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STUDIES OF REGIONAL WALL MOTION AND EJECTION FRACTION USING CARDIAC TABLE.

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ECG gated first-pass and equilibrium pulling scan using 99mTc-HSA was performed at rest and exercise in 29 subjects consisting of myocardial infarction 19 cases, angina pectoris 5 cases and volunteer 5 cases. The regional wall motion of ventricule was observed with regional ejection fraction (E.F.) from 8 division method. The exercise of subjects were performed by the cardiac stress table which could change motor load stepwise from 25W to 75W. The pulling scan image of left and right ventricle were collected 5 times, rest, 25W, and 5 minutes, 10 minutes after exercise. In the volunteer cases, E.F of both ventricles were increased as increasing of motor load, but in the patients with myocardial infarction, E.F of both ventricles were decreased by 75W motor load. Between E.F of left and right ventricles, there was significant difference in the left and right coronary lesion that E.F of both ventricle decreased by 75W motor load in left coronary lesion, but E.F of right ventricle decreased early by 25W motor load in right coronary lesion. With observating of regional wall motion, the movement of poor moved sections of myocardial wall were still poor and the well moved sections became poor by 75W motor load.

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MOVING EJECTION FRACTION IMAGE: A NEW SCINTIPHOTOGRAPHIC METHOD FOR ASSESSING LEFT VENTRICULAR WALL MOTION.

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The moving ejection fraction image which made 3 dimennsional assessment of regional wall motion possible consists of continous EF images(0.05sec/F) throughout the cardiac cycle obtained by system77 multicrystal gamma camera. We studied 19 patients with old myocardial infarction: Group A comprised 4 patients with EF≧55%,Group B comprised 7 patients with 31%<EF<55%, Group C comprised 8 patients with EF≦30%. Group A showed a low EF image in late diatole and early systole but a high EF image in late systole. The patients in Group B had a low EF image areas in late systole and the diastolic expansion in these area terminated earlier than other areas. Group C showed low EF image throughout the cardiac cycle. In this study we could assess the enhanced image which was modified according to maximum regional EF value as base line(100%).

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ECG-GATED EMISSION COMPUTED TOMOGRAPHY OF THE CARDIAC BLOOD-POOL.

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Multiple ECG-gated acquisition was employed with emission computed tomography (ECT) using a rotating gamma camera to obtain multiple section images of the cardiac blood-pool. Twenty cases were studied with this technique. A series of transaxial tomograms was reconstructed, and thereafter, short axis, long axis, and "four-chamber-view" tomograms were reorganized. In gated blood-pool ECT, each cardiac chamber was visualized separately. As compared to the gated planar imaging, the gated ECT showed regional asynergy more precisely in cases with myocardial infarction, and demonstrated dilatation of the right atrium as well as ventricle more accurately in cases with atrial septal defect. Left ventricular volume was geometrically calculated from the ECT images by summation of left ventricular area in each "four-chamber-view" plane. The ECT volume correlated well with contrast angiographic volume (r=0.979).

Gated blood-pool ECT providing any angle section of the heart allows three-dimensional assessment of cardiac chambers in motion more accurately without mutual superimposition.

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AN ANALYTICAL APPROACH FOR CORRECTION OF BACKGROUND COUNTS AND ITS CLINICAL APPLICATION.

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A new method for calculation of left ventricular ejection fraction(LVEF) based on the analytical correction of background counts by the complex demodulation technique was presented.

First pass radionuclide cardiographies were done in 25 patients. Six different regions of interest(ROI) were selected as following criteria; carefully selected entire LV, laxly selected entire LV, small central portion of the LV, laterql helf of the LV, septal half of the LV and both left and right ventricles. The time-activity curve of each ROI was taken and its LVEF was calculated by the new method. LVEFs were compared each other.

The LVEFs obtained from the ROIs covered entire LV did show good agreement, but those of obtained from the ROIs covered only partial LV were different each other. The conclusion is that our new method of calculation of LVEF is not dependent on the size of the ROIs, but whether or not the ROIs cover entire LV is very critical.