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EFFECT OF UNIFORMITY AND LINEARITY OF SCINTILLATION CAMERA ON PERFORMANCE OF ROTATING-CAMERA TYPE ECT. K. Abe, K. Ohtomo, T. Ohtake, J. Nishikawa, K. Machida, M. Iio, Tokyo Univ. M. Tnaka, R. Ban, H. Wani, Shimadzu Corp. Y. Murata, H. Toyama, Tokyo Metropolitan Geriatriac Hospital, Japan

The evaluation of the image of the emission computed tomography (ECT), using the newly developed scintillation camera-Shimadzu Siemens ZLC/75, is proposed. The accuracy of ECT image depends highly on that of each projection i.e each scintigram, because the ECT image is reconstructed from each projection. In rotating-camera type ECT, the uniformity and linearity of scintillation camera are the critical factors for getting high quality ECT image. We measured our camera performance and obtained the following data; ±2.08% as differential uniformity, 0.16mm as differential linearity and 3.45mm FWHM at central field of view as intrinsic spatial resolution. And the measured resolution of ECT image by the line source phantom is 11mm FWHM at 188mm away from HR collimator's surface. In clinical case,liver space occupying lesion was more clearly demonstrated with this ECT than the conventional ECT. In conclusion, Shimadzu Siemens ZLC/75 showed the improved uniformity, linearity and resolution and satisfactory ECT image for the clinical application.

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DESIGN OF NEW PHANTOM FOR GAMMA CAMERA ROTATING EMISSION CT. F. Kinoshita, M. Koakutsu, Y. Akiyama and N. Yui Division of Nuclear Medicine, Chiba cancer Center Hospital, Chiba

Recently we have had many reports on ECT employing gamma camera in our country. Some hospitals and institutes have ECT systems and they are putting in routin examinations. We have been studying fundamental problems on ECT system employing gamma camera and had reported some basic and clinical results obtained from rotating chair method. We got a conclusion that rotating chair method is mechanicaliy similar to rotating camera method but not practical for clinical use because of the difficulty of the patient's posture supporting. Recently we introduced a whole body gamma camera system equipping dual detctors rotating ECT. We studied fundamental tests on the device using newly designed phantoms. Now we present the results obtained from the phantoms and conclusion that the phantoms is useful for standardizing efficiency tests of ECT.

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BASIC STUDY OF SINGLE PHOTON ECT IMAGE. H.Hoshi,S.Nakayama and K.Watanabe. Department of Radiology, Miyazaki Medical College. Miyazaki.

Uniformity and spatial resolution of single photon ECT images obtained by MaxiCamera 400T equipped DEC Gamma 11 computer were evaluated. The experiments were performed under various data sampling methods using the phantom containing Tc-99m (0.44 Ci/ml) and ECT images were displayed in the matrix of 64 x 64. In the constant total data sampling time of 1280sec, the uniformity of the images obtained by 64 and 128 angles was better than that of 16 and 32 angles. And the images of 64 and 128 angles showed almost same quality. CV(coefficient of variation) was 16% in 100 counts per pixel, 9% in 500 counts per pixel and 7% in 1000 counts per pixel. In order to obtain good ECT image, counts more than 400 per pixel may be necessary in practical use. Spatial resolution was evaluated by MTF curve calculated from LSF and the MTF of ECT images were compared with that of conventional image. MTF showed the best in the near location to surface of the phantom and the lowest in the location of 5cm distance from rotating centre. These results appeared to related to poor uniformity correction. In the constant total data sampling time, MTF curves of ECT images showed a little difference and resembled that of conventional image of 5cm depth from surface of the phantom.

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AN EXPERIENCE ON ECT SYSTEM WITH A SINGLE ROTATING HEAD (LFOV-E). H. Fukukita H. Oyamada, H. Kawai and S. Terui Dept. of Radiology, National Cancer Center, Tokyo

A newly installed ECT system (LFOV-E) was tested from the basic and clinical standpoints of view. This system is composed of a gamma camera with a large field of view, a computer (Scintipac-1200) and an imager (Microdot). The data were obtained in the form of 64x64 digital image by rottating the head stepwise every 10 degree around the object. The filtered back projection method was used for the image reconstraction.

In the cylindrical phantom studies, a cold spot of 1.5 cm in diameter was successfully depicted whereas our previous rotation chair method had failed to depict it.

This mehtod was found to be very useful in detecting focal lesions of the brain even in cases with normal conventional brain scintigrams.

In the liver studies using dual isotopes, Tc-99m colloid and Ga-67 citrate, subtracition method on the transaxial slices clearly demonstrated abnormal Ga-67 accumlations within the liver, which were not clear on the ordinaly Ga-67 scintigram.

In conclusion, this system offered us a new tool for the clinical image diagnosis, and the subtraction method on the ECT images was found to be worthy of traila.