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CLINICAL EVALUATION OF THE SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY WITH THE TOMOGSCANNER II. T. Maeda, H. Matsuda, M. Ooguchi, K. Nakajima, A. Tada, A. Kuwajima, H. Bunko, T. Michigishi, T. Aburano, H. Mori, N. Tonami, K. Hisada, H. Seto and H. Shimazu. Kanazawa University, Toyama Medical and Pharmacological University and Tokushima University. Kanazawa, Toyama and Tokushima.

Transverse section computed tomography was added to the conventional scintigraphy, such as Tc-99m·O_4 brain scan, In-111 cisternography, Tc-99m·HSA blood pool scan, Kr-81m intracarotid perfusion study, Tl-201 myocardial scan, Tc-99m·MAA lung scan, Tc-99m·Sn colloid liver-spleen scan, Tc-99m·DMSA renal scan, Tc-99m·MDP bone scan, Ga-67 citrate tumor scan, Se-75 methionine pancreas scan and Se-75 scintadren adrenal scan. We obtained high quality images on these studies except Se-75 studies. The brain RCT was very useful for evaluation of the postoperated brain lesion, the lesion at the base of brain or infratentorial region, low grade astrocytoma and so on. The Kr infusion RCT evaluated the rCBF in cross section. The Tl RCT was more useful to evaluate the myocardial ischemic region than conventional study.

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SOFTWARE SYSTEM OF HEADTOME. Y.Miura, I.Kanno,S.Miura,S.Takahashi,Y.Kawata and K.Uemura. Research Institute of Brain and Blood Vessels. Akita.

The image reconstruction program of HEADTOME (Hybrid Emission Advanced Dynamic Tomograph) consists of the following routines. Sampling routine: The single photon and positron raysum data are collected in histogram form in each scan format. Data edit routine: A set of sampled data of the single photon or the positron are rebined and interpolated into a set of equal-spaced projections. Reconstruction routine : Algorithms used are an interative technique (ART) for the single photon image and a filtered back projection technique for the positron image. The filter function used is the Shepp filter convoluted smoothing function. We employed the original weighting factor determined by the distance from the center of the pixel. Correction routine: The projections are corrected by each detector sensitivity. The unequal sensitivity due to swing HEADTOME collimator system and attenuation effect are made correction by the uniform activity pool image. Image analysis routine: The dynamic studies from the time sequential images are made such as regional cerebral blood flow by Xe-133 inhalation method.

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DESIGN AND PRELIMINARY RESULTS OF HEADTOME. I.Kanno,K.Uemura,S.Miura,Y.Miura,S.Takahashi,Y.Kawata and K.Hirose. Research Institute of Brain and Blood Vessels and Shimadzu Ltd. Akita and Kyoto.

HEADTOME (Hybrid Emission Advanced Dynamic Tomograph) has been developed for brain circulation study. The Headtome was designed to measure both images of single photon and positron emitters and also to perform dynamic Xe-133 clearance study. The 64 NaI circular ring detector of 420mmφ was employed with unique collimator system for single photon imaging and masking system for positron imaging. Collimator system consisted of 64 moving vanes which swung synchronously back and forth to see whole field of view. Masking system designed to decrease accidental coincidence and to narrow ray width. High speed hardware logic and quantitatively reconstructing software logic were designed simultaneously. Preliminary study of single photon images showed the resolution of 15mm FWHM at periphery and 20mm at center, and system sensitivity of 15 Kcps/μCi with 20cmφ uniform activity pool of Tc-99m by 20mm-thick slice collimator. Positron imaging revealed the resolution of 20mm FWHM at center and 30mm at periphery.

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THE HARDWARE DESIGN OF HEADTOME. S.Miura, I.Kanno,K.Uemura,Y.Miura,S.Takahashi,Y. Kawata and K.Hirose. Research Institute of Brain and Blood Vessels and Shimadzu Ltd. Akita and Kyoto.

The hardware system of HEADTOME (Hybrid Emission Advanced Dynamic Tomograph) was designed and constructed. The hardware consists of (1) 64 detector units which include 3/4 in. photomultiplier, preamplifier and timing (constant fraction) single channel analyzer; (2) positron circuits for detecting and addressing positron annihilation that include 64 delay lines for timing adjustment of 64 channels; (3) single photon circuits for detecting single gamma event that encode 64 channels to 6 bits; (4) two units of 12 bit-4k word memory, one of which acquires from detecting circuits in "histogram" or in "list" mode and the other transfers to computer, simultanenously. The acquisition of data and the mechanical movements of gantry have been accomplished synchronously under the control of PDP-11/34 computer.