intracranial pressure.

- Grade 7. Semicomatous state.
- Grade 8. Semicomatous state with neurological deficit and/or increased intracranial pressure.
- Grade 9. Semicomatous state with poor vital signs.

Grade 10. Comatous state

Grade 11. Comatous state with decerebrate posture.

Grade 12. Comatous state and state of brain death.

III) Acute communicating hydrocephalus and ventricular atrial shunt.

In the first week after subarachnoid hemorrhage, angiography was done in 31 cases of ruptured intracranial aneurysm. We found that 11 cases of these patients had acute hydrocephalus. 7 cases were found out with in 2 days and conciousness of these patients were coma or semicoma.

In 6 cases of acute hydrocephalus V-A shunt was carried out before the intracranial surgery. After V-A shunt patient's conciousness was markedly recovered in 1–3 days in 5 cases and we stressed necessity of V-A shunt operation as preoperative management.

S-III-2. Shunting Procedure for Poor Risk Patients with Intracranial Aneurysm

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Despite of techniques of microsurgical procedures the postoperative course of intracranial aneurysms has not been necessarily improved. One of the important reasons is that the prognosis of intracranial aneurysms is closely related to the level of consciousness of the patient at the time of surgery. As far as factors affecting consciousness are concerned, the following can be pointed out; hydrocephalus secondary to subarachnoid hemorrhage, intracerebral hematoma, brain edema, cerebral vasospasm and cerebral ischemia. Therefore, it would be expected to improve the condition of these patients by eliminating these factors as early as possible. Hydrocephalus, one of the most important factors above mentioned, was investigated in relation to the level of consciousness of critical patients with aneurysm and the result of shunting operation on it was examined.

First of all, we actively carried out the direct attack to aneurysm as neck clipping irrespective of the condition of patient. When the postoperative consciousness failed to improve and moreover hydrocephalus was revealed on cerebral angiograms, we performed shunting procedure such as external ventricular drainage, ventriculoperitoneal or atrial shunt.

The results of 18 cases with shunting operation to date were as follows; six

excellent, three good and nine fair. Especially, five of 6 excellent cases were Hunt and Hess's Grade IV patients. Cerebrospinal fluid pressures in excellent and good cases preoperatively revealed much higher than those in fair cases. This fact implies that shunting procedure improves the level of the consciousness with hydrocephalus secondary to subarachnoid hemorrhage.

Futhermore, the relationship of the consciousness to hydrocephalus and vasospasm was studied 26 poor risk patients. Hydrocephalus was observed in 19 cases of them (73.1%), whereas vasospasm was recognized in 11 cases (42.3%).

Consequently, it might be suggested that hydrocephalus significantly influenced upon the level of the consciousness.

S-III-3. Treatment for Ruptured Aneurysm in Acute Phase

---Especially, concerning with medication of hypotensor, vasodilator and anti-fibrinolytic agent----

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In acute phase of ruptured aneurysm for patients in Grade III with uphill course, elective operation was done after getting better conditions, and for patients in Grade III with downhill course or in Grade IV, operation was performed immediately when vital signs were allowable.

Anti-hypertensive agents were given to all patients in acute phase. But diastolic hypertension which was over 110 mmHg was brought down lower than 90 mmHg. When patients were old, arteriosclerotic, cerebrovasospastic, and showed systolic hypertension over 160 mmHg, blood pressure was reduced to 20 percent.

Local application of papaverine to spastic cerebral artery at operation was performed, and excellent cerebral vasodilation was obtained in 7 of 12 cases.

ECG changes associated with subarachnoid hemorrhage are ST-segment displacement, T-wave changes and ST-interval changes. However myocardial infarction should be ruled out by serial ECG, SGOT and SCPK.

24g of EACA was administered to 14 cases intravenously or orally. But one of them rebleeded before operation. Anti-fibrinolytic agents were thought to increase the incidence of ischemic cerebral infarction. Therefore following experiment was under-taken.

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