

in the unit volume of serum was used.

The RBC suspension was made up by the resuspension of RBC which was separated from serum by refrigerated centrifugation (-15°C , 3500 rpm).

Bradykinin could be activated and absorbed on the cell membrane of the erythrocytes, therefore the introduction of the RBC suspension resulted in the change mentioned above.

On the contrary, the RBC suspension treated with trasylol, which is polyvalent inhibitor to kallikrein, plasmin and trypsin, did not increase the formation rate.

In these points of view, it was speculated that increase of the formation rate of cerebrospinal fluid was due to permeability globulin and bradykinin, and in part by 5-hydroxytryptamin in larger amount.

A-3. Studies on Normal Pressure Hydrocephalus with R.I. (The third report)

^{133}Xe rCBF for Evaluating the Brain Damage—

Motoki BABA, Toshio BEPPU, Eiji TAKEYAMA, Tadashi OHKUBO, Eiichi TAKARA, and Koichi KITAMURA
Department of Neurosurgery, Neurological Institute, Tokyo Women's Medical College

Some patients whose diagnosis were Normal Pressure Hydrocephalus (NPH) failed to show improved clinical signs after shunt operations. This result might have been, in our opinion, influenced by the duration and the severity of accompanying brain damages. We already demonstrated the existence of brain damage in NPH utilizing the theory of "barrier ratio", and in this report we measured regional cerebral blood flow (rCBF) with ^{133}Xe -method to determine the degree of the damage from aspect of cerebral circulation.

Subjects: rCBF was measured upon 10 among 21 patients who are diagnosed to have NPH secondary to subarachnoid hemorrhages, avoiding acute phase, and as control group upon 2 patients of headache with no neurological disorder.

Results: NPH group had lower rCBF at each cerebral area than the control group. Also increase of rCBF with inhalation of CO_2 was 21.3% which was lower than that of the control. Decrease ratio of NPH to control group were -53% at frontal, -44% at temporal and -45% at occipital area showing the largest decrease at frontal area.

Three patients who had marked leptomeningeal fibrosis and one with long standing brain damage demonstrated marked decrease ratio of -45% to -57% of mean rCBF at each area, and were found to have low reactivity to CO_2 inhalation. On the other hand, preoperative decrease ratio of mean rCBF had been smaller in 6 patients whose shunt operation were effective than those of ineffective shunt operation group, and their reactivity to CO_2 inhalation were larger.

Furthermore we measured the "barrier ratio" upon 7 NPH and 2 control patients. And there was positive moderate correlation between CBF and "barrier ratio" ($r=0.893$). Therefore they could be used as a parameter to determine the degree of brain damage.

Conclusion: Patients indicating prolonged mildly increased intracranial pressure and brain damage with lowered CBF or "barrier ratio" demonstrated marked decrease of CBF. After shunt operations they failed to show improvements clinically nor in CBF measurement. Therefore, an effective shunt operation might not be expected for such a case even if NPH were a probable diagnosis, or strictly speaking it should be excluded from the criteria for genuine NPH.

A-4. Attempts of Measuring the Increment Rate of Water Contents in Edematous Brain Tissues by $^3\text{H}_2\text{O}$ -Liquid Scintillation Counter

Hiroshi ISHIMITSU, Tetsuo ARIMITSU, Hiromasa NAKAYAMA, Kenji SUZUKI, Akira MATSUMOTO and Akira NISHIMOTO
Department of Neurological Surgery, Okayama University Medical School, Okayama

Kosuke OHTA
Neurosurgical Service National Hospital in Fukuyama, Fukuyama

For the purpose of measuring the increment