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QUANTITATIVE ANALYSIS OF EXERCISE THALLIUM-201 EMISSION COMPUTED TOMOGRAPHY IN CORONARY ARTERY DISEASE.

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The clinical usefulness of quantitative analysis of myocardial emission computed tomography (ECT) was evaluated in 12 pts. with old myocardial infarction, 22 with effort angina pectoris and 10 normal subjects.

Long- and short-axial myocardial images of the left ventricle were analyzed quantitatively using the circumferential profile method. Two types of scintigraphic abnormalities were studied; (1)stress defect and (2)slow thallium washout. "Stress defect" alone and combined with "slow washout" was used to assess the ischemic myocardial volume and also to detect significant coronary arterial stenosis. Diagnostic accuracy of "stress defect" criterion was 79-91% for the stenosis of major coronary arteries, 68 % for the number of diseased vessels and 91 % for multiple vessel disease. The ischemic myocardial volume evaluated with combined criterion was significantly larger in triple (40.2%) or double vessel (30.6%) than in single vessel disease (20.1%) ($p<0.05$).

It was concluded that the quantitative analysis of exercise thallium-201 myocardial images was useful for evaluation of coronary artery disease.

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A BASIC STUDY OF FUNDAMENTAL AND HIGHER ORDER PHASE ANALYSIS IN ECG GATED BLOOD POOL EMISSION COMPUTED TOMOGRAPHY USING CARDIAC PHANTOMS.

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Using a rotating dual gamma camera system,we applied Fourier analysis to gated blood pool emission computed tomography (GPECT) with cardiac phantoms and examined reliability of this method.The phase images indicated almost synchronous contraction with a narrow peak in the histogram in case of sufficient count collection(above 600 counts/pixel in GPECT end-diastolic images). The 2nd Fourier harmonics was considered to be optimum for TAC curve fitting,in GPECT.Using a heart muscle phantom,counts of the infero-posterior region were examined.Mean counts was the same as those of the other regions under both 180° and 360° data acquisition.In obtaining regional functional images calculated from TAC curve of GPECT,cutoff level should be under consideration according to LV/BG count ratio. The number of projections was studied on the systolic parameter PER(peak ejection rate)calculated from the 2nd order Fourier analysis.We found that above at least 18 projections suffice for data acquisition.

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FUNDAMENTAL STUDIES OF γ-CAMERA COLLIMATORS USING I-123 NUCLIDE.

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Recently, I-123 nuclide preparations have been developed for renal function and cerebral blood flow tests. If they contained no nuclides other than I-123, their energy level (159 ket) would make them suitable for γ-camera imaging. In practice, however, they are invariably contaminated with I-124 since the extraction of I-123 only is extremely difficult in the current manufacturing processes.

Using a Hitachi γ-camera equipped with each of the two types of collimator currently in clinical use, we performed fundamental studies of the collimators, based on the performance testing method for external RI measuring instruments, which has been reported by the "Technical Committee on Radioactive Isope Testing" of the Japanese Society of Radiological Technology. This paper present the study results and some discussions along with SPECT data taken with the camera.

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I-123 IMP BRAIN IMAGING: COMPARISON WITH HEADTOME-II , TOMOMATIC-64 AND OMEGA 500.

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Our group can use HEADTOME-II,Tomomatic 64 and OMEGA 500 for brain SPECT study with I-123 IMP. HEADTOME-II and Tomomatik 64 were developed for brain study. OMEGA 500 is a camera rotating SPECT system and this time we used slant hole collimator and parallel hole medium energy collimator. Fundamental and clinical study with I-123 IMP were performed by these different divices. The results were shown in the table.

Device	Unif.	Sens.	Reso.	C.L.D.
HEADTOME-II	5.9	747	11.7	0.37-0.19
Tomomatic-64	6.0	659	10.3	0.35-0.18
OMEGA 500 medium energy	6.2	55	21.8	0.68-0.19
OMEGA 500 slant hole	6.0	60	17.6	0.64-0.33

Unif.: Uniformity (CV (%))
Sens.: Sensitivity (cps/μCi/ml/mm)
Reso.: Resolution (FWHM (mm))
C.L.D.:Cold Lesion Detectability (Contrast)