Positron CT was performed after the intravenous injection of N-13 ammonia in 10 patients with hypertrophic cardiomyopathy (HCM), 7 patients with dilated cardiomyopathy (DCM) and 3 normals. Three slices in the midventricular level were selected in each patient for the study. Thresholds at 70 % and 80% of maximal myocardial radioactivity in each slice were arbitrarily defined to assess heterogeneity of accumulation of N-13 ammonia throughout the myocardium. Patients with HCM revealed the hypertrophic myocardium of left ventricle associated with concomitant visualization of right ventricular myocardium. Patients with DCM revealed the enlarged left ventricle without left ventricular hypertrophy. Besides that, patients with DCM more frequently exhibited noncontiguous irregular shaped regions of accumulations of N-13 ammonia within myocardium than other subjects examined in this study.

CLINICAL USEFULNESS OF SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY USING THALLIUM-201 (201Tl-SPECT) IN THE ACUTE PHASE OF MYOCARDIAL INFARCTION (MI)

In order to clarify the clinical usefulness of 201Tl-SPECT in the acute phase of myocardial infarction, 42 patients were studied. 20 patients were treated with 201Tl-SPECT within 3 days after the onset of MI (group A) and 22 patients were treated from 4 days up to 3 weeks (group B). We calculated SPECT score (SS) by visual evaluation (cold 5, severe low 4, low 3, suspectable low 2, normal) of about 28 SPECT pictures showing the coronal and sagittal planes and also compared SS with other parameters (Killip classification, Forrester hemodynamic subset, CI, PCWP, Cardiac enzymes, LVEF). As a result, 1) SS of the patients with Forrester III or IV proved to be significantly higher than that of Forrester I or II in both group A and B. 2) There were significant correlation between SS and max GOT, and max LDH in both groups, SS and max CPK in group A only. 3) There were also significant correlations between SS and LVEF calculated by 99m Tc-technetium ventriculography in both groups, and closed correlation in group A. It was concluded that SS might reflect the infarct size and severity of MI and be useful for determination of LV function, especially in group A.

MEASUREMENT OF REGIONAL MYOCARDIAL BLOOD FLOW AND AMMONIA EXTRACTION FRACTION WITH N-13-NH3 DYNAMIC POSITRON CT

Regional myocardial blood flow (RMBF) can be evaluated by analyzing (1) wash out process after injection of 133-Xe into coronary artery, or (2) extraction and trap of 13-N-NH3 or 82-Rb. But these are highly invasive methods, which need insertion of a catheter into artery to inject a tracer or withdraw blood at a constant rate. In order to develop a non-invasive method, we have tried to measure RMBF and extraction fraction of ammonia with dynamic positron CT after venous injection of 13-N-NH3. Serial 6-second PET scans for two minutes (20 scans) were performed after a bolus venous injection of 13-N-NH3 (5-10 mCi) water solution. The RMBF and extraction fraction were calculated from time-activity curves of myocardium and blood pool (atrium), using a first-pass model proposed by Mullani et al. Our preliminary results showed a good agreement with values reported in other literatures.

COMPARISON BETWEEN Tl-201 MYOCARDIAL SCINTIGRAM AND TWO DIMENSIONAL ECHOCARDIOGRAM (2D ECHO)

The comparison between infarct size of Tl-201 myocardial scintigram (1 scinti) and wall motion of two dimensional echocardiogram (2DE) were performed in 30 patients with AMI. Two examinations were studied within 1 - 5 days after the onset of AMI. The estimation of defect score from Tl scinti were made using circumferential profile curve. Akinetic ratio was obtained from 2DE by measuring akinetic length and end diastolic length. In patients with antero-septal infarction, correlation between defect score(LAO) and akinetic ratio(Ap4C) was $r = 0.860 (P<0.01)$, between defect score (ANT+LAT) and akinetic ratio(Ap4C) was $r = 0.758 (P < 0.05)$, between defect angle(LAO) and akinetic ratio(Ap4C) was $r = 0.539 (P = 0.05)$. In patients with inferior or posterior infarction, correlation between defect score (ANT+LAT) and akinetic ratio(Ap4A) was $r = 0.676 (P<0.05)$, between defect angle(Ant+Lat) and akinetic ratio(Ap4A) was $r = 0.539 (n.s.)$. In conclusion, defect score from Tl scinti was significantly correlated with akinetic ratio from 2DE and defect size from Tl scinti larger than akinetic size from 2DE.