

THE TUBERCULIN REACTION IN PATIENTS OF THE FIJI LEPROSY HOSPITAL

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Tuberculosis has long been, and still remains, an important if subsidiary complication of leprosy in this institution. Beginning in 1947-1948 (1), and continued more recently, the inmate population was subjected to tuberculin testing. Having received an inquiry about the results of that work (3), I present the findings here in summary form.

The reports from this hospital show that such an investigation was made here by Hall in 1917 (2). He applied the von Pirquet test to 121 patients and recorded 65.5 per cent positive reactions. Pointing out that a large proportion of all Fijians have tuberculous foci, active or inactive, he recalled that Harper, of the Fiji Medical Service, had tested by the same method 224 individuals of the general population and found 62.5 per cent of them positive. The high incidence of tuberculous infection was emphasized especially by the fact that Harper had found 22.7 per cent positives in children under five years of age. Hall himself had no young patients to test, who would have lowered somewhat the proportion of positives, but as it stands his figure is essentially the same as the one of Harper for the general population.

In the work mentioned briefly in my 1948 report, 1,010 tests were made on 645 patients, comprising 229 Indians, 120 Fijians, 76 Gilbert Islanders, 57 Cook Islanders, 50 Samoans, and less than 20 each of several other groups—Solomon Islanders, Niue Islanders, Rotumans, Chinese and Euroesians. Altogether, positive results were obtained in 55.5 per cent of the patients, although as stated in that report only 34.1 per cent of the total tests made resulted in positive reactions. There were 86 school-children of whom 38, or 44.2 per cent, were found positive; of the 559 adults 307, or 54.9 per cent, were positive.

The tuberculin used was of the OT type. The dosage varied, and because of shortage of material the testing could not be continued in the negatives to the normal 1:100 maximum dose except in a few cases. Most of the patients (550) were started with a 1:10,000 dilution, to which 119 (21.6%) reacted. On

retesting the nonreactors with 1:1,000, 177 more positives (41.2%) were detected, making a total of 296 positives (53.8%). The rest of the patients (95) were tested with the 1:1,000 dilution only; 44 of them (46.3%) were positive. Thus of the whole lot 340, or 52.7 per cent, were sensitive within the 1:1,000 limit. Only 6 nonreactors were tested with the 1:100 dilution, and 5 of them proved positive; this gives the total percentage of 53.5 already stated. Obviously, if the larger dose had been applied to all nonreactors that figure would have been materially larger.

The classification of these cases was: tuberculoid, 249; lepromatous, 396. Of the former, 149, or 59.8 per cent, were reactive, and of the latter, 196, or 49.5 per cent. This difference is statistically significant, the probability of its occurrence by chance is approximately .01.

More recently (1949-1950), this inquiry has been pursued further, in a total of 454 cases with a two-dose series, the dilutions 1:1,000 and 1:100. This group is not a homogeneous population, however, since only 224 of the cases were new with respect to this test; the other 230 were patients who had previously been found negative.

Of the group not previously tested 180, or 80.6 per cent, were found positive. Of those who had been tested before 142, or 61.8 per cent, reacted—97 of them only to the 1:100 dilution, which strength had not previously been reached with them. It is of some interest that 45 patients were now positive to dilutions to which previously they were negative; in other words, 19.6 per cent of the retested patients had become sensitized within a two-year period.

With regard to type in this instance, the new group comprised 88 tuberculoid cases of which 79 (89.8%) were positive, and 136 lepromatous cases among which there were 101 positives (74.3%). On the other hand, in the 62 tuberculoid cases of the retested group there were 27 positives (43.5%), and of the 168 lepromatous ones 115 were positive (68.5%).

Since the inquiry received bore on this question of the possible influence of type on reactivity, the foregoing data are assembled in the following tabulation.

Tuberculoid cases:

First group (1947-48)	249 cases, 149 positive, 59.8%
Do, retested (1949-50)	62 cases, 27 positive, 43.5%
Second group (1949-50)	88 cases, 79 positive, 89.8%

Lepromatous cases:

First group (1947-48)	396 cases, 196 positive, 49.5%
Do, retested (1949-50)	168 cases, 115 positive, 68.5%
Second group (1949-50)	136 cases, 101 positive, 74.3%

These data do not permit one to draw valid total percentages, firstly because of the time lapse between the testing of the first groups with the maximum dose of 1:1,000 and the retesting with the 1:100 dose, and secondly because only 62 per cent of the originally negative tuberculoid cases were later retested with the larger dose against 84 per cent of the originally negative lepromatous cases. No explanation can be offered for the fact that, contrary to the results of the original tests, in the retested group a larger proportion of the lepromatous cases should have been positive than of the tuberculoids.* In the second group, in which the cases negative to the first test with the 1:1,000 dilution were retested at once with 1:100, the difference in favor of reactivity on the part of tuberculoid cases is greater than in the original tests of the first group, and is statistically significant. Such a difference would be expected to occur 4 times in 1,000 by chance.

