in the course of anesthesia and operation.

Postoperative adrenocortical reactions of studied cases were labile in comparison with the cases under general surgical operations.

Therefore, in order to prevent excessive vital reaction to stress, we have operated our brain tumor cases in cocktails hypothermic anesthesia which has been found very effective and useful.

81. Studies on Metabolism in Case of Brain Tumor and Brain Lesion: with Special Reference to its Influence to Liver Function.

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In order to study metabolic disorder in case of brain tumor, we examined the pathophysiology of the liver as well as endocrine organs. In our present study, we investigated liver function in accordance with the locations of brain tumor in our clinical cases. On the other hand, brain tumors were experimentally made in rabbits and mice and histology, histochemistry, liver functions, and circulatory dynamics of the liver were observed.

1) In clinical cases, those who have major lesions in several portions including caudate and lenticular nuclei, hypothalamus (dorsolateral portion and preoptic area) and island, show disturbance of hepatic function, and react sensitively to the C.C.F. test.

2) As to the experimentally produced brain tumor, we observed morphological and functional changes of the liver in cases having brain tumor in the above mentioned regions. Then, its genesis was considered.

3) By examining hepatic circulatory dynamics, we intended to clarify whether these changes of the liver are primarily influenced by the central nervous system, particularly caused by direct damage of parenchymatous cells themselves or disturbance of visceral circulation of the liver.

82. Pathophysiology of Cerebral Hemispherectomy: Autopsy Findings of Two Cases

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We carried out cerebral hemispherectomy in 9 cases of infantile hemiplegia,
and 2 out of the cases died. The autopsy findings of these causes showed us some important pathophysiology.

Case 1: a boy of 9 years; his chief complaints were hemiplegia, epileptic seizures, and mental retardation.

Case 2: a boy of 10 years; his chief complaints resembled those of the first case, but in a more marked way.

The first case died of successive epileptic seizures, just 3 weeks following the operation though his postoperative course was very smooth. The child in the second case, who after the operation became very calm and almost free from severe epileptic seizures, complained several times of some episodes of autonomic dysfunction and died 4 years following the operation.

In the 1st case the cerebral hemisphere was removed including caudate, lentiforme, and amygdaloid nuclei along the outside of the thalamus en block. The removed hemisphere showed no marked histological changes responsible for the hemiplegia.

The operative procedure of the 2nd case was almost the same as that of the 1st case. The most noticeable change in the removed hemisphere of this case was cerebral softening, occupying nearly the whole occipital lobe except for area 17. Other findings were disappearance of some pyramidal cells of the 3rd and 5th layers in area 4 and of the 3rd layer in area 6. In the white matter, there were some parts showing gliosis without demyelinating lesions. Also, this case did not show morphological change causing hemiplegia.

The autopsy findings of the 1st case were as follows: The left cerebral cavity was filled with clear but xanthochromic fluid, and the right cerebral hemisphere and brainstem showed no shift toward left. At the time of operation the left cerebral hemisphere was removed along the outside of thalamus, and the internal part of the globus pallidus remained. However, autopsy findings showed that operative damage reached the anterior nucleus, the lateral part of the lateral nucleus and the ventral nucleus of the thalamus. Again, necrotic lesions seemingly due to scanty vascular supply occupied the lateral, ventral, pulvinar and central nuclei of the thalamus. This necrosis became much more extensive posteriorly, and there existed such lesions in the medial and lateral geniculate bodies, sub-thalamus, and some parts of the substantia nigra. In spite of the healthy appearing thalamic nuclei, the nerve cells had disappeared or showed degenerative change and gliosis occurred there. Conclusively, none of the normal thalamic nuclei were complete. Subthalamic nuclei on the operative side also showed gliosis and cell degeneration. In the hypothalamus, we could see small necrotic lesions of the anterior hypothalamic nucleus, gliosis without nerve cell disappearance of the lateral hypothalamic nucleus, and gliosis with cell disappearance of the mammillary body on the operative side. There existed some necrotic lesions, gliosis, and slight cell degeneration in the substantia nigra. Red nucleus showed gliosis and the cells of reticular formation were not so well stained. In the pons,
medulla, and spinal cord some gliosis and granular dissolution of pontine nuclei, gliosis of the pyramidal tract, and slight shrinkage of the inferior olivary nucleus were found. There were all on the operative side. The nuclei of cranial nerves were quite normal. Marginal gliosis, edema, perivascular gliosis, and atrophy cruciatus of the dentate nucleus were seen in the cerebellum.

