

Clinical significance of Mantoux test in Malaysian patients

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Summary

The value of tuberculin skin testing in the diagnosis of active tuberculosis remains uncertain. Interpretation of tuberculin tests would be easier if the tuberculin test profiles in different communities were accurately known. We reviewed 468 Mantoux test reactions in patients coming to Hospital Universiti Sains Malaysia with suspected tuberculosis. Eighty six percent of patients with active tuberculosis had a positive Mantoux test. Forty two percent of the cases of positive Mantoux test did not have evidence of active tuberculosis. Most of these cases had evidence of past infection with tuberculosis. We conclude that Mantoux test is a sensitive but a non-specific test in the diagnosis of active tuberculosis.

Key words: Mantoux test, tuberculosis

Introduction

Tuberculosis is a systemic disease with protean manifestations. Definite diagnosis usually requires the demonstration of *Mycobacterium tuberculosis* in patients' tissues or secretions by microscopy and/or culture. Diagnosis can sometimes be difficult and it was noted that in 42 percent of cases, bacteriology was negative.¹ Although the history, physical examination and chest X-ray are frequently helpful adjunct and at times may strongly suggest tuberculosis, tuberculin skin testing is often done as an aid to diagnosis.

The value of tuberculin skin testing in an adult patient with possible tuberculosis infection remains uncertain. At present, most clinicians appear to interpret tuberculin test results from personal experience of the local population. The pattern of tuberculin test reaction in the local setting will serve a useful guide for interpreting them. The aim of this study was to determine the usefulness of tuberculin skin tests in helping make a diagnosis of tuberculosis in Malaysian subjects.

Materials and Methods

The results of 468 Mantoux tests done in out-patients and in-patients attending the Hospital Universiti Sains Malaysia, Kubang Kerian, Kelantan with clinical suspicion of tuberculosis during the period from January 1988 to December 1988 were reviewed. Mantoux tests were done by one of the two nurses specially assigned to do this procedure. It was performed by intracutaneous

injection of 0.1 ml of purified protein derivative (PPD—RT25 stabilised with Tween 80) containing two tuberculin units into the volar surface of the forearm. Reading was made on the second or third day after the injection. The diameter of induration was measured in millimetres. A reading of 10mm or more was considered as positive Mantoux reaction.

Eighty-five cases of active tuberculosis (detection of *Mycobacterium* on sputum direct smears, gastric lavage, biopsies, cultures etc.) and 30 cases of 'old' tuberculosis diagnosed in this hospital were then reviewed for their Mantoux reactions. The diagnosis of old tuberculosis was made when the patient gave a history of past tuberculosis and the chest X-ray showed evidence of bilateral apical fibrosis but examination for *Mycobacteria* including cultures was negative.

Results

A total of 568 patients had the Mantoux test done during the one year period from January 1988 to December 1988. In 100 patients, the Mantoux test was done but no reading was recorded. The reasons for unread Mantoux tests were (i) out-patients who did not return for reading, (ii) positive tuberculosis patients who were transferred to the Tuberculosis Centre, General Hospital before readings could be made and (iii) unrecorded readings.

One hundred and three cases of active tuberculosis were diagnosed during the period of study. In ten cases, Mantoux tests were not done and in eight cases they were not read because the patients were transferred to the Tuberculosis Centre before the test/readings were made. Eighty five cases of positive tuberculosis with Mantoux test readings recorded were available for study. The relationship between the Mantoux reactions to tuberculosis is shown in Table 1.

Table 1
Mantoux Test and Tuberculosis

	Positive Mantoux	Negative Mantoux	Total
Active Tuberculosis	73	12	85
Not Tuberculosis	39	344	383
Total	112	356	468

Fifty five of the 112 cases of positive Mantoux test had active tuberculosis. The specificity of Mantoux test for diagnosis of tuberculosis was therefore 49.1%. Thirty nine cases (34.8%) had positive Mantoux reactions but without evidence of active tuberculosis. In 14 (36%) of them there were clinical and chest X-ray evidence of 'old' tuberculosis. Seventeen (56.7%) of the 30 cases of old tuberculosis reviewed had positive Mantoux reactions.

Three hundred and fifty six patients had negative Mantoux reactions and 12 of them had active tuberculosis giving a false negative result in 3.4%. Of the 85 patients with active tuberculosis, 73 (85.8%) had positive Mantoux test and 14.1% had negative results. No specific causes like age, sex or severity of disease were found to explain the false negative reaction.

Discussion

The tuberculin skin test is often used to detect infection with *Mycobacterium tuberculosis*. Reports recommend using 10 mm of induration as a criterion for reactive (positive) Mantoux skin test^{2,3}. When the test is positive, it means that the patient has been infected with *Mycobacterium spp.*, whether they are viable and growing or dormant. Tuberculin skin test is also regarded as a useful test in epidemiological studies for the prevalence of tuberculosis. In certain communities, it is still regarded as a useful diagnostic aid in individuals with suspected tuberculosis.

Attention has recently been highlighted on the problems of false positive and false negative reactions. Capewell et al⁵ found that a strongly positive tuberculin test in an adult was not uncommon and will have little clinical value in discriminating between active tuberculosis disease and previous infections. In support to this finding, our study found that 41.5% of positive Mantoux reactions had no evidence of active tuberculosis. Positive Mantoux reactions in these patients may be due to previous *Mycobacterium* infection with or without disease. Seventeen (57%) of the 30 patients with evidence of old tuberculosis had positive Mantoux reaction but in the other 13 patients, the Mantoux tests were negative.

When a tuberculin test is used in the evaluation of persons having a disease process that might be of tuberculosis origin, the major concern is false-negative reaction. It is generally believed that almost all persons who have had a tuberculous infection, except the aged and critically ill, will react to the standard skin test with 5TU of tuberculin. In 1942, Furcolow, Hewel and Nelson⁵ reported that 99.6% of 468 tuberculosis patients had positive reaction to 0.001 mg of PPD. Additional surveys in the following decade^{6,7} confirmed this high degree of reactivity. Recent studies, however have contended that the test is not as sensitive as an index of infection with tuberculosis as previously held. Stead⁸ estimated that 20% of his patients newly admitted to a general hospital and with positive sputum culture, and 30% of his elderly, debilitated and very ill patients had negative tests. Holden et al⁹ found 17% of some 155 patients with bacteriologically confirmed diagnosis of pulmonary tuberculosis failed to respond with a positive reaction to a product containing anti-absorbent material Tween-80. In our present study we found that 14.1% of patients with positive evidence of tuberculosis had negative Mantoux reaction.

Conclusion

Definite diagnosis of tuberculosis requires the demonstration of *Mycobacterium tuberculosis* by direct smear, culture or on histology. Mantoux test may be helpful in excluding the diagnosis since it is fairly sensitive (85.8 percent). A negative Mantoux reaction therefore make a diagnosis tuberculosis less likely. However, because many patients (34.8 percent) with positive Mantoux reactions did not show evidence of active tuberculosis, a positive test may not be so helpful in diagnosis of active tuberculosis.

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