It has been suggested that the factor of dosage may enter into this matter, i. e., that lepromatous cases may perhaps be relatively less responsive than tuberculoids to a low dose of tuberculin (3). The records of the results obtained in the first group of patients with the first dose used on that occasion (1:10,000) show that with that dose the tuberculoid cases gave 23.1 per cent positives and the lepromatous cases gave 20.7 per cent. Relatively, the difference between these two figures is less, instead of greater, than that between the percentages of 59.8 against 49.5 obtained after retesting the negatives with the 1:1,000 dose.

With regard to the findings in the different ethnic groups in this institution, the results of the first tests as reported indicated that materially fewer of the Indians were sensitive to tuberculin than of the Fijians and Gilbert Islanders, which were virtually identical (1). In the recent tests the Fijians took the lead, and the difference between them and the Indians persisted. The data on this point are as follows:

* If one were to draw percentages from the first two lines of each section of the tabulation as they are, that for the lepromatous cases would be the larger (78.7 vs. 70.7).

Fijians:

First group (1947-48)	120 patients, 68 positives, 56.6%
Do, retested (1949-50)	45 patients, 28 positives, 62.3%
Second group (1949-50)	44 patients, 42 positives, 95.5%

Gilbert Islanders:

First group (1947-48)	76 patients, 42 positives, 55.3%
Do, retested (1949-50)	19 patients, 12 positives, 63.2%
Second group (1949-50)	42 patients, 36 positives, 86.8%

Indians:

First group (1947-48)	227 patients, 95 positives, 41.5%
Do, retested (1949-50)	112 patients, 70 positives, 62.4%
Second group (1949-50)	79 patients, 54 positives, 68.3%

In the 1947-1948 tests the proportion of Indians giving positive reactions was 26.7 per cent less than that of the Fijians, and in the second group that difference was 28.5 per cent, which is essentially the same. For the fact that in the retests the three ethnic groups should have given essentially identical results, no explanation is evident; but as has been noted that particular group of cases also gave type figures that differed from others. Incidentally, the recently tested group included 29 children of school age (up to 16 years), of whom 12 (41.4%) were positive; without them the total figure would have been even higher than it is.

With regard to the present rate of tuberculin positivity of the general population of Fiji, the only information at hand pertains to the people of one province, but the findings in them are probably representative. These show 24.5 per cent of positive Mantoux reactions among children up to the age of 14, and 86.9 per cent from 15 years upwards. The 29 Makogai children included in the second group tested gave a materially higher rate than that for children in the general population, presumably because of the close association of the inmates of a leprosy institution rather than any cross-sensitizing effect of the leprosy infection. The higher rate also seen in adults is likewise usual for such institutions.

SUMMARY

The patients of the Makogai hospital have been tested with tuberculin on two occasions widely separated in time. This was first done in 1917 by Hall with the von Pirquet test, when he found 65.5 per cent of 121 patients to be positive, that being about the same rate as had been recorded for a normal group in the general population. In the recent tests, made by me in 1947-1948 and 1949-1950, in two series comprising a total of

869 patients, the Mantoux method was used with varying dilutions of old tuberculin. The over-all positive rate of the first group of 645 patients was 53.5 per cent, but the maximum dilution used was only 1:1,000 except in 6 cases. In the second group of 224 newly-tested cases the maximum dose was a 1:100 dilution, and the positives were 80.6 per cent.

Analysis of the data with regard to type of the disease reveals an apparent tendency for tuberculoid cases to give more positives than lepromatous cases. The difference was 10.3 per cent in the first group tested, 15.5 per cent in the second group, both of these differences were statistically significant. The results in the first group with the first dilution used (1:10,000) are contrary to the idea that with low dosage there may be a greater difference between the two types than with higher dosage.

The higher prevalence of tuberculous infection, as represented by sensitivity to tuberculin, among the Fijians than the Indians and even the Gilbert Islanders is indicated by the total figures by racial grouping, but particularly by the results in the second group (95.5%, 68.3% and 86.8% respectively).

REFERENCES

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3. WADE, H. W. Reactions to tuberculins in leprosy; a review. *Internat. J. Leprosy* **18** (1950) 373-388.