The following findings are for the 2nd case: Neomembrane was formed covering the inner surface of the hemispherectomized cavity filled with xanthochromic fluid, however, no brainstem shift could be found. The thalamus of the operative side had disappeared completely, though it had been left during the operative procedure 4 years ago. Lateral ventricle and 3rd ventricle were dilated. From the basal view, we could see the atrophy of the ipsilateral pons and medulla, but the cerebellum and the upper part of the spinal cord showed atrophy on the contralateral side. In general, meningeal adhesion, marginal gliosis and granular ependymitis were noticed. In the cortex, pyramidal cells of the 3rd layer showed slight atrophy and in the white matter perivascular edema, acute swelling of oligodentroglia and some gliosis were present. As mentioned above, the thalamus and subthalamus of the operative side disappeared completely macroscopically, and only remnants filled with remarkable gliosis were seen microscopically. The contralateral structures were deformed, but no change in the nerve cells was seen. The following changes were noticed on the operative side too; demyelinating lesions in the superior colliculus, demyelination without cell change in the red nucleus and atrophy associated with gliosis in the substantia nigra. Some crumbling of nerve fibers with sheats was seen in the reticular formation, more on the operative side. There existed almost complete demyelination and marked atrophy of the peduncle on the operative side. Nuclei of cranial nerves in the pons and medulla were all normal; however, slight atrophy was seen in the inferior olive. In the spinal cord, degeneration was found in the contralateral lateral pyramidal tract the ipsilateral anterior pyramidal tract, some parts of Goll's tract, and at the entrance of the posterior roots. The degeneration of the anterior pyramidal tract almost disappeared in Li. The atrophy of the contralateral anterior horn cells was seen, however it became less remarkable caudarwarts. Atrophia cruciatus due to Gudden atrophy, and marginal and perivascular gliosis were the change in cerebellum.

In short, evident different findings in the 2nd case of 4 postoperative years compared with the 1st case of 21 postoperative days were disappearance of the thalamus and hypothalamus, atrophy of the cerebral peduncle and pons as well as the medulla on the ipsilateral side, and atrophy of the upper part of the spinal cord as well as the cerebellum on the contralateral side. The disappearance of the thalamus and hypothalamus seemed to be caused by vascular disturbance from the histological point of view. Ependymitis granularis and marginal gliosis may be responsible for the fact. The vascular supply of the thalamus and hypothalamus is supported by the thalamogeniculate, thalamoperforate, and medial caudal
chorioidal arteries. These blood vessels come from the posterior cerebral artery; therefore, if possible, it is most important to ligate the artery peripherally. In other cases, postoperative vertebral arteriography showed occlusion of the posterior cerebral artery from the bifurcation, though the clipping was carried out two to three cm from bifurcation. Therefore, it is very probable that the supplying artery of the thalamus and hypothalamus was occluded. Also, in the 1st case the just supplied part by the thalamogeniculate artery of thalamus was going to be necrotized. The necrosis in the 2nd case seemed to be due to progressive ischemia. The cerebrospinal fluid containing these pathological products might stimulate the brain substance causing marginal gliosis and granular ependymitis. The cause of death was the fact that the hypothalamus inclined to be disharmonious. The changes in the 1st case also seem to resemble the morphological changes of the 2nd case. The postoperative clinical course was reported previously in detail. However, I should like to emphasize the strong functional compensation of the brain.

83. Studies on Cerebral Hemispherectomy, especially ACTH, Insulin and Adrenalin Response Test

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ACTH, insulin and adrenalin response was studied on 10th and 20th days, 1st- and 3rd-month after cerebral hemispherectomy was performed on dogs for the purpose of finding its influence on the thalamus and hypothalamus. The responses were observed on the phase of counts of eosinophile leucocyte, neutrophile leucocyte, blood sugar content and ChE activity after injection with insulin 1.5 unit/Kg, ACTH 1 unit/Kg, and adrenalin 0.01 mg/Kg for each dog. On 10th and 20th day after hemispherectomy the dogs showed apparent ACTH, insulin resistance, and on 1st and 3rd month the dogs showed sensitive patterns, although they appeared normal. In the early stage, the balance of hypothalamus hypophyseal system was disordered in stress following the operation, and in a late stage recovered from the stress.

These results were most probably caused by the activity of hypothalamus hypophyseal system to stress and have risen owing to the removal of cortical controls.