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PROGNOSTIC VALUE OF THE LEPROMIN TEST IN CONTACTS OF LEPROSY CASES¹

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The lepromin test is of great prognostic value in cases of leprosy, a positive reaction being of good prognosis and a negative reaction of bad prognosis. This prognostic value of the test in cases of leprosy is well-established and very well illustrated by the results of the test in the two clear cut types of the disease—it being always negative in the malign lepromatous type, and always positive in the benign tuberculoid type. The test is generally considered to be of prognostic value in contacts also: the positive reactors amongst them are likely either not to get the disease or to get it in the benign form; whereas the negative reactors are considered more likely both to get the disease, and to get it in the malign form.

While the prognostic value of the test is well established in cases of leprosy, the same cannot be said about its value in contacts. All the same interest in this subject has considerably increased during recent years, because of the increasing interest in the likely prophylactic value in leprosy of BCG vaccination. Vaccination with BCG is known to convert a negative lepromin reaction into a positive one, and on the assumption that BCG induced positive lepromin reaction has the same value as a spontaneously occurring positive reaction in contacts, it is being argued that BCG vaccination may have a protective value against leprosy infection.

With this increase in interest in the prognostic value of lepromin test in contacts, it is now being questioned what evidence is there regarding the prognostic value of a spontaneously occurring positive lepromin reaction in contacts. This question has recently been studied in a population in which lepromin test was done about 15 to 20 years ago. A total of 803 healthy persons were lepromin tested in 2 different experiments, 15 and 20 years ago respectively in a rural area in Bankura District. Recently a visit was paid to this area to find out how many of them have since developed the disease. Out of 803 persons, 123 were not available for examination, having left the area or having died. The examination of the remaining 680 persons revealed that 39 of them (5.7%) were suffering from leprosy. A correlation of the results of

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the lepromin test (done 15 to 20 years ago) and the development of the disease and type of the disease, as revealed by the present examination, has given interesting results which are reported below.

Results of the lepromin test.—The results of the initial lepromin test (Mitsuda antigen and late reaction) in all the 680 persons now available for examination were as under:

Negative	156
Positive:	
Weak	163
Moderate	125
Strong	236
	— 524

In one of the experiments (the first one 20 years ago) an attempt was made to increase the reaction to lepromin by repeated testing, and for this purpose a total of 3 tests were done in the course of one year. This was done in 109 lepromin negative cases. In 93 of these the reaction was found to have become positive (weak in 30, moderate in 35, and strong in 28 cases), while it continued to be negative in the remaining 16.

Initial lepromin reaction and development of the disease.—Of the 39 cases of leprosy detected during the recent examination amongst these individuals, 15 have been of lepromatous and 24 of the non-lepromatous type. The incidence and type of the disease in the negative and positive reactors is shown below.

Result of the lepromin test	No. of persons	Cases of leprosy ^a		
		L	N	Total
Negative	156	15 (9.6%)	7 (4.5%)	22 (14.1%)
Positive				
Weak	163	0	9	9 (5.5%)
Moderate	125	0	3	3 (2.4%)
Strong	236	0	5	5 (2.1%)
Total	524	0	17	17 (3.2%)
TOTAL	680	15 (2.2%)	24 (3.5%)	39 (5.7%)

^a L signifies lepromatous; N, nonlepromatous.

It will be noticed that the incidence of the disease in the lepromin negative group has been much higher (14.1%) than in the lepromin positive group (3.2%). Moreover, in the lepromin negative group two-thirds of the cases have been of the lepromatous type, whereas in the lepromin positive group there has not been a single case of this type.

Spontaneous lepromin reaction and development of the disease.—The above is a correlation between the results of the initial lepromin test and the subsequent development of the disease and its type. Out of the 156

negative reactors included in the previous table, in 93 the reaction was later found to have been positive after three repeated tests during the course of the year. It can not be said to what extent this conversion from negative to positive was a result of the repeated testing; however, since the positive result was seen after the repeated testing, these individuals should be excluded while assessing the value of a spontaneous lepromin reaction. Their exclusion will reduce the number of negative reactors to 63, while the number of positive reactors will remain unchanged (524). A correlation of the results of the lepromin test on these 587 persons with the development of leprosy and type of the disease is shown in the following table:

Result of the lepromin test ^a	No. of persons	Cases of leprosy		
		L	N	Total
Negative	63	14 (22.2%)	3 (4.8%)	17 (27.0%)
Positive	524	0	17	17 (3.2%)

^a "Spontaneous" negatives, excluding the 93 of the first lot that became positive during repeated testing; the positives as at the initial test.

