

THE EFFECT OF ADMINISTRATION OF VITAMIN C ON THE RETICULOCYTES IN CERTAIN INFECTIOUS DISEASES*

A Preliminary Report

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THE effect of administration of large daily doses of vitamin C has been studied in twenty-seven cases of rheumatic fever, eight

cases of bone tuberculosis and two cases of Still's disease. In each of the disease groups were included both active and inactive or recovered cases. None of the cases showed any clinical signs suggestive of scurvy. All the patients had been on a diet generally considered to be adequate in vitamin C. It had contained daily for all but three of the rheumatic fever patients either 120 cc. of orange juice or canned tomato juice or some fresh fruit. In the bone tuberculosis and Still's disease group the diet had included at least one-half of an orange daily. The thirty-seven patients varied in age from three to twenty-five years with an average age of 10.6 years. All these patients were given additional vitamin C in the form of 530 cc. of orange juice per day by mouth, or in the pure crystalline form in daily doses of 200-300 mg. by mouth and in two cases intravenously.

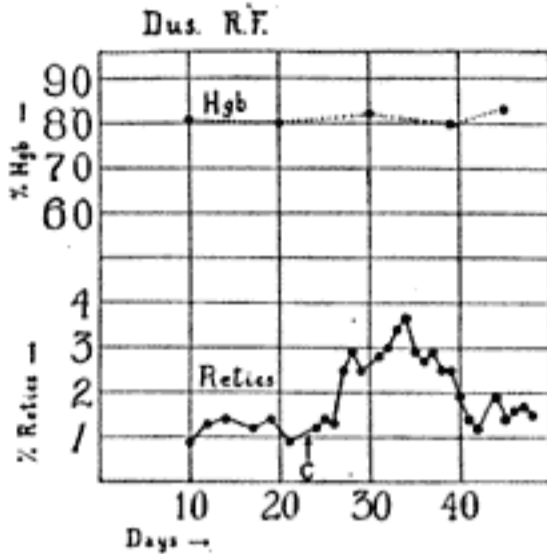
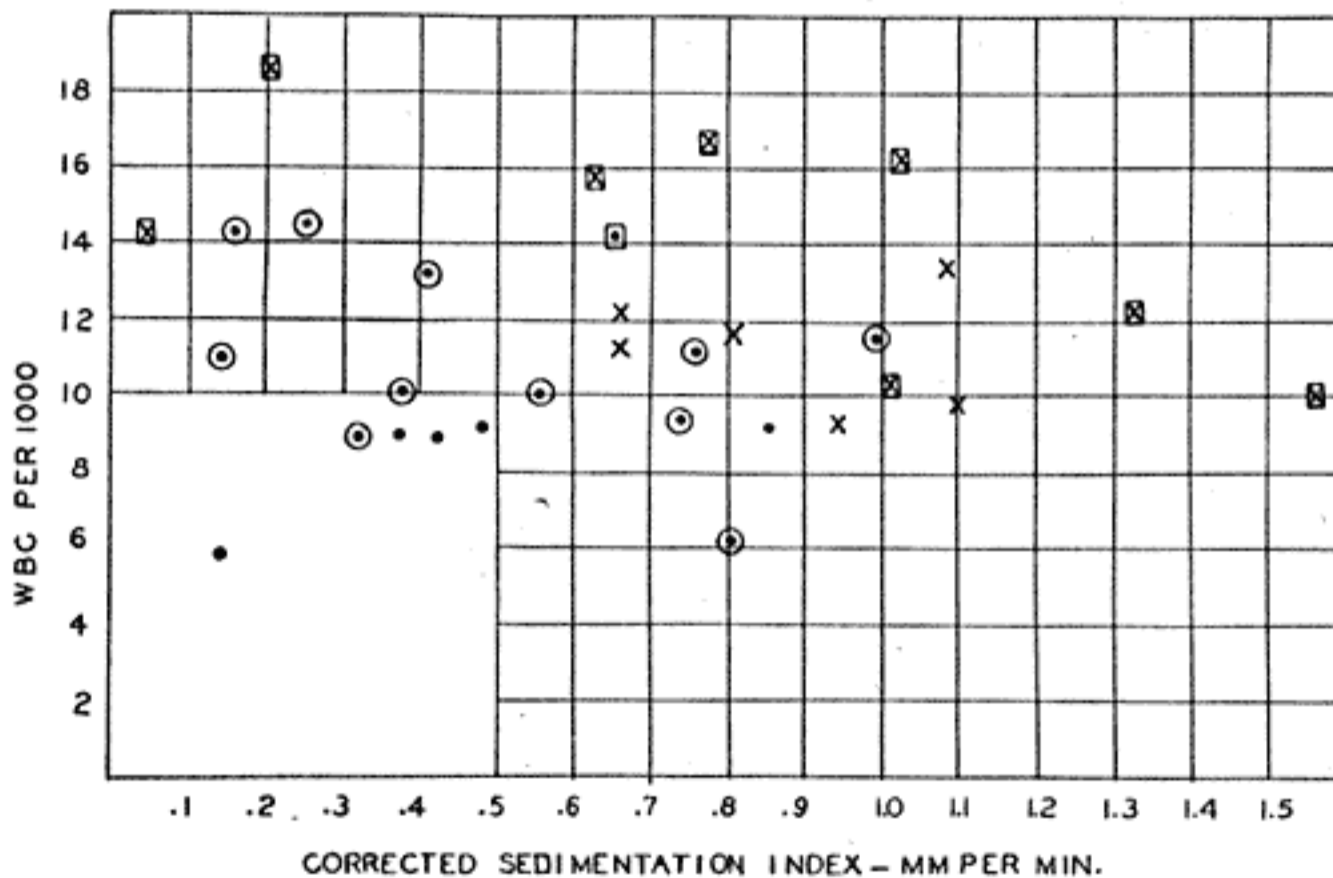


