separated. CSF pH were somewhat lowered but in narrow range between 7.2 and 7.35. Homeostasis of CSF pH was seemingly maintained, when HCO_3^- deficit was compensated by decreased pCO_2 . If the metabolic acidosis of CSF was associated with insufficient hyperventilation, CSF pH was consequently lowered. Increment of lactate in CSF, which was varified immediately after trauma, correspondent to significant reductions of CSF HCO_3^- . In the cases of favorable con-

valence, both lactate and HCO_3^- in CSF were normalized simultaneously within a week of course.

Acid-base status of CSF, especially HCO_3^- concentration, is a good indicator of metabolic disturbance in the brain tissue which is less influenced by blood than other indexes such as H^+ and pCO_2 . Severe hyperventilation may aggravate the metabolic acidosis conversely. Here, the validity of intrathecal administration of buffer agents is consecutively to be estimated.

1-4. Polygraphic Study as a Prognostic Criterion in Post-traumatic Coma

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For the clinical evolution of post-traumatic comatose patients serial polygraphic recordings were taken night and day, which were EEG, chin-EMG, both eye movements and ECG and in some cases with the temperature of the tympanum or the plethysmogram.

Our comatose subjects was composed of 23 cases with acute head injury, in which 20 cases had operative treatments. This study was helped by 10 cases of post-traumatic prolonged coma, 4 coma cases of brain tumor and one come

case with ruptured cerebral aneurysm.

This examination revealed that the typical polygraphic sleep patterns and organized circadian activity was shown in 13 patients with favourable prognosis and on the other hand, nocturnal unchanged "biphasic" or "monophasic" activity was seen in fatal cases.

In our 23 cases the presence of the typical sleep patterns or organized circadian rhythm suggests a favorable prognosis in post-traumatic comatose state and seems the very valid neurophysiological criterion for prognosis.

To judge the prognosis of comatose patients after head injury, to take the nocturnal and diurnal polygraphic recording are useful and recommended.

1-5. PaCO_2 and PaO_2 in Acute Stage of Patient with Severe Head Injury and Pulmonary Complication

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Head injury may be associated with thoracic injury or may occur to those who have preexisting lung disease. It has been stressed that in a comatose patient, the airway is apt to obstruct and product hypoxemia and hypercapnia. PaCO_2 and PaO_2 in acute stage were studied of 8 patients having severe head injury and the associated pulmonary complication.

Five cases had positive x-ray findings such as diffuse veiling or pneumothrax, and two had chronic pulmonary diseases. In a patient, in whom examinations failed to reveal serious signs, the hypoxemia had continued to aggravate until an assisted respiration was started.

All were kept under oxygen inhalation and prevented from airway obstruction with endotracheal tubing or tracheotomy. None had a controlled respiration.

PaCO_2 was decreased or within normal range in all except one who had had pulmonary tuberculosis. PaO_2 was decreased without exceptions, but concomitant increase of PaCO_2 (hypercapnia) never occurred to 7 cases. Effective alleviation of the hypoxemia was achieved first with mechanical assisted respiration.