The above correlation brings out even in a more clear cut manner that compared to the positive reactors the negative reactors are not only more likely to get the disease, but also more likely to get the more serious lepromatous form of the disease.

As already stated, repeated testing was resorted to in 109 persons with initially negative lepromin reactions; in 93 persons the reaction was later found to be positive and these persons have been excluded from analysis in the above table; in the remaining 16 the reaction continued to be negative and they have been included in the above table. A consideration of these 16 persons separately brings out the interesting information that as many as 10 of them later developed the disease, and in 8 of the cases the disease was of the lepromatous type. This would tend to show that the prognosis with regard to the development of the disease and that too of the serious type is worst in persons in whom a negative lepromin reaction persists.

These findings may with advantage be compared with those in the 93 persons in whom the reaction was found to have been converted from negative to positive after repeated testing (though not necessarily as a result of it). In this group of 93, there developed 5 cases, only 1 of which was of the lepromatous type, and this was in a person in which a negative reaction had been converted into a weak positive. It is difficult to argue to what extent was this conversion due to repeated testing and to what extent it was spontaneous, because the repeated test had been spread over a period of 1 year.

The results taken as a whole.—Taking the results as a whole, and

including in the positive group the 93 persons who were first found to be negative but later positive after re-testing, the correlation between a lepromin reaction and development of the disease and its types is indicated below:

Result of the test initial or re-test	No. of persons	Cases of leprosy		
		L	N	Total
Negative	63	14 (22.2%)	3 (4.8%)	17 (27.0%)
Positive, weak	193	1 (0.5%)	10 (5.2%)	11 (5.7%)
Positive, moderate	160	0	5 (3.1%)	5 (3.1%)
Positive, strong	264	0	6 (2.3%)	6 (2.3%)
TOTAL	680	15 (2.2%)	24 (3.5%)	39 (5.7%)

These findings point to the same conclusion regarding the prognostic value of a positive lepromin reaction as arrived at by studying the correlation between a spontaneously positive lepromin reaction and development of the disease and its type.

CONCLUSION

The above results, looked at from different points of view, point to the great prognostic value of the lepromin reaction in persons exposed to leprous infection. They lend support to the generally held view that, compared to the contacts with a positive lepromin reaction, those with a negative reaction are more likely both to develop the disease, and to get it in the more serious (lepomatous) form.

[To indulge in a little play with figures, with respect to the second table and the finding that of the 16 persistently negative individuals of the first lot no less than 10 (63%) developed leprosy subsequently, against only 5 of the 93 (5.4%) who became positive during retests: Deducting those 16 from the 63 final negatives leaves 47 who had been tested only once. Since 85% of the 109 who received three tests became positive, it is within the bounds of possibility that a similar proportion of the 47, or 40 persons, would have become positive if that group had been similarly retested, 7 remaining unchanged to make a total of 23 persistent negatives. It is said that only 1 of the 93 in whom positivity developed during the period of retesting (a weak reactor) acquired lepomatous leprosy, at which rate it would be a matter of chance whether or not, out of the 40, any individual would have developed the disease in that form.—EDITOR.]

[A study of the data presented in this paper, from the statistical point of view, supports the conclusions of the author. The probability of obtaining a difference as great as that between the 14.1 per cent developing leprosy among the negative lepromin reactors and the 3.2 per cent among the positive reactors is less than 1 in 100,000 trials. Obviously the difference in the proportion developing leprosy among the persistently negative reactors (27.0%) and among the positive reactors (3.2%) is of still greater significance—the probability of such a difference is infinitesimally small. Although there appears to be considerable difference between the proportions developing leprosy according to the strength of the positive reactions, none of the differences are statistically significant.—ASST. EDITOR.]