THE C-REACTIVE PROTEIN IN THE SERUM OF LEPROMATOUS CASE IN LEPRA REACTION[1]

ETIENNE MONTESTRUC, M.D.

Institut Pasteur de Martinique
Fort-de-France, Martinique

This article deals mainly with the lepra reaction occurring in patients of the lepromatous type, namely, the classical reactions—erythema nodosum leprosum—and neural reactions, which latter kind usually accompanies the former.

Although the pathogenesis of these reactions is still a much discussed question, it nevertheless seems that they consist of a very particular kind of inflammatory state, and that in these conditions one should test for C-reactive protein (CRP).

Tillet and Francis ([5]), in 1930, first demonstrated the existence of the C-reactive protein. This protein, entirely different from the other blood proteins, is produced in the organism whenever there occurs an inflammation or an acute infection. It is a globulin, probably a β-globulin. It is precipitated by the C polysaccharide of the pneumococcus, from which fact the name C-reactive protein derived.

The demonstration of this special protein during the course of inflammatory conditions seems to have a role in the appreciation of the diagnosis and evolution, and of the therapeutic value of the medications used, without in the slightest degree reducing the value of the biologic criteria of inflammation usually used, i.e., the blood formula, the erythrocyte sedimentation test, and the electrophoresis of the different proteins.

In leprosy, the demonstration of CRP was the subject of articles by Alan S. Rabson in 1955 ([4]) and by Ovid Bush in 1958 ([1]). In the sera of 100 leprosy patients Rabson found the following: 79 per cent positive reactions in 47 active lepromatous cases; 30 per cent positives in 41 arrested lepromatous cases; and 58 per cent positives in 12 tuberculoid cases. Of 24 leprosy cases with secondary amyloidosis, 79 per cent had the C-protein in the serum.

Commenting on these findings, Wade ([6]) stressed the importance of ascertaining the frequency and the degrees of positive results in cases of lepra reaction, since the presence of CRP indicates a more or less active inflammatory condition. In 2 of Rabson's patients who had erythema nodosum leprosum this protein was absent. It is interesting

[1] A somewhat more general article on the subject of C-reactive protein in leprosy, without references to previous work done in that disease, has been published by the author elsewhere ([3]).—EDITOR.

to note, however, these 2 patients had been submitted to cortisone treatment, and Wade asked whether in identical cases not treated with cortisone this response would also be negative. Furthermore, it seemed to him abnormal to find the presence of CRP in arrested cases without amyloidosis. Wade ended with the hope that, because of the simplicity of the test, further investigations would be carried out with, simultaneously, comparative tests for the presence of CRP and the blood sedimentation rate.

Bush, in 1958 ([1]), reported from Japan a study of 104 cases of neural or nodular leprosy involving the demonstration of CRP, the blood sedimentation rate, and the hematocrit value. Out of 31 patients with neural leprosy, 12 had positive reactions for the C protein, 6 of them over 1+ in degree. It is interesting to note that only 4 of the cases which gave the strongest reactions showed a high coefficient of the blood sedimentation rate. This coefficient was also high in 2 cases in which the reaction was only 1+.

Out of 73 cases of nodular leprosy, 39 were positive for CRP, 24 of them more than 1+. Of these 24 patients, only 12 had complications, and 9 had high blood sedimentation rates. In 5 cases with 1+ reactions the blood sedimentation rate was over 20.

Although the patients used in this study were examined only once, his findings led Bush to believe that the determination of CRP will be used in the future not only to ascertain the presence of complications but also to govern therapy.

MATERIAL AND METHODS

Cases studied.—In the present study the test for C-reactive protein was applied to the sera of 49 lepromatous cases, reactional and nonreactional. Of the 20 reactional cases, 9 had not received cortisone treatment while 11 were receiving cortisone. The former were cases tested before the beginning of hormone treatment, or mild cases not requiring such treatment. The 29 nonreactional cases comprised three groups: 23 which had never exhibited signs of lepra reaction, 4 cases previously with reactions after which the cortisone treatment had been stopped, and 2 such cases which had not had cortisone when in reaction.

Demonstration of CRP.—Among the different methods employed for this demonstration the one most currently employed utilizes the antigen-antibody reaction between immunized rabbit serum (anti-CRP serum) and the human serum to be tested for the CRP antigen. This reaction is highly specific.

