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ASSESSMENT of SEVERITY of BRAIN ISCHEMIA in PATIENTS with ISCHEMIC EPISODE using POSITRON TOMOGRAPHY

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Eleven patients with transient ischemic episode are analysed for cerebral blood volume, blood flow, oxygen utilization using positron tomography. Two thirds of the patient showed reduced blood flow in one or both hemisphere even after disappearance of symptoms. Oxygen extraction fraction tends to increase in course of progression of ischemia but after reaching to the value of .6, it begin to go down with reduction of oxygen metabolism. In a patients in impending stroke who actually suffered from infarction on 6th day after the positron study, a remarkable vasodilation is observed in a brain hemisphere which probably reflects PCO₂ increased and low Ph. Comparative study of these parameters with positron tomography may make it possible to detect brain ischemia, assess its severity and risks for stroke.

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EVALUATION OF CEREBRAL BLOOD FLOW, OXYGEN EXTRACTION FRACTION, OXYGEN METABOLISM AND BLOOD VOLUME IN PATIENTS WITH TRANSIENT ISCHEMIC ATTACKS BY POSITRON EMISSION COMPUTED TOMOGRAPHY.

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We examined eight patients with transient ischemic attack (TIA) by positron emission computed tomography using radioactive gasses or water. Six patients of them had areas of decreased cerebral blood flow (CBF) in the brain, especially in the frontal and parietal cortices contralateral to the ischemic attacks. Oxygen extraction fraction (OEF) was usually elevated in the regions of decreased CBF, and cerebral oxygen metabolic rate (CMRO₂) was relatively preserved. In two patients, cerebral blood volume (CBV) was increased in the areas corresponding to the regions of increased OEF.

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BRAIN IMAGING WITH N-ISOPROPYL-P-(I-123) IODOAMPHETAMINE (IMP) AND SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT).

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Brain imaging with IMP and SPECT was studied in fourteen epileptic patients in interictal phase. The different clinical epileptic types of the 14 patients were as follows; complex partial epilepsy-4; secondary generalized epilepsy-4; primary generalized epilepsy-6. Brain images obtained were compared with X-CT, and with findings of electroencephalography (EEG). Five lesions identified by X-CT were seen as low uptake zones on IMP-SPECT. Five lesions shown as epileptogenic foci by EEG were seen as low uptake zones on IMP-SPECT. In four patients with diffuse EEG abnormalities, three patients had localized low uptake zones of IMP, though one patient had relatively diffuse low uptake zones. In an uncontrolled patient, a high uptake zone turned to be a low uptake zone in the delayed scan (4.5 hrs after IMP injection). Four patients with normal or borderline EEG had low uptake zones of IMP. Two of them were in attack-free states for 2 and 3 years. In conclusion, all our epileptic patients had abnormal IMP distributions in the cerebral cortex, though its mechanism and meanings must be elucidated. This simple and noninvasive imaging method could be a useful tool in the diagnosis and management of epileptic patients.

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CLINICAL EFFICACY OF SINGLE PHOTON EMISSION CT OF THE BRAIN USING I-123-IMP.

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The clinical efficacy of single photon emission CT of brain using I-123-IMP is planned as the group study of several hospitals located in Kanto area under the support of Japan Radioisotope Association. In 50 cases of cerebrovascular diseases including normal the images of brain SPECT were obtained, whose diagnoses were confirmed by angiography, clinical findings etc.. The two types of sheets were made, one was for the confirmative diagnosis and the other for the findings of film reading. The idea and some problems concerning the present study will be discussed.