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THE DATA PROCESSING SYSTEM OF N.I.R.S. POSITRON CT Y.SUDA,M.ENDO,T.TOMITANI M.YAMAMOTO National Institute of Radiological Sciences. Anakawa,Chiba

Positolosica measurement steps are as follows;

1.Patient Setting
2.Measurement of Transmition data
3.Measurement of Blank Data
4.Administration of R.I.
5.Measurement of Emission Data
6.All Data are recorded into a magnetic tape.
7.Image Reconstruction Process
8.Display and Image Processing Process

Now we have three kinds of R.I.,N]3-Ammonia ,C]]-CO and F]8-fluorodeoxyglucose. Administration doses are 40 mci,80mci and 5 mci each in typical cases. From these doses total counts per one slices we get in average lies from 2 to 7 million counts. The counting times are between 3 and 5 minuites in NH3 and CO cases and]0 to]2 min in last case.

The blank and transmission data reaches to]0 million counts.

The display Process is as follows;

It has 64 gray levels. Image data are normalized into]28 ranges. Three windows are available. And simple smoothing process are available in any times.

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BASIC INVESTIGATION OF ECT WITH ROTATING A LFOV CAMERA. M.Makino,N.Katsuyama, K.Kawakami,T.Matsuyama,S.Nakaoka,M.Tanaka. Jikei University School of Medicine, Shimazu Co.,LTD. Tokyo and Kyoto.

We investigated the basic charateristis of a ECT system designed by Shimazu. It consists of the gantry with rotating a LFOV camera. With a 360° rotation of the camera (either 5° or 10° intervals) all signals obtained by the photo-tubes were fed into the scintipac 1200 processor, where stored data were processed and ECT images were reconstructed.

We measured (1) the uniformity of the camera sensitivity, (2) the rsolution of the camera in both the radial direction and its tangential direction, (3) actual spacial resolution using a line source filled with Tc-99m solution. The following results were obtained: the camera uniformity was 6%; average FWHM of both radial and tangential derections was 15 mm;the spacial resolution was 17 mm.

Also we developed a new method to determine a rim of the body from the Compton Scattering, replacing an ellipitical figure normally used for calculating the attenuation of γ-rays.

These results will be presented.

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TOMOGRAPHIC MEASUREMENT OF REGIONAL CEREBRAL BLOOD FLOW USING Xe-133 CLEARANCE TECHNIQUE AND HEADTOME. FUNDAMENTAL ANALYSIS OF "TIME INTEGRAL METHOD". I.Kanno,K.Uemura, Y.Miura,S.Miura,E.Hagami and T.Hachiya. Division of Radiology, Research Institute of Brain and Blood Vessels, Akita.

Tomographic regional cerebral blood flow can be measured employing a Xe-133 clearance technique and a hybrid emission tomograph, HEADTOME. In this data analysis prolonged sampling time is indispensable to reduce statistical noise. Thus, in order to evaluate regional cerebral clearance rates at each pixel from such noisy data, it is one solution to use time integrals of them. Early picture method uses 1 min picture during which peak point exists. Sequence picture method uses series of four 1 min pictures of first 4 min. Two picture method which is developed to escape uncertainty of previous two methods and to reduce statistical noise, two 2 min pictures of first 4 min. All methods require tables of integrals precalculated for steppingly increasing k-value by convoluting an exponential decay with k and an endtidal air Xe-133 curve. Secondly errors included in these methods was estimated by simulation analysis. Errors due to including multiple components in single regional of pixel was evaluated by simplifying a model to contain two components with equal weight. The k-value obtained by two picture method showed 10 % difference from mean of two k-value and by early picture method 5 % difference.

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ESTIMATION OF REGIONAL CEREBRAL BLOOD FLOW (rCBF) BY Xe-133 CLEARANCE METHOD AND HEADTOME, II. CLINICAL APPLICATION. K.Uemura, I.Kanno,Y.Miura,S.Miura,E.Hagami and T. Hachiya. Division of Radiology, Research Institute of Brain and Blood Vessels,Akita.

Method & Materials: Xe-133 clearances of brain tissue were measured every 5 sec using dynamic scan of the headtome. Input of Xe-133 for the brain tissue is made by a intravenous slow-injection of Xe-133 solution (30-40 mCi). A input curve of Xe-1-3 in the brain tissue is evaluated by the monitoring of Xe-133 concentration in the endtidal air. The data are analysed with the time-integral method which has been presented on 'Part I' of the study. Three patients with cerebral infarct and a patient with cerebro-vascular Moyamoya disease were studied.

Results & Discussion: Three dimentional regional cerebral blood flows were obtained by the method non-invasively. Mean rCBF of the gray substance of the intact brain was 60-80 ml/100g/min and that of the white substance 30-40 ml/100g/min. Infarcted brain showed around 30 ml/100g/min. 2) The area with decreased rCBF was more widespread than that of low density brain appeared on X-CT. 3) Transfer of intravenously injected Xe-133 to arterial blood was estimated around 15 %, and with breath holding of 20 sec after the bolus injection that increased to about 19 %. 4) Early picture method gave rather insensitive to statistical noise than sequence picture method.