

H. Brain and Central Nervous System

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THE STUDY OF CEREBRAL BLOOD FLOW IN CEREBRAL INFARCTION : THE COMPARISON BETWEEN CORTICAL AND PERFORATING ARTERIAL INFARCTION. R. Fukunaga, Y. Tsuneoka, M. Hirata, T. Takano, J. Shirai, M. Nakamura*, M. Kusunoki* and K. Kimura* Kobe Ekisai-kai Hospital, Kobe. Department of 1st Medicine, Osaka University, Osaka*

Twenty cases with cerebral infarction were classified into 2 groups by the neurological examination, CT scan, angiogram etc., 9 cases with cortical infarction (cortical group) and 11 with perforating arterial infarction (perforating group). The regional cerebral blood flow (rCBF) of each case was measured. Xe-133 was injected rapidly into the internal carotid artery through the catheter. The Xe-133 dynamic images were measured by a gamma camera (PICKER DYNA CAMERA 4) with an on-line minicomputer (HITACHI EDR 4200). The rCBF was calculated by the initial slope method and the rCBF functional image (rCBF FI) was developed. The partition coefficient of Xe-133 between blood and brain tissue was 0.87. The average value of mean cerebral blood flow (mCBF) was 35.3 ml/100g/min in cortical group and 45.5 ml/100g/min in perforating group. The former was considerably low in comparison with our normal value, 52-57 ml/100g/min. In cortical group, the low flow area was observed in corresponding to the focal cortical lesion. Otherwise, in perforating group, the low flow area was found near the central sulcus.

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rCBF ANALYSIS OF BRAIN TUMOR CASES. T. Minezaki, J. Haraoka, T. Tajima, H. Ito, T. Miwa, Department of Neurosurgery. H. Murayama, Department of Radiology. Tokyo Medical Collage.

From July 1980 to September 1981, we performed the measurement of rCBF for brain tumor cases using γ -camera combined with microcomputer. There were 29 cases of brain tumors containing 8 gliomas, 9 metastatic brain tumors, 9 meningiomas, 2 pituitary adenomas, and a chordoma. The measurement of rCBF were all done by intracarotid bolus injection of 5 mCi of ^{133}Xe , and after the measurement we performed radionuclide CAG with ^{99m}Tc HSA for precise localization of the lesion. In this report we pursued the relationship between rCBF and intracranial pressure, consciousness level, low density on CT, and EEG. In the case of increased ICP peritumoral rCBF decrease was found in 90% of cases and nontumoral rCBF decrease was found in 50%. In the case of impaired consciousness rCBF decreased both in peritumoral and in nontumoral region. As for EEG and rCBF, the decrease of rCBF in peritumoral region was found in 76% of cases which showed slow EEG wave and in 43% of cases which showed normal EEG. These tumors were divided into intraaxial and extraaxial tumors, peritumoral fw of intraaxial tumor was apparently lower than that of extraaxial tumor. This finding suggests that low density of CT in the case of meningioma is something different from actual brain edema.

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CORRELATION BETWEEN CEREBRAL BLOOD FLOW AND AGE-RELATED BRAIN ATROPHY. T. Yamaguchi, J. Hatazawa, S. Yoshioaka, K. Kubota, H. Yamaura and T. Matsuzawa Department of Radiology and Nuclear Medicine, Research Institute of Tuberculosis and Cancer, Tohoku University. Sendai S. Itagaki, A. Onae, and Y. Sasaki Sasaki Hospital, Minamimacni Clinic. Furukawa

Regional cerebral blood flow (rCBF) was measured by Xe-133 inhalation method about 24 subjects without abnormal findings on CT examination, and free from neurological disorders. Their age ranged from 26 to 81 years, and none of them has respiratory disturbance. The rCBF was computed as the initial slope index value (ISI). Brain atrophy was evaluated with computed tomography, using the brain volume index (BVI), developed by Yamaura, Ito et al., 1980. Correlation between mean brain ISI value and BVI was investigated. Decrease of BVI was associated with significant reduction in mean brain ISI value. ($p < 0.005$) Our findings suggested that decline of mean rCBF affected progression of age-related brain atrophy.

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CLINICAL EXPERIENCE WITH XE-133 INHALATION METHOD FOR MEASUREMENT OF REGIONAL CEREBRAL BLOOD FLOW. A. Matsumoto, H. Kikuchi, T. Shimomura, T. Arimitsu, K. Ito and S. Tsuchimoto Department of Neurosurgery, National Cardio-Vascular Center, Osaka

During the past few years, Xe-133 inhalation method has widely spread. But the reliability of this method is still under discussion. The purpose of this study is to discuss its reliability and reproducibility, based on our clinical experiences of 428 measurements. For CBF measurement, NOVO Inhalation Cerebrograph has been used. The normal CBF data were obtained on 15 healthy volunteers with an age range of 22 to 62 years (mean age 36.5). The mean value of ISI for the right hemisphere was 51.6 ± 6.3 (mean $\pm$ S.D.) and that for the left was 52.4 ± 6.0 . The regional CBF values were the highest frontally, then temporally and the lowest parieto-occipitally on both hemispheres. Those results were well correlated with the values obtained by Xe-133 intracarotid injection method. The correlation coefficient between ISI values and F_{init} was 0.965.

The correlation coefficient of reproducibility was 0.98 on the occasion of two rest measurements were made on the same day in 11 patients, and it was almost 0.98 on the occasion of two measurements were performed on some other day in 13 patients. From these results, it may conclude Xe-133 inhalation method is able to be used for regional CBF measurement in clinical cases.