

The Cephalin-Cholesterol Flocculation Test in Malaria.

LEWIS H. BRONSTEIN AND ROGER D. REID.

From the Medical Service, Regional Hospital, Fort George G. Meade, Md., and Eighth Service Command Laboratory, Fort Sam Houston, Texas.

This study was done as a result of a report¹ stating that all patients with malaria had an abnormal liver function as tested by the cephalin-cholesterol flocculation test. Subsequently, in a report on phlebotomus fever,² Sabin *et al.* reported that in sand fly fever this test is negative and that the test can be used as an aid in differential diagnosis between that disease and malaria.

All our tests were done with a commercial preparation of cephalin-cholesterol and, at the start, readings were taken at 24 and 48 hours. In the middle of this series it was noted that some results apparently did not follow consistently if the 48-hour reading were used. The 24-hour reading appeared to give more consistent results. A series of tests were then performed on 20 psychotic patients. These produced negative results at 24 hours and positive reactions if the 48-hour readings were used. This has been previously reported.³ Other factors tending to increase false positive reactions are light and temperature. More consistent results were obtained when tests were incubated in the dark at room temperature.

Our first series consisted of 114 patients and our second series of 102 patients. The tests were done within 24 to 48 hours after admission for a malarial attack and was repeated once a week, when possible, until the patient was discharged from the hospital.

Table I shows the result of the 2 series. It will be noted that if only one reading were taken, on admission, even with the reading of 48 hours, only 52% of the results were positive. If the 24-hour reading were used, more of the patients showed negative results. It is to be noted that Sabin *et al.* used the 24-hour reading in their report. When follow-up tests were done, as recorded in section marked "2 or more readings," a greater percentage showed positive results. In the 48-hour readings, 58.6% had a positive reading on admission and an additional 34.3% became positive during their stay. Only 7.1% remained negative. If 24-hour readings were used, the percentage that remained negative was 24.3%. When 24-hour readings only were done, the percentage that remained negative was essentially the same as in the 24-hour group of series I.

TABLE I.
Cephalin-cholesterol Flocculation Results in Malaria.

	Series I				Series II	
	Read at 48 hr		Read at 24 hr		24-hr technic	
	No.	%	No.	%	No.	%
One reading:						
Pos. on Adm.	23	52	17	38.6	4	36.4
Neg. on Adm.	21	48	27	61.4	7	63.6
Two or more readings:						
Pos. on Adm.	41	58.6	23	32.85	32	35.2
Pos. sometime	24	34.3	30	42.85	35	38.4
Negative	5	7	17	24.3	24	26.4

¹ Mirsky, I. A., Von Brecht, R., and Williams, L. D., *Science*, 1944, **99**, 20.

J. A. M. A., 1944, **125**, 693.

² Sabin, A. B., Philip, C. B., and Paul, J. R.,

³ Pohle, J. F., and Stewart, J. K., *J. Clin. Invest.*, 1941, **20**, 241.

We could not find any correlation between the results of the tests and the number of attacks of malaria that the patient has had. Two soldiers came back with a subsequent attack while the study was going on. One had had a positive series of tests on the first admission and a negative series on the second. Another had negative tests on both occasions. There was also no correlation between the duration of the malaria, dated from the first attack, or between the origin of the malaria and the result of the cephalin-cholesterol flocculation test.

As stated by Mirsky¹, there was no correla-

tion between the result of the Kahn test and the cephalin-cholesterol flocculation test, regardless of time of reading of the test.

These results do not verify the statement that all patients with malaria show impairment of liver function as measured by the cephalin-cholesterol flocculation test. The 24-hour technic shows a lower percentage of positive results than the 48-hour technic. The percentage of positive results becomes higher if repeat tests are done, but never higher than 75%. The cephalin-cholesterol flocculation test is not an absolute differential diagnostic point between malaria and sand fly fever.

15120

Further Observations on Red Cell Agglutinating Agent Present in Lungs of Virus-Infected Mice.

KATHERINE C. MILLS AND A. R. DOCHEZ.

From the Departments of Medicine and of Bacteriology, College of Physicians and Surgeons, Columbia University, New York City.

In a previous communication¹ we have reported the presence of a heat-stable hemagglutinating agent in the lungs of mice infected with a pneumonitis virus. This agent agglutinates murine erythrocytes and the agglutinin is inhibited by specific antiserum. The agglutinating property becomes manifest only after treatment of infected lung extract by heat.

The work reported in this paper, and the previous one, has been carried out with the "ES" strain of pneumonitis virus, a strain nearly identical with the pneumonia virus of mice, described by Horsfall and Hahn.^{2,3} The hemagglutinating agent is regularly present in the lungs of infected mice. It has been demonstrated in mice killed 48 hours after intranasal inoculation, is present in its highest titer 5-6 days after infection and is usually absent in mice surviving 9-10 days or longer.

Preparation of the agglutinating lung extract has been simplified. Each pair of infected lungs is ground with sand and 2 cc of normal salt solution. The suspension is heated for 10 minutes in a water bath at 75-80°C, centrifuged, and the supernatant fluid removed for study. Various tests have been performed in order to determine the nature of the agglutinating agent and the conditions under which the agglutinating property is masked or unmasked.

The results in Table I indicate that the max-

TABLE I.
Range of Temperature Causing Maximum Activity of Agglutinating Property of Lung Extract.

Degree of heat °C	Time, min.	Agglutination (titer)
Untreated	—	0
56	30	0
60	15	±
65	5	±
70	5	1-64
75	5	1-64
80	5	1-32
85	5	1-16
90	5	±
95	5	trace
100	5	0

¹ Mills, K. C., and Dochez, A. R., *PROC. SOC. EXP. BIOL. AND MED.*, 1944, **57**, 140.

² Horsfall, F. L., and Hahn, R. G., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **40**, 684.

³ Horsfall, F. L., and Hahn, R. G., *J. Exp. Med.*, 1940, **71**, 391.