

17258. Occurrence of a Transient Leucocytosis During the Jarisch-Herxheimer Reaction.*

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There is no agreement in the medical literature on the characteristic blood picture in untreated early syphilis. Willcox¹ in a study of 405 patients with early syphilis found an average total white blood count of 8,950 with a normal differential. Previous to this report, findings of leucocytosis,² lymphocytosis,³ monocytosis,⁴ and eosinophilia⁵ fill the literature on this subject.

No report exists, as far as can be determined, concerning the changes in the peripheral blood picture during a Jarisch-Herxheimer reaction. Sheldon and Heyman^{6,7} have reported the occurrence of an acute polymorphonuclear leucocyte infiltration around early syphilitic lesions during a Jarisch-Herxheimer reaction, but they make no mention of the peripheral blood picture.

Material. Seventeen patients with early syphilis were used in this study. Of these 3 were seronegative primary, 6 were seropositive primary, and 8 were secondary. Four patients were female and 13 were male.

Method. After a diagnosis of syphilis was made and the pre-treatment white blood counts, differentials, and base line temperatures were completed, the patients were given a 300,000 unit dose of aqueous penicillin-G intramuscularly. They were then followed at

2 hourly intervals with total white blood counts, differentials and rectal temperatures. A total of 8 patients were followed with differential counts throughout the entire course of the reaction. All white counts were done by one observer, and 200 cells were counted in each differential. Periods of observation continued until the temperature returned to the pre-treatment level. The periods of observation varied from 10 to 16 hours in duration. At the end of the period of observation treatment was continued until a total of 2.4 million units of penicillin-G had been given over an 8-day period.

Results. Of the 17 patients, 15 had definite febrile Jarisch-Herxheimer reactions (defined here as in temperature to 37.5°C or above, occurring within 10 hours after the start of treatment and returning to normal within 16 to 18 hours). The distribution of the temperature elevations was as follows:

Temperature height	No. of patients
37.8-38	3
38 -39	3
39 -40	8
40 -41	1

All temperatures were rectal and 37.5°C was taken as normal temperature.

In 10 of the 15 patients there was a definite leucocytosis occurring at the height or just before the height of the reaction, as judged by the temperature peak. The leucocytosis here is measured by the percentage change in total leucocyte count, from the base line count. No change of less than 40% in total count was considered significant. The average percentage change in the ten cases considered was 89%. The lowest change was 50% and the highest 113%. In the remaining 5 cases having Jarisch-Herxheimer reactions, a leucocytosis was noted but the percentage change was not above 40%. The variations in counts that occurred in these 5 patients are as follows: 15%, 20%, 34%, 15%, and 34%. The duration of the leucocytosis was transient, the

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¹ Willcox, R. R., *J. Royal Army Med. Corps*, 1923, **40**, 48.

² Whitby and Britton, *Disorders of the Blood*, Blakiston and Co., Philadelphia, 1942, p. 457.

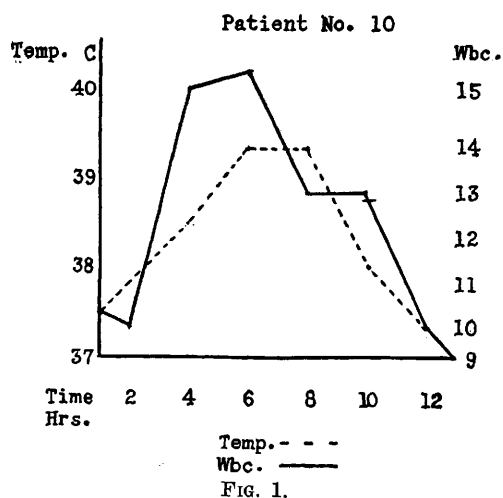
³ Wintrobe, *Clinical Hematology*, Lea and Febiger, Philadelphia, 1942, p. 123.

⁴ Downey, *Handbook of Hematology*, Paul Hoeber, New York, 1938, p. 675.

⁵ Spangler, R. H., *J. Lab. and Clin. Med.*, 1935, **20**, 733.

⁶ Sheldon and Heyman, *Recent Advances in the Study of Venereal Diseases*, 1948, p. 129.

⁷ Sheldon, W. H., personal communication.



average duration being 4.4 hours. The longest period of duration was 8 hours, the shortest was 2 hours.

Fig. 1 indicates the type of response seen during the Jarisch-Herxheimer reaction.

Complete differential counts were done on 8 of the 15 patients every 2 hours during the Jarisch-Herxheimer reaction. The changes observed here were an increase in neutrophils with a lymphopenia. The average percentage increase in polymorphonuclear cells was 43.4% with a maximum change of 87% and a minimum change of 23%. The average percentage drop in lymphocytes was 55% with a maximum drop of 77% and a minimum drop of 39%. The maximum drop in lymphocytes occurred in the cases with the maximum increase in polymorphonuclear cells, and the minimum drop in lymphocytes occurred in the cases with the minimum increase in polymorphonuclear cells.

Discussion. The occurrence of the leucocytosis was at first felt to be caused by the fever associated with the Jarisch-Herxheimer reaction and not related to the mechanism of the reaction. The pattern of leucocyte re-

sponse found in induced fever was found to be quite different;^{8,9} the rise in leucocytes in induced fever usually occurred after the height of the fever and the leucocytosis continued for several hours after a return to normal temperature. In this study the leucocytosis usually occurred 2 to 4 hours before the temperature spike and returned to the base line count at the same time or just before the temperature. It therefore appeared that the mechanism causing the leucocytosis was the same mechanism as that causing the Jarisch-Herxheimer reaction. The obscurity of the mechanism involved in the production of the Jarisch-Herxheimer reaction prevents any conclusions as to the causative factors. However, it is interesting to note that with the leucocytosis there is a neutrophilia which corresponds in time with the acute polymorphonuclear infiltration around syphilitic lesions as described by Sheldon and Heyman.^{6,7}

Summary. 1. In 10 of 15 patients having febrile Jarisch-Herxheimer reactions there was a definite leucocytosis occurring before or at the same time as the temperature spike. Some degree of leucocytosis occurred in the other 5 cases but was not considered significant.

2. The average percentage increase in leucocytes was 89%.

3. As shown by differential counts the increase in cells was predominantly in the polymorphonuclear series.

4. There was also a lymphopenia with an average percentage drop in total lymphocyte counts of 55%.

5. The causative factor in the leucocytosis and the causative factor of the Jarisch-Herxheimer reaction are felt to be the same.

⁸ Bierman, W., and Fishberg, E. H., *J. Am. Med. Assn.*, 1934, **103**, 1354.

⁹ Bierman, W., *Am. J. Med. Sci.*, 1934, **187**, 545.