

m-5. The Hypotensive Effect of Ascorbate on Intracranial Pressure

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The experimental and clinical results obtained with the intravenous use of ascorbate (sodium and meglumine salt) as agents for decreasing intracranial pressure are reported. The method of administration is as follows. In a dosage of 1.0 gm/kg body weight, administered intravenously for 20 minutes as 25% solution, ascorbate induces marked intracranial hypotony within 30 minutes, to be continued for 3 or 4 hours.

Meglumine ascorbate has proved valuable in completely eliminating hypernatremia as well as disorder of blood-brain barrier, which are obliged to originate in the intravenous rapid injection of sodium salt. The results in animal experiment show that meglumine ascorbate is more highly effective than sodium salt to produce a significant osmoredution in intracranial pressure.

m-6. Studies on the Osmotherapeutic Agents for Brain Edema

IV. Prolongation of CSF Pressure Lowering Effect by the New Osmotherapeutic Agent, 30% Fructose-25% Ascorbic Acid

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Osmotherapeutic agents are indispensable in the field of neurological surgery. We have been studying on the osmotherapeutic agents systematically for many years. In 1965 we reported on fructose-mannitol solution containing 30% fructose and 15% mannitol in Japanese neurosurgical society meeting and in 1967 this paper was published in J. of Neurosurgery Vol. XXVI, No. 3. The main important point for ideal lasting effect with intravenous administration of minimal fluid volume. We mixed hypertonic fructose solution and ascorbic acid instead of mannitol to prolong the CSF Pressure lowering effect and to reduce the water volume administered into the cardiovascular system after fundamental study on the osmotherapeutic effect of ascorbic acid. The new agent contains fructose in 30% and ascorbic acid in 25%. One of the advantages of this solution is that the amount of water volume into the cardiovascular system is only 3 ml/kg and is much less than the other osmotherapeutic agents, as much

as 30% urea solution. The degree of CSF Pressure lowering effect is 48.6–81.5% of initial pressure. The other great advantage of this solution is the duration of the CSF Pressure lowering effect and it lasts for 6 hours to 12 hours, 8 hours 36 minutes on the average. The diuretic action continues only for three hours and the volume of urine for this period is about 5–6 times as much as the water volume administered. The serum osmotic pressure increased 10–25 mOsm for one hour after the beginning of administration and returned as before in three hours. The amount of ascorbic acid in blood reaches to 140 mg/dl just after administration and decreases rapidly to 20 mg/dl for 5 hours and returns to normal value after 24 hours. 60% of the administered ascorbic acid is excreted into urine on the first day. The amount of ascorbic acid in CSF is about 9 mg/dl five hours after administration and decreases gradually and returns as before after 24 hours. No acidosis is observed after administration of this new mixture.

N. Subdural Hematoma

n-1. Studies of the Etiology of Chronic Subdural Hematoma

I. On Experimental Subdural Hematoma

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This is a preliminary report of production of chronic subdural hematoma in experimental animals which had been tried by many investigators without success.

When CSF is mixed with blood and incubated at 37°C, elastic clot is formed within one to two hours. This clot is very elastic and hangs from surface of medium in the test tube as a slack sac-like structure. Microscopic and ultrastructural examinations demonstrate that the erythrocyte containing clot is surrounded by a membranous structure with high fibrin content. This peculiar form of clot is formed even after blood is mixed with CSF which has been diluted with physiological saline solution. Capacity of clot formation of this type is also maintained, when CSF has been heated for 20 min. at 100°C or when CSF has been dialysed against water or physiological saline solution (in inner dialysate). In the other isotonic solutions of various compositions, on the other hand, this type of clot has never been formed.

Ultrastructural findings of fibrin fiber which has been formed in the existence of CSF differ remarkably from those of regular fibrin. The former is much