within CSF cavity. The ratio B/A indicates the order of RISA diffusion. A: counts between xyphoidion and symphysion after 30 min. B: counts between vertex and gnathion after 4 hrs. This B/A ratio was similar value in GBS group(6) as in control group (6).

Single dose administration of 100μCi of RISA into P revealed that disappearance curves from P in GBS and control cases was not discriminated at all. Because C is negligiblly small compared with P and E, RISA disappeared from P with albumin metabolism and with transport into E. Therefore it may be assumed that the albumin metabolism and permeability of P-E barrier in GBS are as normal as in control. When the same amount of RISA was administrated intrathecally, RISA appeared more rapidly, into P reached higher peaks and then declined more faster in P in GBS than in control cases.

The only possible explanation on the results is that C-P barrier in GBS is more permeable than that of control. Accelerated influx of RISA from C into P is owing to hyperpermeability of C-P barrier and elimination from P is also accelerated, because its supply from C is stopped earlier.

Summary: the RISA diffusion within CSF cavity is not different at all between the cases of GBS and the control. As the mechanism of high content of CSF-protein in GBS, it may be concluded that CSF-plasma barrier is more permeable than that of control.

Radionuclide Measurement of CSF Flow Rate in Ventricular Shunt.

——Phantom Experiment and Clinical Application——

T. Maeda, H. Mori, K. Hisada

Department of Neclear Medicine

S. Kadoya, K. Haba

Department of Neurosurgery, University Hospital, Kanazawa University, Kanazawa

Methods:

On phantom experiment, the Rickham resesvoir-Holter and the flushing device-Pudenz shunt, Picker Dyna Camera II–C apparatus and digital analytical balance (Sartorius Type 2463) and $^{99m}TcO_4^-$ were used.

The shunt system operated as a siphon under the gamma camera. $^{99m}TcO_4^-$ of 50 to 100 μCi was injected into the reservoir and removal of it was expressed as a time activity curve, and a clearance half-time ($T_{1/2}$) of radioactivity was determined from this curves.

The flow downed and evaporated water was wieghted with the balance and total of these values divided by the duration of water transfer yielded the flow rate in gram/min or ml/min. The removal of radioactivity and the flow rate of water through the CSF shunt divice were studied simultaniously. These values were plotted on logarithmic graph and compared with calculated ones according following equation:

$$C_{CSF}=\frac{0.693}{T_{1/2}}\times \text{Reservoir volume}$$

Results and Discussion:

The proper volume of $^{99m}TcO_4^-$ was 0.05ml for prevent the ventricular reflux. The relation of flow rate and $T_{1/2}$ showed almost linear logarithmic graph. But the experimental $T_{1/2}$ was longer than calculated one in every flow rate. This reason may be incomplete mixing of the radionuclide in the reservoir instantaneously.

The degree of the discrepancy in these values was differed from the use of Rickham reservoir-Holter shunt to the flushing device Pudenz shunt because of different volum, machanism and functional structure of the reservoi.

Our experimental graph is more useful and practical than the equation in clinically determination of the CSF flow rate through the shunt were measured with this experimental graph as 0.25 to 0.44 ml/min in sitting and more small in supine.

A Measurement of Cerebral Hemodynamic in Both Hemispheres with Radionuclide Angiography and Analog Simulation Method

K. UEMURA, K. YAMAGUCHI, S. KOJIMA, Y. AIZAWA and T. HACHIYA

Division of Radiology, Research Institute of Brain and Blood Vessels, Akita.

Clinical investigators have continued to search for a simple method of measurement of cerebral blood flow that would achieve the widespread clinical usefulness of techniques such as brain scanning. This report deals with a simple method to determine hemodynamics of each hemisphere by means of analog computer simulation of radioencephalogram(REG).

Method : The basic principle of the analog simulation was based on the reports of Kuwahara et al.

A bolus of 10—15mCi ^{99m}Tc pertechnetate in a volume of 1—5 mCi was injected into the femoral vein. Cranial activity was recorded in serial two frame per second by an Autofluoroscope. The radiocardiogram and input curve into the right atrium was also recorded for later analysis with analog simulation. The REG of both hemispheres were described by the selection of ROI on the brain image using a light pen of Autofluoroscope. Data distortion due to dead time (24 μ sec) of the Autofluoroscope was corrected by the method of Jones et al.

With this method, CBF ratio between both hemispheres was calculated by the ratio of integrated value of input functions to both hemispheres. Mean transit time of the each hemisphere could be calculated as the sum of transportation lag and time constant of the brain.

Results : 1) Using the method described above, hemodynamics of both hemispheres was examined in healthy brains and some cases of cerebral infarction. CBF ratio between the both hemispheres was nearly one in the healthy brains and considerable decrease in the ratio was observed in stroke patients between hemispheres with cerebral infarction and intact hemispheres. 2) The study could easily be performed on a routine basis since only an intravenous injection was required. Combined with the study, radionuclide angiography and static brain scan could also be carried out. 3) Contamination of radioactivity in the external carotid arterial system was considerably smaller than Oldendorf's method and separation of the REG in both hemispheres was excellent in this method.