

G, is required to supplement the antineuritic factor in preventing and correcting the anorexia under investigation. In order to reach a decision concerning these possibilities, further experiments involving parenteral administrations of the antineuritic vitamin are planned.

5516

Hemophilia.

CARROLL LA FLEUR BIRCH. (Introduced by C. S. Williamson.)

From the Departments of Medicine and Orthopedics, University of Illinois College of Medicine.

Hemophilia is limited to the male sex while it is transmitted through the unaffected female. Hence she must potentially have the disease. There are two possibilities. Is the disease manifest only in the presence of the male sex organs or are its symptoms held in abeyance in the presence of the female sex organs?

Two high grade hemophiliacs have been treated with ovarian extract. The first, age 10 years, had been under observation for 18 months prior to the institution of treatment. During this time he was admitted to the hospital several times in severe bleeding phases necessitating transfusion. The coagulation time of the blood usually exceeded one hour. Beginning May 5, 1930, he was given ovarian extract daily until January 1, 1931. He has remained symptom-free with normal blood findings to date (March 17, 1931).

This patient's older brother, the more severe hemophiliac of the 2, was placed on ovarian extract April 5, 1930. After his blood findings became normal (May 2, 1930) a fresh human ovarian transplant was made into the anterior abdominal wall. (The idea of the ovarian transplant was suggested by Dr. H. B. Thomas and he performed the operation.) There was no excessive hemorrhage at the time of the operation. This patient remained free from symptoms with normal blood findings until October 8, 1930, (5 months after the transplant) at which time he had a bleeding phase.

The blood platelets in hemophilia are normal in number and normal morphologically. The resistance of the platelets was measured just as the resistance of red blood cells by the fragility test. The 12 test tubes were arranged as for an ordinary fragility test with salt concentrations varying from 0.28% to 0.5%. Normal red cells

begin to hemolize at about 0.4% or 0.38%. Normal platelets also hemolize at about this level.

Method: 5 cc. of hemophilic blood is drawn from a vein. It is centrifuged at low speed for 5 minutes to precipitate the red cells. The blood platelets are found in a homogeneous suspension in the blood plasma above the precipitated red cells. Two drops of the platelet suspension are added to each of the 12 tubes and mixed, and allowed to stand for 2 hours. Then a drop from the bottom of each of these tubes is placed on a slide, covered, and examined with oil immersion lens. The beginning of hemolysis of a platelet is shown by its imbibing water and increasing in size, it elongates and becomes gelatinous in appearance. Normal platelets begin to hemolize at about 0.38%. In hemophilia the blood platelets remain intact throughout the entire series. We then elongated the series to include from distilled water to 5% NaCl. The platelets remained entirely whole and normal in contour in distilled water for 12 hours. They also showed no signs of crenation until they reached the 5% saline. In other words the platelets are very resistant to hypo- and hypertonic salt solution.

Could this increase in resistance of the platelets be overcome, and if so would the blood coagulate in normal time? We tried many chemicals without success. Then we thought of mechanical traumatization. Blood was drawn from the vein, centrifuged at low speed to precipitate the red cells. The supernatant fluid consisting of plasma and platelets was pipetted off, placed in mortar and traumatized with a pestle for 2 minutes. This solution of traumatized platelets was then returned to the blood cells from which it was taken and mixed by inverting once. A control coagulation time with undisturbed platelets was kept in each test. In every instance the tube in which the platelets were traumatized coagulated many minutes before the control tube and usually it coagulated in normal time. An average of 10 control coagulation times (without traumatization of the platelets) was 94 minutes; an average of the same 10 with traumatization of the platelets was 12 minutes.

Conclusions. 1. Ovarian extract and transplant controlled the bleeding of 2 high grade hemophiliacs for a period of 11 and 5 months respectively. 2. Blood platelets of hemophiliacs have a greatly increased resistance both to hypo- and hypertonic salt solution. 3. When the resistance of hemophiliac platelets is overcome mechanically the blood coagulates in normal time.