N-ISOPROPYL-1-123-IODOAMPHETAMINE IMAGING IN CEREBRAL INFARCT. M.Murata, Y.Seki, T.Aiba and H.Toyama. Toranomon Hospital & Tokyo Metropolitan Geriatric Hospital, Tokyo.

This study was performed to evaluate the usefulness of N-isopropyl-1-123-Iodoamphetamine (IMP) for detection of regional cerebral blood flow abnormalities in cerebral infarcts. Single photon emission computed tomography (SPECT) with 3 mCi of IMP was done in 20 patients (27 imagings) with cerebral infarct and transverse dramatical and coronal images of the brain were reconstructed. Then the reconstructed images (IMP image) were compared with CT images. The results of the present study were as follow:

1. Significantly decreased regional flow was detected in IMP image of an acute cerebral infarct, whereas abnormality was not detected on the CT image obtained on the same day.
2. Luxury perfusion at the infarcted area was visualized in the IMP image of a patient with infarct 1 week after the stroke.
3. Crossed cerebellar diaschisis was observed in five images out of 27 imagings.
4. IMP images more than 50% showed larger lesions in comparison with those of CT. On the other hand, some of the smaller infarct lesions at the thalamus, caudate and putamen were not detected in IMP images. IMP image was sensitive to detect regional blood flow abnormality of the infarct and was useful for early diagnosis and follow up of the patients with cerebral infarction.

We reported the comparison 133-Xe inhalation study and 123-I IMP study in occlusive cerebrovascular disease.

1. The 133-Xe CBF image, obtained by "power spectrum map", had no significant difference of image quality, compared to 123-I IMP images (mCi, 180/sec scan).
2. IMP images had no influence from paranasal cavity, and, radio activity in IMP image had more accumulation than that of Xe image in cerebellum, brain stem and visual cortex.
3. IMP images changed slowly after inter-vencous administration, and image on about 14 min after injection had almost same pattern as Xe CBF image by tomomatic-64.
4. We could obtain sagittal and coronal reconstructed image using IMP-ECT images by the ling-type ECT (tomomatic-64).
5. IMP study can administrate by simple method, therefore we can easily observe ischemic lesion in poor risk patients.
6. 133-Xe is commercial radio isotope. The activation study can be easily performed by Xe inhalation method, and needs less time than IMP study. The quantitative CBF measurement were done by Xe inhalation.

THE COMPARISON OF REGIONAL CEREBRAL BLOOD FLOW AND METABOLISM WITH OXYGEN-15.


In order to investigate the cerebel hemodynamics, the measurement of regional cerebral blood flow and metabolism were undergone. Positron emission tomography (PET) using oxygen-15 were performed on 5 patients with aphasia due to cerebral infarction and 18 cases without aphasia. CBF, OEF and CMRO2 were measured by oxygen-15 labelled gases inhalation technique. The value of CBF on Broca area ranged between 6 and 29 ml/100g/min in motor aphasia and between 25 and 53 in cases without motor aphasia. The value of CMRO2 on Broca area ranged between 0.7 and 1.9 ml/100g/min in motor aphasia and between 2.1 and 4.5 in cases without motor aphasia. In our investigation, clinical threshold to cause motor aphasia was between 25 and 50 in CBF, and was about 2.0 in CMRO2. We conclude the measurement of CBF and CMRO2 were useful to decide prognosis and treatment of patients.

CONTROL VALUES AND SOME ERROR FACTORS IN THE MEASUREMENT OF CEREBRAL CIRCULATION AND OXYGEN METABOLISM USING THE 0-15 STEADY STATE METHOD.


Regional cerebral blood flow (rCBF), regional cerebral metabolic rate of oxygen (rCMRO2) and regional oxygen extraction fraction (rOEF) were measured on 7 normal volunteers using the 0-15 steady state method. Regional cerebral blood volume (rCBV) was also measured on each subject, and with the rCBV values, the correction was made for rCMRO2 and rOEF. In the present study, the regional values were analysed using the regions of interest (ROI), on the 4 functional images (rCBF, rCMRO2, rOEF and rCBV), which were displayed on the imaging-analysis system named "VAX-DEANZA" system. rCBF and rCMRO2 in the thalamus and in the basal ganglia were about 0.38 in any area. rCBV showed almost the same values reported previously.

Error factors in the measurement of these parameters using the 0-15 steady state method were also evaluated. The steadiness of subject's respiration is thought to be the most important factor that affects the accuracy of the measurement.