In the antigen-antibody mixture there first appears a cloud, then a precipitate after 37°C, or 8 hours at +3°C in a refrigerator, according to the method of Wood and and McCarthy ([7]). The mixture is made in capillary tubes, and one evaluates the height of the precipitate from 0 to 4+. The intensity of the reaction is a function of the abundance of CRP in the serum.

RESULTS

The results of these tests are shown in Table 1. Also shown for each group of patients are the maximal, minimal, and average results of the 1-hour red-cell sedimentation tests of the group.

It can be said at once that these results confirm well those which have been obtained generally in affections of inflammatory nature. But,

TABLE 1.—*Results of tests for C-reactive protein and of red-cell sedimentation in 49 cases of lepromatous leprosy with or without lepra reaction, and with or without cortisone treatment.*

Patient group	No. of cases	C-reactive protein					Sedimentation		
		0	1+	2+	3+	4+	Max.	Min.	Av.
Reactional									
Without cortisone	9	0	3	2	3	1	130	25	74
With cortisone	11	0	8	2	1	0	105	13	44
Nonreactional									
Never with reaction	23	21	2	0	0	0	60	6	32
Old reactional, cortisone stopped	4	4	0	0	0	0	25	5	14
Old reactional, without cortisone	2	2	0	0	0	0	26	6	14

in addition, there are certain features peculiar to the leprosy infection which are entirely interesting. These are summarized as follows:

SUMMARY

1. The C-reactive protein is always present in the serum of patients with lepromatous leprosy who are in the state of lepra reaction.

2. The concentration of this protein is clearly higher in the reactional cases which have not been submitted to cortisone treatment than in those which have been.

3. The CRP is absent in old, cured, reactional cases, whether or not they received hormone treatment during the reaction. It is suggested that when hormone treatment has been started it should be continued until the CRP has completely disappeared.

4. In the case of lepromatous patients who have never presented lepra reaction, the CRP is present in the serum in only a small percentage (9% in my group of 21 patients), and in low concentration. It is logical to think that such "bearers" of CRP should be watched closely when they are given sulfone treatment, the action of which in precipitating reactions is well known.

5. There is an evident parallelism between the red-cell sedimentation rate and the presence of CRP in th blood serum. This fact confirms the results of a previous study ([2]), which convinced me of the value of the red-cell sedimentation test in leprosy cases presenting lepra reactions.

CONCLUSION

The determination of C-reactive protein in the serum in cases of patients with leprosy of the lepromatous type, because of its simplicity and of the value of the information it gives, should become—concurrently with the red-cell sedimentation test—a routine procedure in leprosy.

RESUMEN

1. La proteína C-reactiva se encuentra siempre presente en el suero de los enfermos de lepra lepromatosa en el estado de reacción leprosa.

2. La concentración de esta proteína es netamente más alta en los casos del reactores que no han sido sometidos a la cortisonoterapia qce en los que lo han sido.

3. No se encuentra la PCR en los casos reactores, antiguos, curados, ya hayan o no recibido hormonoterapia durante la reacción. Se sugiere que, cuando se ha iniciado la hormonoterapia, debe continuarse hasta que haya desaparecido completamente la PCR.

4. Tratándose de enfermos lepromatosos que jamás han presentado reacción leprosa, la PCR no aparece en el suero más que en un pequeño porcentaje de los casos (9 por ciento en un grupo de 21 enfermos), y a una concentración baja. Es lógico creer que hay que vigilar cuidadosamente a estos "portadores" de PCR cuando se les administra sulfonoterapia, cuya acción en la precipitación de reacciones es bien conocida.

5. No hay paralelismo manifiesto entre el coeficiente de eritrosedimentación y la presencia de PCR en el suero sanguíneo. Confirma este dato los resultades de un estudio anterior (3), que convencieron al A. del valor de la prueba de la eritrosedimentación en los casos de lepra que presentan reacción leprosa.

CONCLUSIONES

La determinación de la proteína C-reactiva en el suero de los enfermos de lepra de la forma lepromatosa, debido a su sencillez y al valor de la información que aporta, debe convertirse—junto con la prueba de la eritrosedimentación—en procedimiento obligatorio en la lepra.

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