circumscribed cortical lesion and underlying white matter were dissected. This edematous white matter was placed in a refrigerated centrifuge and spun at 10000 rpm for ten minutes. This produced a slightly xanthochromic transparent fluid. For comparison, sample of serum and cerebrospinal fluid were obtained from the same animal at the time of sacrifice.

Two lysosomal enzymes, i.e., acid phosphatase and acid proteinase were assayed for a total activity. The activity of acid phosphatase in edema fluid was $136 \pm 32$ phenol mg/dl/60 min. at $37^\circ$C. This value was equivalent to about 100-fold of that of the cerebrospinal fluid and slightly less than that in the edematous white matter.

The activity of acid proteinase was $5.17 \pm 2.57$ glutamic acid/ml/60 min. at $37^\circ$C and about 10-to 100-fold of that of the cerebrospinal fluid, though with great fluctuation.

The activity of acid phosphatase of the neighbouring gray matter of circumscribed cortical lesion and underlying white matter decreased a little.

The activity of acid proteinase of circumscribed cortical lesion almost fell within the normal range, while that of white matter increased by two-fold, reaching that of the gray matter. Then, comparison was made of relation between the activity of two enzymes of the white matter of the edematus brain and that of the edema fluid.

The activity of acid phosphatase in the edema fluid was only a little lower than in the white matter, while acid proteinase in the former was about 1/4 of that in the latter. But it was noteworthy that the enzyme activity observed was very high for that in the cell free edema fluid.

It may be that lysosome plays some role in the increase of vascular permeability and the solubility of structural proteins, though the present result could not elucidate the relationship between the enzyme and the brain edema formation.

C-4. Increased Cerebral Permeability to Sodium Fluorescein During Profound Differential Cooling of the Brain
—With Special Reference to the Temperature Difference between the Brain and the Blood, and Some Aspect to Clinical Application—

Yushi Kondo and Maitland Baldwin
Surgical Neurology, National Institute of Neurological Disease and Stroke, National Institutes of Health, Public Health Service, U.S. Department of H.E.W.

Increased cerebral permeability during profound hypothermia below 25°C was investigated with intracerebral uptake of sodium fluorescein.

With combination of extracorporeal perfusion cooling and/or warming, head
cooling and head warming, three different arrangements between brain tissue temperature and inflow blood temperature at neck level were achieved. They were cold brain-cold blood, cold brain-warm blood, and warm brain-cold blood respectively. (CC, CW, and WC). In CC, difference of temperature between brain and blood was about 1°C, while, CW and WC could achieve about 5°C of difference and well separated at 25°C, on adult dogs.

These conditions were maintained about 1 hour and sodium fluorescein was given intravenously at the middle of this duration.

Sodium fluorescein uptake was the highest in WC and the lowest in CW. From these results, it was suggested that the cooling of inflow blood temperature seemed to be more important than the cooling of the brain tissue itself to achieve increased cerebral permeability during profound hypothermia, and some temperature gradient in which brain temperature was higher than blood temperature might be a helpful factor.

Increased cerebral permeability in these experimental groups was confirmed to be reversible with rewarming.

In general aspects, WC-type hypothermia is considered to be harmful, so that the clinical application must be inadequate even though the condition is reversible to the temperature. In addition, WC and CC need extensive procedure such as extracorporeal circulation with heparinization invariably.

CW-type hypothermia by means of superficial head cooling and/or topical brain cooling is a handy technique to expect increased cerebral uptake of drugs when this procedure is aimed to introduce as clinical application, though there is the disadvantage to achieve increased cerebral permeability.

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C-5. Acute Intracranial Hypertension

Minoru Hayashi, Akira Kinoshita, Shinobu Igarashi and Shinjiro Yamamoto

Department of Neurosurgery, School of Medicine, University of Kanazawa

Continuous recording of the CSF pressure by means of lumbar puncture in patients with ruptured aneurysm, traumatic subdural hematoma and intracerebral hemorrhage was made during the posthemorrhagic acute stage.

The CSF pressure curves in acute stage show spike-like elevations (pressure waves) which superimposed on an elevated basal intracranial pressure. The pressure waves could be classified into two types. One was slow waves in the range from 30 seconds to three minutes in duration and the other being sharp waves with duration of about 15 to 30 seconds. It was particularly notable that while marked rises in the systemic blood pressure occurred synchronously with the sharp waves, opposite was true for the slow waves.

The slow waves were usually observed in early or still not severe stage of the