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AGE-MATCHED NORMAL VALUES AND JUDGMENT IMAGE IN REGIONAL CEREBRAL BLOOD FLOW MEASUREMENTS BY ^{133}Xe INHALATION. H.Matsuda, T.Maeda, Xi Gui Luo, H.Seki, K.Hisada and M.Yamada. Kanazawa University School of Medicine. Kanazawa.

Age-matched normal values of initial slope index (ISI) of Fourier analysis were calculated from 125 regional cerebral blood flow (rCBF) measurements by ^{133}Xe inhalation method in 90 normal subjects, aged 19 to 80 years old, at rest and eye closed. Mean brain ISI showed significant negative correlation with advancing age ($r=-0.70$, $P<0.001$). The regression line and 95% confidence interval were $Y=-0.30X+67.8$ and ± 11.8 , respectively. Regional ISI also showed significant negative correlations with advancing age in the entire brain ($P<0.001$). The regional reduction of ISI with advancing age was significantly greater in the regional distribution of the middle cerebral arteries bilaterally, compared with regions in the distributions of the other arteries ($P<0.05$). Hyperfrontal distribution became gradually obscured with advancing age, because reduction of ISI with aging was significantly greater in the frontal than in other regions. Judgment image was automatically made with dividing the patient's values by the 95% confidence limits of age-matched normal values. According to this image, regions in which rCBF significantly decrease or increase can be easily evaluated.

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A STUDY ON REGIONAL CEREBRAL BLOOD FLOW MEASUREMENT BY ^{133}Xe INHALATION METHOD. H.Matsuda, T.Maeda, Xi Gui Luo, H.Seki, K.Hisada and M.Yamada. Kanazawa University School of Medicine. Kanazawa.

Fundamental investigation was performed on reliability of Fourier analysis of head clearance curves in regional cerebral blood flow measurements by ^{133}Xe inhalation as compared with conventional Obrist analysis. Fourier analysis revealed better reproducibilities determined by computer simulated curves and repetitive measurements in man than Obrist analysis. The excellent reproducibilities were obtained in Initial Slope Index (ISI) of Fourier analysis. The result was that coefficient of variation (C.V.%) in computer simulated curves was 1.4% and that C.V.% of the intermeasurement changes in serial measurements and in two measurements repeated at intervals of more than one month in man were 3.3% and 7.5% in hemispheric mean values, on average 5.0% and 8.7% in regional absolute values and on average 3.9% and 4.1% in regional hemispheric percent values, respectively. In the studies of the changes of regional cerebral blood flow from the resting conditions to the conditions of finger movement, listening to verbal material or music and reading aloud in right-handed normal subjects, both F_1 and ISI of Fourier analysis were more sensitive to detect significant changes than Obrist analysis.

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EVALUATION OF REGIONAL CEREBRAL BLOOD FLOW IN OCCLUSIVE DISEASE OF MIDDLE CEREBRAL ARTERY BY Xe-133 INHALATION METHOD. K.Tsuchiya, T.Machida, J.Nishikawa, K.Machida and M.Iio. Department of Radiology, Faculty of Medicine, University of Tokyo. Tokyo.

Regional cerebral blood flow (r-CBF) measurement was carried out in cases of occlusive disease of middle cerebral artery (MCA), which was demonstrated by cerebral angiography. The results of r-CBF measurement were compared with findings of cerebral angiograms and CT scans, and were divided into groups as follows: (I) Diffusely decreased blood flow in MCA area.

CT scans of these cases showed relatively large infarct in MCA area, although their angiographic findings were varied. A case showed complete occlusion of stem of MCA and another showed no abnormal finding.

(II) Partially decreased blood flow in MCA area.

These cases were subdivided into;

a: Cases in which collateral blood flow from surrounding vessels seemed to be demonstrated.

b: Cases in which occluded or stenotic branches seemed to be demonstrated.

These findings suggest effectiveness of r-CBF measurement by Xe-133 inhalation method for evaluation of blood flow in MCA occlusive diseases.

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EVALUATIONS OF TIAS AND COMPLETED STROKES BY SIMULTANEOUS CBF MEASUREMENTS OF AFFECTED & UNAFFECTED HEMISPHERES IN ICA OCCLUSIONS. Y. Tsuda, K. Kimura, H. Etani, Y. Isaka, T. Asai, M. Nakamura, Y. Kusumi, H. Omori, Y. Nakamura, S. Yoneda and H. Abe. Osaka University School of Medicine. Osaka.

Bi-hemispheric CBF measurements during rest and hyperventilation, with intracarotid Xe-133 injection method, were investigated in 19 cases, angiographically diagnosed as unilateral ICA occlusion as the responsible lesion for symptoms, including 8 cases with TIAs and 11 cases with completed strokes. CVR index (MABP/mCBF) and CO_2 reactivity ($\Delta\text{CBF}(\%)/\Delta\text{PaCO}_2$) were also investigated. A significant decrease ($P<0.05$) of hemispheric mCBF with preserved CO_2 responsiveness was observed in the affected hemisphere, as compared with the unaffected hemisphere in a subacute-chronic stage of TIAs. Moreover, a direct proportionality of CBF in pressure-flow relationship, observed in 11 cases with completed strokes was not recognized in 8 cases with TIAs. A degree of the abnormalities in cerebral circulation of the affected hemisphere was suggested to be somewhat different between TIAs and completed strokes in ICA occlusions, i.e., reduced hemispheric mCBF with preserved CO_2 responsiveness and independence of CBF with blood pressure may exist in cases with TIAs despite the subacute-chronic stage of the clinical course.

In conclusion, bi-hemispheric CBF measurements would be a useful method for evaluating the CBF in ICA occlusions.