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Alterations of intracranial tension by salt solutions in the alimentary canal.

By HARVEY CUSHING and FREDERICK E. B. FOLEY.

[From the Laboratory of Surgical Research, Harvard Medical School, and the Surgical Clinic, Peter Bent Brigham Hospital].

In two interesting and suggestive papers¹ Weed and McKibben demonstrated the significant physiological fact that it is possible to reduce the cerebrospinal fluid pressure and diminish the bulk of the brain by injecting a hypertonic solution into the blood stream. Conversely they found that hypotonic solutions had the opposite effect: a rise of cerebrospinal fluid pressure and an increase of brain bulk. In the course of our studies their work has been repeated and their general conclusions confirmed.

The clinical bearing of these facts is obvious. Particularly they concern the states commonly referred to as "pressure symptoms." By similar methods it has been found possible to secure these same results in patients with increased degrees of intracranial tension. It was felt that the undesirable effects on pulse, respiration and blood pressure of such intravenous injections might contraindicate their use. For this reason the effects of gastrointestinal doses of hypertonic solutions were studied.

In a large series of animal experiments it has been found that practically the same effects may be obtained by the gastrointestinal route of administration. By this method the intracranial changes are not attended by disturbances of pulse, respiration or blood pressure, also the possible alterations of the cellular elements of the blood are avoided.

Twenty to thirty cubic centimeters of a saturated sodium chloride solution introduced into the duodenum or rectum of an average-sized cat produced a maximal fall of cerebrospinal fluid pressure precisely comparable to that which occurred when the solution was given intravenously. Following such doses the

¹ "Experimental Alterations of Brain Bulk," *Am. Journ. Physiol.*, 1919, XLVIII, p. 531; "Pressure Changes in the Cerebrospinal Fluid following Intravenous Injection of Solutions of Various Concentrations," *Ibid.*, p. 512.

average fall of pressure in a large series of experiments was 258 mm. normal saline. The changes were roughly proportionate to the concentration of the salt and the size of the dose. Two per cent. sodium chloride solution in large doses or a saturated solution in doses as small as 5 c.c. gave corresponding though less marked effects. Non-absorbable salts gave similar reductions though slower in occurrence and less in extent. Dextrose solution caused still less striking results though identical in nature.

The converse results seen after the ingestion of hypotonic solutions (water) were not great in extent nor well sustained. A previous dose of a hypertonic solution rendered more extensive the rise of pressure in these cases.

The changes observed were independent of blood pressure and were not attended by significant alterations of pulse or respiration.

These effects on cerebrospinal fluid pressure and brain volume were investigated in patients. An excellent opportunity for this was afforded by patients with brain tumor and cerebral herniæ subsequent to decompression operations. In these patients there was a lowering of tension when hypertonic salines were given by mouth. Occasionally very striking results could be obtained in which case the tense convex protrusion became a soft concave area over the decompression site.

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Some results with a new technique in vitamine measurement.

By **WALTER H. EDDY** and **HELEN C. STEVENSON.**

[From the Department of Physiological Chemistry, Teachers College, Columbia University and the Department of Pathology, New York Hospital, N. Y. City.]

By means of a technique described in detail in the March, 1920 number of the PROCEEDINGS certain results have been attained that seem to indicate the specificity of the test for the "B" vitamine. These results are briefly as follows:

(a) Application of the test to three specimens of Funk's antineuritic vitamine prepared in 1912 and '13 showed that the