Selective catheterization and superimposition technique for the topographic assessment of krypton-81m single-photon emission computed tomography of the brain. Toshikazu Higa, Shuji Tanada, Wataru Taki, Hisao Fukuyama, Yasushi Ishii, Toru Fujita, Yasuhiro Yonekawa, Teruo Odorij, Takao Mukai, Hajime Handa, Masakuni Kameyama, Kishi Morita, and Kenji Toriizuka, Kyoto University Hospital, Kyoto.

Selective catheterization and continuous infusion of krypton-81m (half-life of 13 sec) was performed for the tomographic assessment of the regional cerebral blood perfusion. Krypton-81m single-photon emission computed tomography and X-ray computed tomography were corelatively evaluated using a superimposition technique. The edge image of the lesion, the ventricles, and the cortical surfaces of the brain were detected by the X-ray computed tomography, and photographically superimposed on the krypton-81m single-photon emission computed tomogram.

Topographic distribution of each major cerebral artery was precisely demonstrated in supratentorial and infratentorial compartments. The regional cerebral blood perfusion in the basal ganglia, the thalamus, and the watershed zones among the anterior, the middle, and the posterior cerebral arteries were evaluated with the method. The method potentiated detecting capability for abnormal perfusion areas aided by anatomical landmarks on the edge image of the brain.

Twenty-one cases with various brain diseases were presented and clinical usefulness of the technique was discussed.


To evaluate the cerebral hemodynamics in moyamoya disease, we examined five patients with positron CT using N-13-ammonia. Three were female under eighteen years old, and two were male and female adults. Two cases were examined after encephalo-myo-synangiosis. One case of children who had no neurological deficit, revealed no abnormal accumulation of N-13-ammonia. The other children had severe neurological deficits and had abnormally low accumulation of N-13-ammonia in cortical area, corresponding to neurological deficit. In an adult case, accumulation at the frontal cortex was slightly decreased but neurological sign was not significant. In these moyamoya disease the area of abnormal moyamoya vessels in angiography was almost normal in accumulation of N-13-ammonia by PET. Although, it is difficult to calculate absolute CBF value with N-13-ammonia, because of its uncertainty of uptake to brain under abnormal pH or other factors, positron CT was valuable to evaluate cerebral hemodynamics in moyamoya disease.


We have utilized a multi-slice positron CT device for whole body and automatic radioactive gases production system of O-15-oxygen (02) and O-15-carbon dioxide (CO2), since this spring. The purpose of this paper was to introduce these systems and to show preliminary clinical results of brain tumor imaging.

Each of 02 and CO2 gas was given 10-20 mcilm/min in dose, and was administered by continuous inhalation. Equilibrium images were obtained 10 min after the beginning of continuous inhalation. For Positologica-II provides 5 simultaneous images with 18 mm interval, we performed 3 scans with 6 mm interval.

We studied cases of glioblastoma multiforme, and brain metastasis from lung cancer. The cerebral lesions of all cases were clearly shown as defect in CT images. These findings indicated the lesions are low blood flow and low oxygen utilization.