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THE MEASUREMENTS OF REGIONAL CEREBRAL BLOOD FLOW USING SINGLE INJECTION METHOD OF O-15 LABELED WATER. S.Nishizawa, S.Tanada, M.Senda, Y.Yonekura, H.Saji, T.Mukai, T.Fujita and K.Torizuka. Kyoto University School of Medicine, Kyoto.

Although the steady state method of O-15 labeled CO₂ is widely accepted to measure cerebral blood flow (CBF) with PET, there are several disadvantages to overcome such as errors in measurement attributable to unstable output of cyclotron, changes in respiration of subject and heterogeneity of brain tissues etc. We performed a single injection method of O-15 labeled water (H₂O) to solve these problems. Frequent arterial blood samplings were performed immediately after the injection of H₂O to determine the arterial concentration of H₂O. We observed higher values in H₂O method than steady state method attributable to the underestimation of CBF in the latter. Image acquisition time also affected the CBF values, that is, the shorter acquisition time, the higher values. Visual stimulation studies in normal volunteer demonstrated the local increase in CBF between control and stimulated state as same as motor stimulation studies. This preliminary work suggested that H₂O single injection method is useful to measure the changes in CBF against various loadings.

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CEREBRAL BLOOD FLOW IN ACUTE STAGE WITH ISCHEMIC CEREBROVASCULAR DISEASE BY SINGLE PHOTON EMISSION COMPUTERIZED TOMOGRAPHY. H.Kurokawa, K.Iino. Southern TOHOKU Research Institute for Neuroscience, Fukushima.

Regional Cerebral Blood Flow (rCBF) was studied on sixty-eight patients in acute stage with ischemic cerebrovascular disease from February 1984 through February 1985, 51 patients with cerebral infarction and 17 patients with TIA, rCBF was measured by Single Photon Emission Computerized Tomography (SPECT) using Xe-133 inhalation.

SPECT, conventional X-ray CT (GECT/T 9800) and carotid angiography were simultaneously performed within 48 hours after the onset.

SPECT clearly showed an ischemic focus correlated with clinical symptom just after the attack rather than X-ray CT, the positive finding on SPECT was 92.2% and that on X-ray CT was 62.7% in acute stage with cerebral infarction.

SPECT using Xe-133 inhalation was useful and noninvasive method in the diagnosis in acute stage with ischemic cerebrovascular disease.

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USEFULNESS OF FUNCTIONAL IMAGING OF LOCAL CEREBRAL TRANSIENT TIME FOR CEREBROVASCULAR DISEASE. F.Shishido, K.Uemura, A.Inugami, T.Ogawa, T.Yamaguchi, S.Higano, I.Kanno, S.Miura, H.Iida, M.Murakami, K.Takahashi and H.Sasaki. Research Institute for Brain and Blood Vessels-AKITA, Akita.

Blood transient time of brain tissue is expressed as $[CBV \div CBF]$. We measured local cerebral blood flow (lCBF) and local cerebral blood volume (lCBV) with positron CT and O-15-labeled gases, and calculated local cerebral transient time (lTT) as above the equation.

Parameter of lTT had a significant positive correlation with local oxygen extraction fraction (lOEF), and the functional image of lTT were similar to lOEF functional image in almost cases. However, some cases had a difference between perfusion (low OEF) in almost cases showed normal values of lTT, in a case the lesion of low OEF revealed prolonged lTT. In a case with internal carotid occlusion, sequential changes of these two parameters were slightly different from each other. However, the differences between lOEF and lTT were shown in only few cases. Our results suggest that lTT is a useful parameter for cerebrovascular disease instead of lOEF in using for single photon emission tomography.

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STUDY OF CBF IN OCCLUSIVE CEREBRO-VASCULAR DISEASE BY SINGLE PHOTON EMISSION CT. Y.Sakai, T.Kasuga, F.Nakanishi and S.Sone. Shinshu University school of Medicine, Matsumoto. Y.Tanizaki and S.Kato. Kakeyu Hospital, Maruko, Nagano.

The blood flow study in the ischemic area was performed in 35 patients with occlusion in the unilateral internal carotid artery and/or middle cerebral artery, utilizing both SPECT with Xe-133 inhalation technique and IVDSA. In all of them the delayed scan was done at 7, 12 and 17 min following the initiation of Xe-133 gas inhalation. In 20 cases the activation study with intravenous injection of acetazolamide was done.

The delayed scan images were classified into the following 3 types; a greater amount of accumulation of Xe-133 in the affected side (Type I), an approximately equal amount of accumulation on both sides (Type II), a lesser amount of accumulation in the affected side (Type III).

In the type III a poorer collateral circulation on DSA and an impaired response to the activation study by acetazolamide were shown.

From this study it is concluded that the SPECT study with the delayed scan may add some informations on the perfusion status through the collateral circulation into the ischemic brain area.