

A STUDY OF THE MORO TUBERCULIN OINTMENT
TEST, WITH SPECIAL REFERENCE TO ITS
USE IN THE INSANE.*

REVIEW OF LITERATURE ON THE TEST. PREVALENCE OF TUBER-
CULOSIS AMONG THE INSANE. NEED OF EARLY DETECTION
AND ISOLATION IF WE ARE TO LESSEN THE DEATH RATE
FROM TUBERCULOSIS. REPORT OF 100 CASES. CONCLUSIONS.

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The purpose of this paper is to present the value of the Moro tuberculin ointment test as a simple and reliable method of the diagnosis of tuberculosis, particularly in that class of patients found in insane hospitals and other large institutions.

A brief review of the literature on the Moro test and the method of its application may not be out of place here, since this test has not been brought into such prominence as the Calmette, the Wolff-Eisner or the von Pirquet tests.

In 1908, E. Moro (1a-b), of Munich, brought to the attention of the profession the use of an ointment consisting of five parts of lanolin and six parts of Koch's old tuberculin. He rubbed a small piece of the ointment into the skin of the abdomen, the skin having been previously prepared, and in 24 to 48 hours obtained a papular eruption over the site of the application. Moro divided his reactions into three groups: (1) a slight reaction which appeared within 24 hours, consisting of two to ten discrete papules; (2) a moderately severe reaction, consisting of a hundred or more minute almost pin-point papules; and (3) a marked reaction of large red papules scattered beyond the area where the ointment was applied.

Moro (1a) tried this test in 89 cases, 43 of whom were tubercular or suspected tubercular patients, and he obtained 37 positive reactions. In every case where there was a positive reaction he

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was able to get a positive test with other methods. Later he reported 722 cases (2) and claimed the reaction to be absolutely harmless, most satisfactory and specific. It is diagnostic of either latent or active foci.

Lejeune (3), Heinemann (4) and Emmerich (5), have reported 442 cases tested by this method, with 212 positive reactions; 201 of all these cases were tubercular or suspects and 241 were non-tubercular. Heinemann declares the test harmless and superior to the ocular test.

Kanitz (6) reports 350 tests, with 102 positive reactions; 200 of these cases were non-tubercular and non-suspects and in 22 or only 11 per cent did he get a positive test, while over 64 per cent of the suspected cases reacted and 49 per cent of the distinctly tubercular cases gave positive reactions.

It may be said in passing that many control tests have been tried along with the Moro tests and no reactions obtained. Alderson (7) and Rothschild (8) have reported many interesting controls in tubercular patients where an ointment consisting of lanolin and other agents was tried with negative results, while the tuberculin ointment applied to the same cases gave positive reactions.

Webb and Williams (9) report 155 cases, with 69 positive reactions, and McHammel, Carpenter and Cope (10), in a comparison study of the von Pirquet, Moro and conjunctival tests, report 154 cases in children, with 85 positive reactions. This test compares favorably with the others and they prefer it to the Calamette, which gave some unfavorable eye symptoms.

From the literature (11) to which I have had access and from other sources I have been able to collect up to date 1401 cases tested by this method. Unfortunately it is not possible to give the exact percentage of positive reactions or the number of tubercular and non-tubercular cases, since some authors fail to give these data, but the general average of the complete reports is about 65 per cent positive reactions for all cases.

All authors agree that the test is perfectly harmless, is without temperature reaction, and appears on the average in from 24 to 48 hours. Nearly all writers have given a similar classification to the type of the reactions and nearly all have expressed considerable satisfaction with the reliability and ease of application of the test.

Tice (11d), at the last meeting of the Illinois State Medical Society, reported 107 cases tested with the Moro ointment. In 31 clinically diagnosed tubercular cases he obtained 23 positive reactions, and in the 76 non-tubercular cases, 11 positive reactions and 65 negative reactions. He places considerable value on the test and prefers it to the other tests, especially in children.

Patterson (11e) reports 171 cases tested by this method and at the same time with the von Pirquet. Of the 30 non-tubercular cases only one gave a positive ointment test, while the von Pirquet gave 7 positive tests. The remaining 141 tubercular and suspected tubercular cases gave 98 reactions, the Pirquet giving a slightly larger number of positive reactions.

Thus it will be seen from all sources that this test presents a simple and easy method of diagnosis in tubercular conditions, which compares favorably with any of the other methods of diagnosis. It is simpler than the injection or subcutaneous test, is freed from all the dangers or unpleasant symptoms which may arise from the latter test.

From a limited experience with the von Pirquet test among the insane, the Moro test is easier of application and less confusing in results. The Calamette and Wolff-Eisner tests are not without their dangers and are not to be used with the majority of insane patients, many of whom already have some ocular disease; then there is the additional fact that in nearly all insane cases it is impossible to obtain any history of previous eye disease.

