ures only 1.5 mm thickness and 8 mm in diameter, and connected with FM transmitter.

Several instances of experimental as well as clinical use are to be presented.

C-7. The Treatment of Acute Brain Swelling After Release of Intracranial Hypertension

—The Differential Effects of Cerebral Circulation and Metabolism—

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The effects of increased intracranial pressure (ICP) upon the hemodynamics-responses and total cerebral blood flow have been well defined. But little knowledge is known about the changes of regional cerebral blood flow (rCBF) and blood, csf acid-base balance following release of intracranial hypertension (ICH).

In order to get the information about correct therapy the present study was designed to measurements for the alteration of rCBF, ICP, sagittal venous pressure, blood acid-base balance and vital signs (simultaneously) during and after release of increase of ICP. The cortical blood vessels were observed through a cranial window with a microscope ($\times 20$). The effects of dehydration, hyperventilation, hemodilution therapy, central depressor medication, administration of THAM-sol. and the combination of these therapies were studied on the acute brain swelling occurring after release of ICH.

The results are summarized as follows;

1) Progressive arterial hypoxemia is induced following intracranial hypertension in all cases, but acid-base balance is altered depending on the grade of height of ICP. According to the relationship the grade of ICP and the alteration of the acid-base balance 4 stages are identified as follows; stage 1: normally-slightly metabolic acidosis, stage 2: hypoxic respiratory alkalosis; stage 3: severe metabolic acidosis; stage 4: metabolic and respiratory acidosis.

2) During increased intracranial pressure by compression, there is marked decrease of rCBF at the compressed area, but the clearance is distinctly accelerated except subcortical rCBF at the surrounding area of compression. Following release of moderate brain compression by balloon, rCBF at both area increased markedly without any change of perfusion pressure (Mean Arterial Blood Pressure—Sagittal Sinus Wedge Pressure).

3) Circulatory disturbance is most severe in the venous side and perfusion pressure gradually decrease and finally cease in capillaries and later in the larger vessels associated with high grade of ICH. The causes of reduction and cessation

of circulation are not only external compression on the vessels, but also the alteration vessels themselves, such as internal occlusion by the sludged cells, microemboli and intravascular clotting in vessels.

4) Following the deflation of the balloon, acute brain swelling (stage 2-4) was observed associated with the alteration of cerebral circulation in the majority of the capillaries and small vessels. Microcirculatory disturbances caused by intravascular occlusion must be considered as a cause of acute brain swelling following release of ICH.

According to these experimental results, the treatment of acute brain swelling after release of intracranial hypertension, both the dehydration and hyperventilation is not effective therapy, but the combination therapy of hemodilution and hyperventilation or administration of THAM solution would be useful therapy for such severe acute brain swelling following release of ICH.

The useful clinical indicators selecting correct therapy for the cases, are increasing of intracranial arterio-venous O_1 difference in the first choice.

C-8. Acute Brain Swelling

—Chemical Factor and Cerebrovascular Tone—

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C-9. Formation and Absorption of Cerebrospinal Fluid in Increased Intracranial Pressure

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The technique of cerebrospinal fluid perfusion by Pappenheimer has made a great progress in understanding the CSF dynamics.

Fifteen dogs were perfused from ventricle to cisterna magna with artificial CSF containing 10 μ Ci of ^{111}I -RISA in 500 ml.

The successive 10 min samples were collected and measurements were made on inflow rate, outflow rate and radioactivity.

The CSF formation rate was increased in accordance with the elevation of the