ELECTROPHORESIS OF SERUM PROTEINS OF SPOTTED FEVER

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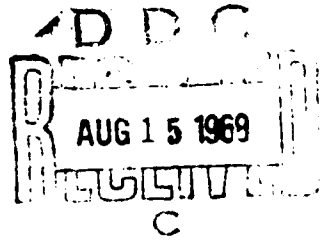

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Laboratornoye Delo (Russian Journal #7, 1961, pp 19-20).

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Electrophoresis of Serum Proteins of Spotted Fever.

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In 1957 we undertook a dynamic study of the serum proteins of spotted fever by a method of electrophoresis on paper with the N.I. Lazarov modification [1].

We used a borate buffer (6.3g of boric acid and 4g of caustic soda to 1000 ml of water) with a gradient of potential of 4.7v and the strength of the current 0.2 - 0.3 ma for 1 cm of paper cross section. The electrophoresis took 18 hrs. The proteinograms were tinted with a dye of the following composition: 0.15g of bromophenol blue in 100 ml of a 7% solution of trichloroacetic acid.

We obtained clear cut electrophoregrams in which the gamma-globulin fraction was sometimes divided into 2 subfractions (gamma 1 and gamma 2-globulins). Determining the quantitative content of the protein fractions was done with the help of elution and a subsequent colorimetering. The proteinogram was cut into pieces according to the number of protein fractions. A check of the reproducibility of the results during a simultaneous investigation of one and the same serum on 7 paper strips demonstrated the sufficient preciseness of the method. The percentage of total protein in the serum was determined by a RLU refractometer.

From studying the sera of 57 donors the following facts were obtained: Total protein - 7.41 g% ± 0.07, albumins - 4.66 g% ± 0.03 (62.9% ± 0.62), globulins: alpha 1 - 0.27 g% ± 0.01 (3.3% ± 0.14), alpha 2 - 0.44 g% ± 0.01 (5.9% ± 0.18), beta - 0.68 g% ± 0.02 (9.2% ± 0.28), gamma - 1.36 g% ± 0.04 (18.3% ± 0.35), [gamma 1 - 0.31 g% (4.2%), gamma 2 - 1.03 g% (13.9%)].

In 14 patients with primary and 16 patients with recurrent spotted fever, we investigated the blood serum 3 times: In the 5-9th day of the febrile period,

during the first days of normal temperature, and before discharge. In the event of complications, investigations were conducted more often.

The course of the disease in the cases studied wasn't any different from the clinical aspects of spotted fever, described lately by many researchers. In 6 patients the disease proceeded in a serious form, in 17 it was moderate, and in 7 it was mild. The agglutination reaction with Rickettsia prowazeki was positive in 28 persons (titer 1:40 and higher), and there was a Weil-Felix reaction in 22. The majority of the patients were treated with synthomycin or levomycetin. The average percentage of total protein in the serum during the course of the entire period of observation of the patients was within the limits of normal. During the febrile periods of the disease, dysproteinemia developed which is characterized by hypoalbuminemia, an increase in the percentage of alpha 1 and alpha 2-globulins, a decrease in the level of beta-globulins, and hypergammaglobulinemia. The stated changes were preserved during the first days of normal temperature and the concentration of gamma-globulins increased. Before discharge a tendency was noted toward normalization of the protein content of the blood, but the proteinogram wasn't completely restored. The changes of the gamma 1 and gamma 2-globulins were the same as for the overall gamma-globulins.

Changes of the protein fractions during initial and recurrent spotted fever were analogous during all the periods of the disease. The expressedness of the changes of all the protein fractions, except beta-globulins, was in direct dependence on the gravity of the course of the disease.

During complications (focal pneumonia in 3, pulmonary infarction in 1, and thrombophlebitis of the skin in 1) dysproteinemia developed with the very same trend of changes as during the height of the illness.

Hypoalbuminemia and an increase in the level of alpha 2-globulins were especially expressed. In one case we succeeded in observing the stated changes in the

proteinogram one day before the clinical manifestations of focal pneumonia.

The value of the titer of the agglutination reaction with Rickettsia prowazeki didn't depend on the concentration of gamma-globulins, and on the contrary. Apparently hypergammaglobulinemia in spotted fever is connected not only with the accumulation of antibodies but with the increase in the formation of nonspecific gamma-globulins.

From what has been said it is apparent that the changes in the protein content of blood serum during spotted fever, just as in other infectious diseases, are non-specific and stereotyped. Therefore dynamic studies of protein fractions during spotted fever by paper electrophoresis have only a prognostic significance. They may be of help in the evaluation of the gravity of the course of the infectious process and in an early diagnosis of complications.

Cited Literature

[1.] Lazarov, N.I., Labor. Delo, 1957, No. 4, p 11.

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