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CLINICAL APPLICATION AND EVALUATION OF I-123 -IMP IMAGING BY SPECT FOR LOCAL CEREBRAL BLOOD FLOW IN PATIENTS WITH CEREBROVASCULAR DISEASE.

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I-123-IMP have recently been developed which accumulate in the Brain proportional to cerebral blood flow for highly lipophilic compound that crosses the BBB with almost complete extraction during a single passage through the cerebral circulation. This paper describes a clinical application and evaluation of I-123-IMP imaging by SPECT for local cerebral blood flow in patients with cerebrovascular disease. 15 patients of old cerebral infarction who are recieving medical treatments were studied after X-CT examination. 3.2 mCi of I-123-IMP was given i.v. by bolus injection. 30 min. after injection, the patients was scanned by a GE MaxiCamera 400A/T with a general purpose collimator at 64 projections for 360° with 30 sec. per projection. In our studies, 15 patients with old cerebral infarction had perfusion defect on the I-123-IMP study. When the I-123-IMP studies were compared to the abnormalities that were eventually demonstrated on the X-CT examination, all patients had I-123-IMP studies with clearer and larger perfusion defects than the abnormalities demonstrated on the X-CT scan. This findings suggested the I-123-IMP imaging by SPECT was useful.

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THE TIME SEQUENCE CHANGE IN I-123-IMP(N-ISOPROPYL-P-IODOAMPHETAMINE)IMAGES.

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The time sequence change in I-123-IMP images were observed on 20 cases (normal 3, cerebral infarction 14, cerebral hematoma 3) immediately, 2 hours and 8 hours after intravenous injection of 3 mCi of IMP.

1)In normal study, IMP mainly accumulated in the gray matter in the early scan. The contrast between gray and white matter was excellent. On the 8 hours delayed scan, IMP mostly accumulated in the white matter.

2)There was no activity of IMP in old cerebral infarction and cerebral hematoma.

3)But, in two acute infarction and one hematoma, IMP accumulated in the area of luxury perfusion which was proven by CBF study with Xe-133 gas.

4)In the area of the luxury perfusion, IMP shows higher activity on the early scan and almost same activity on the 2 hours image as compared to the opposite side. On 8 hours images, the distribution of IMP showed various patterns such as 1)decreased 2)same 3) intense as compared with normal side.

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REGIONAL CEREBRAL BLOOD FLOW MEASUREMENT USING N-ISOPROPYL-p-[I-123]IODOAMPHETAMINE.

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Thirty-one regional cerebral blood flow (rCBF) measurements were performed on 26 patients with cerebrovascular disorders by rotating gamma camera emission computed tomography using intravenously injected N-isopropyl-p-[I-123]iodoamphetamine(I-123-IMP) combined with the arterial input sampling method. The brain activity distributions of late tomographic image were corrected to represent 5 min. reference values with the use of the monitored entire brain's time activity curve. Brain mean blood flow values were 13 to 42ml/100g/min.. In 119 cortical regions obtained from 11 measurements in 9 patients, there was a significant correlation($r=0.41, p<0.001$) between rCBF values obtained from I-123-IMP method and regional initial slope index values obtained from Xe-133 inhalation method. rCBF measurement using I-123-IMP and rotating gamma camera ECT is not only for the entire brain but also three-dimensional. Besides, it is superior in spatial resolution and accuracy to conventional Xe-133 clearance method. Quantitative measurement is necessary to evaluate the diffuse low rCBF in cerebrovascular disorders.

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REGIONAL CEREBRAL BLOOD FLOW CHANGES DURING PHYSIOLOGICAL ACTIVATION.

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Regional cerebral blood flow (rCBF) changes during physiological activation by N-isopropyl-p-[I-123]iodoamphetamine(I-123-IMP) intravenous injection method were combined with those obtained by Xe-133 inhalation method in normal right-handed subjects. In I-123-IMP method, focal increases were detected in prefrontal cortex, both supplementary motor areas, right primary sensorimotor hand area and right central gray matter during left finger movement, and in primary visual cortex, visual striate cortex, prefrontal cortex, both supplementary motor areas, left prefrontal eye field, Broca's area, Wernicke's area and left angular gyrus during reading aloud, and in primary auditory cortex and frontal cortex during listening verbal material. Focal decreases were detected in both mid-Rolandic area during listening. On the other hand, Xe-133 method could neither distinguish focal increase in supplementary motor area from that in primary sensorimotor hand area during left finger movement, nor detect any focal increase other than that in occipital and left postero-superior temporal regions during reading aloud. I-123-IMP method is superior in both spatial resolution and accuracy to Xe-133 method, and is useful in evaluating rCBF changes.

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