FIG. 1. A typical though small reticulocyte response in rheumatic fever. Beginning at the point marked C, 300 mg. per day of cevitamic acid (Cebione-Merck) was given by mouth and continued throughout the rest of the experiment.

No specific therapeutic effect on the course of

X—RETIC RESPONSE OVER 3%
 ⊙— " " BETWEEN 2 AND 3%
 •— " " LESS THAN 2%
 □—FEVER



CORRELATION BETWEEN ACTIVITY OF DISEASE AND RETICULOCYTE RESPONSE

FIG. 2. Chart illustrating the correlation between the cardinal signs of infection and the reticulocyte response. It will be noted that the cases which showed a response of over 3 per cent all showed well-marked signs of infection, the majority of cases which showed no response lie in the normal zone and those which showed a response of between 2 and 3 per cent lie in an intermediate zone.

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the disease was observed during the period of increased vitamin C administration which lasted on the average for four weeks.

In the majority of these cases a response of the reticulocytes followed the large doses of

vitamin C analogous to the reaction which follows the administration of vitamin C to patients with the anemia of scurvy¹. The responses were of small magnitude but the pattern of response, though variable, was orderly. Figure 1 illustrates a typical response of smaller than average magnitude in a case of rheumatic fever. The hemoglobin level was usually above 70 per cent so that the peak of the reticulocyte rise could not be expected to be very great. With lower hemoglobin values there was a slight tendency to higher reticulocyte rises and an increase in the hemoglobin level. Previous administration of large amounts of iron in the form of ferrous sulphate did not prevent the occurrence of the reticulocyte response.

An interesting feature of the reticulocyte response is the fact that it was roughly proportional to the severity of the infection. If the cases are divided into three groups, first, nineteen which showed a rise of 3 per cent or over (average 4.5 per cent); secondly, eleven which showed a rise of between 2 and 3 per cent, and, thirdly, eight which showed no response, it is found that all of those in the first group showed well-marked signs of active infection as measured by body temperature, leucocyte count and corrected sedimentation index of erythrocytes; those in the third group, as a rule, showed little or no signs of infection, and those in the second group showed an intermediate degree of activity. The relationship of the cardinal signs of infection to the reticulocyte response is illustrated in figure 2. The etiology of the infection

was not the controlling factor in conditioning the reticulocyte response.

The failure of large doses of vitamin C to influence the course of rheumatic fever is evidence against the hypothesis of Rinehart² that deficiency of this substance is a specific etiological factor in this disease although more numerous and more prolonged observations are required to reach a final conclusion.

The observation that infections predispose to scurvy is well established and has led to the suggestion that under these conditions the metabolic demands for vitamin C may be much increased^{3,4}. Our results suggest that these demands are not met by diets heretofore considered adequate so that in infectious diseases relative vitamin C deficiency commonly develops and may constitute a secondary complication of some importance.

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MEDICAL PROGRESS

PROGRESS IN PEDIATRICS*

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ACUTE ANTERIOR POLIOMYELITIS

AS a result of the clinical evidence which has been presented^{1,2,3} during the past two to three years, the enthusiasm for the administration of convalescent serum as a therapeutic measure in the treatment of the acute or pre-paralytic stage of anterior poliomyelitis has subsided, and attention is once more being directed toward prevention of the disease.

The development of a vaccine which might be successfully employed as a prophylactic measure in the treatment of poliomyelitis is not new as several attempts have been made in the past^{4,5}. However, with the recent knowledge that favorable results may be obtained with antigens inactivated by germicides in the prevention of

other virus diseases, a new impetus has been given to this phase of study. Maurice Brodie⁶, working with William H. Park, has developed a vaccine which at the present time seems to be efficacious in the prevention of this disease. By employing a vaccine in which the virus has been inactivated by the use of formaldehyde, Brodie has been able to immunize monkeys against poliomyelitis to direct intracerebral inoculation of the virus. Furthermore, the serum obtained from these monkeys possessed neutralizing substances against the virus of poliomyelitis. After having successfully performed these studies in monkeys, the vaccine was injected into members of the research group and these results were in accord with those obtained with the experimental animals.

In 1926 McKinley and Larson⁷, using a vaccine (with sodium ricinoleate as a preservative) that they had prepared from the spinal cords of monkeys killed during the acute phase of the disease, injected four monkeys in an effort to

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