

Immune phenomena observed in the course of these experiments will be made the subject of a future communication.

5873

Salt as a Factor in Edema Formation Following Plasmaphoresis.*

GEORGE FAHR, ARTHUR KERKHOF AND ELLIS GIERE.

From the Department of Medicine, University of Minnesota, and the Minneapolis General Hospital.

It is well known to clinicians that it is sometimes possible to rid a patient with nephrosis or with nephritis of visible edema by the deprivation of salt. When even moderate quantities of salt are ingested, visible edema may appear in 24 to 48 hours. There is a close correlation between edema formation and reduction of the colloid osmotic pressure in these cases consequent upon loss of protein from the blood plasma.

Leiter,¹ and Barker and Kirk² have bled dogs, thrown away the plasma and returned the cells suspended in Ringer's solution to the vascular system. Massive edema was obtained when the protein content of the blood was reduced. They obtained massive edema at protein values frequently higher than we have observed in our patients with edema. We believe this was because they gave large quantities of salt in physiological salt solution each day throughout their experiment. They gave 1500 cc. of physiological salt solution by mouth each day, equalling 13.5 gm. of NaCl per day, equivalent to about 60 gm. a day in an adult.

We have bled 7 dogs (500 cc. or more 3 times a day) removed the plasma which was replaced by Ringer's solution and returned the corpuscles to right heart. Only a very slight edema of the gluteal folds and the skin of the extremities was obtained when the total protein content of plasma was below 3% and osmotic pressure of the plasma colloids below 10 mm. Hg. The dogs were given 1500 cc. of tap water each day and the protein content held at close to the above figures. The dogs put out nearly as much water each day as was ingested. On giving 1500 cc. of 0.9% salt solution the output of urine immediately fell far below the intake and mas-

* Carried out with the aid of a grant from the Emma Sachs Plotz Fund.

¹ Leiter, L., *Arch. Int. Med.*, 1931, **48**, 1.

² Barker, M., and Kirk, E. J., *Arch. Int. Med.*, 1930, **45**, 319.

sive edema and ascites appeared, showing that NaCl is a factor in producing edema where the colloid osmotic pressure reduction leads to "Oedembereitschaft" or Edema Tendency.

The exact mechanism whereby the NaCl leads to increased edema formation we are leaving for a future publication. Suffice it to say that these experiments prove that the statement that salt is held back through renal insufficiency in nephroses and nephritis with edema is probably false.

We also noted in our work that the blood corpuscles should not be returned to the vascular system by intravenous injections because this slight injury to the veins tends to cause increase in venous pressure and local edema when "Oedembereitschaft" is present. The experiment is clean cut only when the corpuscles are returned to the right ventricle.

Conclusions. Lowering plasma proteins to below 3% and osmotic pressure of plasma colloids to below 10 mm. produces a tendency to edema formation. The edema is very slight and does not increase rapidly until NaCl is given, when the urinary output falls suddenly and massive edema appears.

5874

Colloidal Gold Test for Serum Antibodies in Poliomyelitis.*

FREDERICK EBERSON AND WILLIAM G. MOSSMAN.

From the Clinical and Research Laboratories, Mount Zion Hospital, San Francisco, California.

In a previous communication¹ a method was described for the detection and titration of immune bodies in poliomyelitis, with reference to the applicability of the test in the study of susceptible persons, carriers, therapeutic value of serums from normal adults, and in relation to prognosis and convalescence.

A total of 363 serums has been studied to date. These included 100 normal adults and 100 normal children (age groups 6 weeks to 19 years), 58 convalescent serums (monkey, adult human, and children), 76 normal animals (monkey, horse, goat, and sheep),

* Work done under a grant for poliomyelitis research supported by anonymous donations. Read before Section N (Medical Sciences) on June 16, 1931, at the 88th meeting of the American Association for the Advancement of Science, held at Pasadena, California, June 15-20, 1931.

¹ Ebersson, F., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **28**, 405.