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EVALUATION OF LEFT VENTRICULAR EJECTION FRACTION USING SINGLE CARDIAC PROBE SYSTEM MADE BY CADMIUM TELLURIDE.

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We developed a miniature cadmium telluride (CdTe) probe for continuous monitoring of left ventricular ejection fraction (LVEF) using an equilibrium radionuclide blood pool label. The subjects were 21 patients with various heart diseases. We compared LVEF measured by Gamma Camera (G), Natirum Iodide (NaI) and CdTe.

The correlation of LVEF by G and CdTe was 0.94 in single beat mode (SB) and 0.89 in multi beat mode (MB). The correlation of LVEF by NaI and CdTe was 0.94 in SB and 0.90 in MB. The inter-record reproducibility of LVEF measured by CdTe were reasonable good both in SB ($r=0.95$) and in MB ($r=0.90$).

We could measure LVEF of patient with angina pectoris for 30 minutes using a new developed jacket for direct attachment to the chest wall of CdTe.

We conclude that CdTe can prove to be useful in patients in intensive and coronary care units as well as in ambulatory patients.

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EVALUATION OF LEFT VENTRICULAR DIASTOLIC PERFORMANCE IN PATIENTS WITH ASYMPTOMATIC HYPERTENSION.

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In order to assess left ventricular (LV) performance in patients (pts) with hypertension (HT), cardiac blood pool imagings with Tc-99m were performed in 8 normal subjects (Nor) and 20 pts with asymptomatic HT in list mode acquisition. Using ECG R wave as a time marker, both forward-gating and reverse-gating LV volume curves were obtained. From the former LV ejection fraction (EF) and mean filling rate during the first third of diastole (FR) were calculated and from the latter percentage of atrial contraction to LV stroke volume (a/SC) was calculated. Rest EF and EF response to exercise were not different between Nor and HT. On the other hand, FR in HT was significantly ($p<0.001$) lower than Nor and a/SC in HT was significantly ($p<0.05$) higher than Nor at rest. In HT, reduced FR correlated well with LV mass ($r=-0.88$) but a/SC did not show such an excellent correlation with LV mass. Besides, there was only a weak correlation between FR and a/SC ($r=-0.55$).

These data suggest that in many pts with asymptomatic HT, early diastolic LV filling is impaired and atrial contraction may play an important role for compensating it, but this compensatory mechanism may be limited.

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THREE-DIMENSIONAL CARDIAC SURFACE MAPPING OF MYOCARDIAL PERFUSION, Tl-201 WASHOUT, CARDIAC CONTRACTION AND PHASE. K.Nakajima, H.Bunko, J.Taki, I.Nanbu, Y.Shiire, N.Tonami, and K.Hisada. Department of Nuclear Medicine, Kanazawa University Hospital, Kanazawa.

Thallium-201 myocardial perfusion, washout, cardiac wall motion and phase of contraction have been studied in order to estimate the viability of myocardium. The purpose of this study is to evaluate these parameters three-dimensionally (3-D) using single photon emission computed tomography and new method of display. Cardiac surface was divided into 60 segments in each short-axis slice and approximately 10 slices were selected in each patient. In Tl-201 myocardial perfusion study, myocardial uptake and washout rate were calculated in each segment. In tomographic gated blood-pool study, length-based Fourier analysis was applied and two parameters of length-based phase and percent-shortening were computed over the whole cardiac surface. Count-based phase analysis was also performed. Six parameters; that is, Tl-201 uptake, washout, length-based phase, percent shortening, count-based phase and amplitude, were mapped using polar display in the same format. These functional mappings were useful for the evaluation of 3-D information of parameters in patients with coronary artery disease and various conduction disorders.

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ANALYSIS OF LEFT VENTRICULAR WALL MOTION: COMPARATIVE STUDIES OF RN VENTRICULOGRAPHY AND DSA. F.Nakanishi, T.Kasuga, Y.Sakai, S.Sone, S.Haruta, K.Yano and H.Ueda. Shinshu University School of Medicine, Matsumoto.

Ventricular wall motion analysis by first pass RN ventriculography and DSA were compared in 10 patients with ischemic heart disease. Computer processing methods used in RN ventriculography were applied to the analysis of wall motion in DSA. The results were compared with the findings in Tl-201 myocardial ECT. The regional sensitivity and specificity of ECT were 96.9% and 84.0% respectively. RN ventriculography was less sensitive than DSA to regional wall motion abnormalities. It is considered that DSA may be a complementary effective method of detecting ischemic heart disease with negative Tl-201 ECT and RN ventriculography.