There seems to be one possibility of error in the test, namely, the failure to sufficiently rub the ointment in and hence obtaining a negative reaction. The inconvenience of application, the need of repeating the tests or other drawbacks and complications, have been absolutely nil in the series of cases reported below. In two instances the patients washed off the ointment soon after application. There was, however, in less than 48 hours a distinct eruption of many papules over the site of the application, showing that if the ointment is well applied there is little danger of failure of the test if the patient is tubercular.

I believe that the Moro test offers a valuable aid to the diagnostic work among the insane and a means of lessening the high mortality rate from tuberculosis, since active cases can be early detected,

isolated, and the further spread of the disease prevented; latent cases can be under observation for the development of new processes.

That tuberculosis is a very frequent cause of the high mortality rate in insane hospitals few will deny. Forty years ago Bucknill (12), of England, stated: "The number of patients who die of phthisis is always a source of peculiar anxiety, inasmuch as the development of this disease may be regarded as a test of the sanitary conditions of an institution." He furthermore concludes some years later after observing many insane cared for in private residences "that the insane are not more liable to phthisis and other tubercular affections than other people, and that phthisis, which forms so large a portion of the mortality of asylums for the insane, is the product of the institutions and not of the cerebro-mental disease."

In our own country Babcock (13), writing some 33 years later, reports from 98 American insane hospitals that the death rate from phthisis alone varies from 1 to 60 per cent, the majority showing a death rate from this cause alone of over 20 per cent. Among other things he states "that tuberculosis is two to three times as common in institutions as in the general population; that the disease is frequently the result of hospitalism, and its prevalence may be regarded as a test of the sanitary condition of an institution, and being a communicable disease it is, therefore, preventable."

Dr. F. F. Crookshank (14), of London, in his prize essay of the Medico-Psychological Society in 1899, states that "the official death rate from phthisis in asylums of England and Wales is 4.5 times as great as that of the age group of the general population most liable to phthisis. This death rate is presumably one-third to one-half too low."

Many other authorities could be quoted to show the extent of the scourges of the great white plague in insane hospitals. These figures should make us ask if it is not time that some means, if possible, be not used to lessen such conditions. It is acknowledged that the insane, particularly from the fact of their mental condition, their physical attitudes and the necessity of being kept indoors much of the time and the overcrowding so frequently found in many hospitals are favorable subjects to develop the disease; but

the above facts cannot alone account for such a high mortality rate, nor does it excuse the fact that oftentimes the disease develops in those who enter free from it and whose physical and mental condition is not especially of a predisposing type.

It is hoped that few consider the unfortunate insane a class whom it is desirable to get out of the way speedily—this is not the spirit of our noble profession. We know that all measures which make life more pleasant and tend to longevity are an added expense to the State, but on the other hand it is a well-established fact that a large sick list, especially of the phthisical, are a great source of expense and economic loss as well as a danger to all about them, and in the end prolongation of life and preventative measures are economic factors of greater value than a large sick list and a high mortality. Hence any measures which may prevent or detect this disease are surely to be welcomed.

A single active case in a large ward, though perhaps not expectorating, is a source of great danger and may in a short time infect many if untidy and no precautions are taken. It is not enough to wait until bacilli appear in the sputum or physical signs are present to make a diagnosis. Physical examination and history, much less, may give very little satisfaction as regards the true condition of an insane patient. Many swallow their sputum and are untidy in habits, hence a great source of contamination. Early diagnosis, early and complete isolation and less overcrowding, together with plenty of fresh air, are the chief hopes of lessening the disease.

Having gained a knowledge of the particular test in question and the extent of tuberculosis among the insane and the need of early isolation, we will proceed to give a brief report of the results of the Moro test in 100 cases. The majority of cases were taken from a large unit built hospital, the remainder from a still larger institution, but one built principally on the pavilion plan and slightly better as regards ventilation and overcrowding than the first institution.

Only 32 of the cases selected were suspects or known tubercular patients. The remainder were selected without special reference to physical findings or condition, but many were from the same wards as the suspected cases.

The physical condition on entrance and the histories and physical findings have not been known until one to three weeks after the test was made except in a very few cases, so that in every way prejudice in physical findings and reactions has been eliminated.

The ointment used in these tests has all been specially prepared and a uniformity maintained throughout the tests. The method of application has been as follows: an area four to six inches square on the abdomen, breast or other area, if these were not in suitable condition, has been washed with soap and water, then water (not necessarily sterile) and dried. A piece of ointment the size of a small pea has been rubbed into this prepared area for about two minutes and no dressing applied. The patient has been inspected in 18, 24, 36, etc., hours unless a reaction was reached early. In only two cases was the test retried and no change was noted in the second tests. Control areas of lanolin have been done in several cases without results where the ointment test was positive.

