A STU dy on Regional Cerebral Blood Flow Measurement by 133XE Inhalation Method


Fundamental investigation was performed on reliability of Fourier analysis of head clearance curves in regional cerebral blood flow measurements by 133Xe 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 3.0% and 4.1% in regional hemispheric percent values, respectively. In the studies of the changes of regional cerebral blood flow from the results in the conditions of the following conditions: listening to verbal material or music and reading aloud in right-handed normal subjects, both P; and ISI of Fourier analysis were more sensitive to detect significant changes than Obrist analysis.

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

Regional cerebral blood flow (rCBF) measurement was carried out in cases of occlusive disease of middle cerebral artery (MCA) which was demonstrated by cerebral angiography. The results of rCBF 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 rCBF measurement by Xe-133 inhalation method for evaluation of blood flow in MCA occlusive diseases.