEF=[counts in end diastole(peak) - counts in end systole(nadir)]/[counts in end diastole - back ground].

Twenty two subjects inclusing 5 normal cases, 7 cases with angina and 10 cases with other heart diseases were examined with both cardiac probe system and equilibrium gated method.

LVEFs obtained with cardiac probe correlated well with those measured with gated method. Good reproducibility was also observed on measurement of LVEF by cardiac probe. In addition, this system was found to be useful to measure LVEF in equilibrium phase and to analyse of beat by beat left ventricular volume curve.
In conclusion, cardiac probe system could be used to measure LVEF and to follow up the patients with heart diseases.