The earliest reaction was manifest in 6 hours, a glandular case; the majority of reactions have been in 24 hours and only three have gone to 72 hours before showing reaction. The eruption has usually begun to fade within a week. The character of the reactions has not differed from those described by Moro; however, no unusual phenomena as an eruption along the course of a nerve or a nervous reflex reaction have been observed.

In the following table is given the cases and the reactions without regard to the physical findings.

TABLE I.

	Positive	%	Negative	%
Total number of cases 100	73	73	27	27
Total number known tubercular . 8	7	87.5	1	12.5
Total number suspects 24	16	66.6	8	33.4
Total number non-suspects 68	50	73.5	18	26.5

Table 2 gives the physical findings in 60 of the 100 cases. It is regretted that physical examinations could not be obtained in all cases, as circumstances did not permit. The 40 unexamined cases were, however, in the same institution and many from the same wards as the examined cases, and as the physical appearance and condition of these patients were not materially different from the examined cases, it is believed the results would have been proportionately the same had the 100 been examined.

TABLE 2.

	Positive	Negative
Total number of cases examined.....	60	41 19
Total number pulmonary tuberculosis, all stages	37	33 4
Total number gland, bone, peritoneum, etc., tuberculosis	4	4 0
Total number distinctly tubercular, with negative reaction	4	0 4
Total number without physical findings of tuberculosis	15	4 11

In only five cases was there a family history of tuberculosis, as shown by the records, and only two of these five gave a positive reaction. Fourteen cases out of the 100 showed pulmonary disease, tubercular or otherwise, upon entrance, and it will be remembered that 73 per cent of the 100 cases gave positive reactions; hence it is evident that tuberculosis in these cases probably developed in these institutions.

The four tubercular patients not giving a positive reaction, but giving physical findings, were all advanced cases with involvement of both lungs; they were among the known and suspected cases. In two of these cases a diagnosis of pulmonary tuberculosis had been made upon entrance. The period of confinement in the institution of the other two negatively reacting cases was about five years and the lungs were recorded as normal upon entrance. One, however, was not in good physical condition at that time.

Thirty per cent of the cases were expectorating. The sputum findings have been rather unsatisfactory, owing to the difficulty in collecting sputum in certain cases of the insane and also because of the fact that many swallow their sputum. From the dejecta in several cases bacilli were isolated. Seventeen per cent of the sputa examined gave bacilli in varying numbers.

The ages have been from 17 to 70 years, the average being about 30 years. Fifty-six per cent of all cases fell in the ages from 30 to 50 years. Ten nationalities were represented in this study of the 100 cases, 48 being Americans, while 28 were Scandinavians, the remainder being Irish, German, Dane and Bohemian, principally. There seemed to be no special predilection for the disease to attack one nationality more than another, considering the proportions of the different nationalities to the total hospital populations.

The classification of the cases as to the form of the mental trouble, with special reference to the reactions obtained, has presented some interesting figures and is given below in Table 3. The classification is taken from the diagnosis sheet of each patient's record.

TABLE 3.

	Number Cases	Positive	Nega- tive
Melancholia, acute and chronic.....	32	27	5
Dementia senile	7	7	0
Developmental insanities, dementia præcox.....	12	10	2
Puerperal insanity	3	0	3
Imbecile	4	3	1
Mania, acute and chronic.....	25	16	9
Alcoholic insanity	3	2	1
Epileptic insanity	4	2	2
General paresis	6	3	3
Acute confusional	1	1	0
Not given	3	2	1
Total.....	100	73	27

The length of confinement in the institution and the length of the mental disturbance have been noted in this study: the former has varied from one month to twenty-four years, with an average of five and one-half years. The mental disturbance has varied from two months to 30 years and has averaged four and three-quarters years for the 100 cases.

Loss of weight was noted in about 90 per cent of the cases and in nearly all cases temperature charts were maintained for several days, and an almost equal number showed a daily temperature varying from 99° to 102° or over. The above facts are not, however, of great value in this class of patients, since periods of excitement, auto-toxic conditions and periods with depression and refusal of food will give both loss of weight and temperature.

In adults the general opinion seems to be that a negative reaction is of more value than a positive one, except in advanced cases, which often fail to react with any of the tuberculin tests. Among adults it less often gives a positive reaction in those clinically free from tuberculosis than the other tests.

It could not be determined in any of the 100 cases tested that the character of the reaction had any bearing on the extent of the

disease further than the fact that all bone and glandular cases reacted very vigorously.

In reviewing the literature several authors have tested equal numbers of cases with the ointment and the von Pirquet method and their results have been nearly identical and a very favorable comparison of the value of the tests is shown.

In conclusion it may be added that a positive reaction may take place in those patients in whom no tubercular lesion can be demonstrated. These cases are rare and if carefully watched may later show definite lesions.

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