

63

N-ISOPROPYL-I-123-p-iodoamphetamine IMAGING IN CEREBRAL INFARCT. H.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-I-123-p-Iodo-amphetamine(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, sagittal & 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 cerebral blood flow abnormality of the infarct and was useful for early diagnosis and follow up of the patients with cerebral infarction.

64

THE COMPARISON 133-Xe INHALATION ECT IMAGE AND 123-I IODOAMPHETAMINE ECT IMAGE WITH THE USE OF TOMOMATIC-64

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We reported the comparison 133-Xe inhalation study and 123-I IMP study in occlusive cerebro vascular 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 (1mCi, 180sec 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 intravenous administration, and image on about 14min after injection had almost same pattern as Xe CBF image by tomomatic-64. The serial change of IMP distribution corresponded to that of Xe, but no accumulation were observed in scalp and ventricle.
- (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.

65

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

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In order to investigate the cerebral 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 patients 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 30 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.

66

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

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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 O-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, i.e. deep gray matter, were high, but those values in cortical area showed relatively low. rOEF was about 0.38 in any area. rCBV showed almost the same values reported previously.

Error factors in the measurement of these parameters using the O-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.