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Comparison of the Blood Picture in Treated and Untreated Syphilis Patients.

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Blood examinations were made on a number of syphilitic patients* who were divided into 2 groups. One group consisted of 58 patients who had received no treatment up to the time of the blood examination. Thirty-two were seen in the stage of an active primary infection, 18 had active secondary lesions, and 8 had signs and symptoms of tertiary disease. The second group consisted of 55 patients who had received varying amounts of specific treatment, ranging from less than one full course of arsphenamine and mercury to several such courses. In 20 of these, treatment was instituted during the primary stage of the disease, in 16 treatment was begun during the secondary stage, and in 19 during the tertiary stage.

Since the patients were ambulatory and repeated counts could be obtained only with great difficulty, one complete blood examination was made on each individual. Each examination included a total red and white cell count made with standardized pipettes, a hemoglobin determination by the Newcomer method, a platelet count by the Ringer-heparin method of Casey,[1, 2] and a differential white cell count made with the supravital technique, 100 cells being counted on each of 2 smears. The blood findings in these 2 groups were then compared, and the mean and standard error of the mean was determined for each blood element. A difference was considered to be significant when the probability of its occurrence by chance was less than one in 100.

In the treated group as compared with the untreated patients, the hemoglobin level and the absolute and relative numbers of lymphocytes were significantly higher, while the total white cells, the number of platelets, the absolute and relative numbers of neutrophiles, and the absolute and relative numbers of monocytes were significantly lower. The values for these blood elements in the treated cases approached the assumed normal values for normal

* These patients were made available for study through the kind cooperation of Dr. Howard Fox.

[1] Casey, A. E., and Helmer, O. M., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 655.

[2] Casey, A. E., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 523.

individuals. The erythrocyte count was higher in the treated group. Although this change was not significant, the increase in the number of red cells was reflected by a significantly higher hemoglobin value in this group. In absolute numbers, basophiles were higher and eosinophiles lower in the treated cases, but because comparatively few of these cells were present, these differences were not statistically significant.

The monocyte-lymphocyte ratio, which has been suggested by Cunningham and Sabin[3] and their coworkers as a prognostic aid in tuberculosis, is of especial interest. In the untreated group of this study the M/L index was 0.81 while the treated group gave a significantly lower M/L index of 0.52. This difference was due to a higher lymphocyte and a lower monocyte level in the treated group. Eleven treated patients whose serological and spinal fluid examinations were persistently negative, had the lowest M/L index of 0.35. Further observations are being made to determine the significance of the monocyte and lymphocyte values in syphilis.

During the period of active lesions in the experimental disease, Pearce[4] has reported a slight increase in the total white cell count and absolute number of neutrophiles, unchanged or lowered lymphocyte values, and an increase in the absolute number of monocytes. To determine the blood cell levels after complete healing of all lesions, examinations have been made of a group of 19 syphilis rabbits from 6 months to one year after inoculation, when there existed no symptomatic evidence of an infection. The total white cell count, and the absolute numbers of neutrophiles, lymphocytes, and monocytes were well within normal limits. A survey of platelet counts on animals in all stages of infection showed high values during the period of active lesions and normal values when healing had taken place.

The blood picture in the group of treated patients differed significantly from that in the untreated group with respect to white cell count, platelet count, and absolute numbers of neutrophiles, lymphocytes, and monocytes. These changes were in the same direction as those observed in a group of rabbits after the complete subsidence of all lesions. It cannot be stated definitely that the changes observed in the treated group were due solely to treatment. It is possible that the changes might have been due to spontaneous variations occurring during the period required for

[3] Cunningham, R. S., Sabin, F. R., Sugiyama, S., and Kindwall, J. A., *Bull. Johns Hopkins Hosp.*, 1925, **37**, 231.

[4] Pearce, L., *Proc. VIII Inter. Congress Derm. and Syph.*, Copenhagen, 1930.

treatment, and that these differences would have been present regardless of the institution of treatment. Nevertheless, the cellular reaction, whether due to treatment or to the element of time, was identical with that occurring in rabbits which had developed an active immunity and had effectively suppressed the disease without treatment.

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Serum Phosphatase Changes in Calcium Deficiency and in Ammonium Chloride Osteoporosis.

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It was shown by Kay[1] that the plasma phosphatase increases in certain clinically observed cases of bone diseases. We have confirmed and extended these observations.[2] In an investigation of experimentally produced bone lesions we have reported the effects of chronic and acute hyperparathyroidism.[3] In view of the many analogies observed in bone resorption, whether produced by parathormone or by other agents, it was desirable to extend our observations to the osteoporoses produced by low-calcium diets and by ammonium chloride administration to animals on low and high calcium diets.

Four litters of dogs were used—3, 6, 8, and 18 months old, respectively. The experiment was continued for about 11 weeks. The animals received a diet of fresh, lean horse meat supplemented with cod liver oil and tomato juice. This is a low-calcium diet. Some of the animals received a calcium supplement (2.5 gm. each of bone meal and calcium lactate per kilo of food) equivalent to between 0.5 and 2.5 gm. of calcium daily. On this diet the controls grew rapidly; the bones were normal upon autopsy. On the low-calcium diet, the growth was equally rapid; the bones, however, were thinned. Ammonium chloride was administered by stomach tube in a 1% solution. At the end of the experiment some dogs received daily as much as 1 gm. per kilo. In the youngest litter bone softening

[1] Kay, H. D., *J. Biol. Chem.*, 1930, **89**, 249.

[2] To be published.

[3] Bodansky, A., and Jaffe, H. L., *Proc. Am. Soc. Biol. Chem.*, Montreal, Canada, April 8-11, *J. Biol. Chem.*, 1931, **92**, xvi.