



UTILITY OF MANTOUX TEST IN DIAGNOSING TUBERCULOSIS.

Pulmonary Medicine

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ABSTRACT

Objective: To study utility of Mantoux test as a diagnostic tool, in patients getting registered under RNTCP in pulmonary and extrapulmonary tuberculosis

Methods: 50 patients who were getting registered under RNTCP centre in the institute of MGM medical college, Aurangabad for pulmonary and extrapulmonary tuberculosis treatment were recruited in the study. Clinical examination, AFB smears, Mantoux test and CBNAAT (wherever required) were warranted in the study.

Results: Out of all pulmonary and extrapulmonary tuberculosis among 50 patients, 39 patients were found to have Mantoux positive. Among 23 sputum positive pulmonary tuberculosis patients, 15 patients were found to have Mantoux test positive, and the remaining 10 were Mantoux negative. 2 patients who were diagnosed to have pulmonary tuberculosis on the basis of chest radiograph findings and clinical examination were Mantoux positive. Out of 12 tubercular pleural effusion patients, 9 patients were found to have Mantoux test positive and remaining 3 patients have Mantoux negative. Among 9 cervical tubercular lymphadenitis patients, 8 patients were found to have Mantoux positive and remaining 1 patient was Mantoux negative. Out of 3 patients of abdominal tuberculosis, 2 patients were found to have Mantoux positive and 1 patient was Mantoux negative. One patient of TB spine was included in the study was found to have Mantoux positive.

Conclusion: Despite advances in diagnosis of tuberculosis with newer forms of diagnostic modalities (such as CBNAAT, TB-PCR), Mantoux test still plays an important role in diagnosis of tuberculosis.

KEYWORDS

INTRODUCTION:

Tuberculosis is still a major health problem worldwide. Tuberculosis is one of the dreaded diseases which accounts for 9.6 million cases globally as per the WHO Global TB Report 2015. Among these cases India contributes to 2.2 million incidence cases. It has not only high morbidity but also the mortality is high with 0.22 million deaths in India in 2015¹.

Mantoux test dates back to 19th century, and still it is widely used all over the world for diagnosis of tuberculosis.

A standard dose of five tuberculin units (TU) (0.1ml) is injected intradermally and read 48 to 72 hours later. PPD-RT 23 with tween 80 strength 1TU and 2TU are standardized tuberculins available in India supplied by Bacillus Calmette-Guerin vaccine laboratory, Chennai.

Conventionally, the test is given on the left forearm to avoid errors in reading. However, right arm may be used in case of any contraindication to use in left arm. The volar aspect of the arm is preferred site of the test. The patient is instructed to keep the test site clean, uncovered and not to scratch or rub the area. The reading should be taken between 48 to 72 hours after the administration of test. For standardization, the diameter of induration should be measured transversely to the long axis of the forearm and recorded in millimeters^{2,3}.

The mantoux test does not measure immunity to TB but the degree of hypersensitivity to tuberculin. There is no correlation between the size of induration and likelihood of current active TB disease but the reaction size is correlated with future risk of developing TB disease. This has poor positive predictive value for current active disease⁴. The result must be interpreted carefully. The person's medical risk factors determine the size of induration the result is positive (5mm, 10mm, or 15mm) Five mm or more is positive in HIV positive persons, recent contacts of active tuberculosis cases, persons with nodular or fibrotic changes on Chest X-ray consistent with old healed TB, organ transplant recipients and other immunosuppressed patients who are on cytotoxic drugs, patients on long term corticosteroid use, end stage renal disease. Ten mm or more is positive in recent arrivals from high-prevalence countries, injectable drug users, residents and employees

of high congregate settings such as prisons, nursing homes, hospitals. Fifteen mm or more is positive in persons with no known risk factors for TB.

Objectives:

In this study, patients getting registered under RNTCP for the treatment of pulmonary and extrapulmonary tuberculosis were subjected to Mantoux test. Comparative study of pulmonary and extrapulmonary tuberculosis and Mantoux positivity in them were studied

Methodology:

The study is a cross sectional study, conducted at MGM Hospital Aurangabad after obtaining permission of the institutional ethical committee.

The study used data in 50 patients who were getting registered under RNTCP for treatment of pulmonary and extrapulmonary tuberculosis was used.

Inclusion criteria : Patients of all age group, who are willing to undergo separate Mantoux test and willing to participate in the study were included. Patients who have been already diagnosed as pulmonary and extrapulmonary tuberculosis (diagnosed on sputum examination, FNAC, Histopathology reports) were included.

Exclusion criteria : Patients with HIV positive status were excluded.

Materials:

- Mantoux test
- AFB smear (where ever required)
- CBNAAT (where ever required)
- FNAC reports (where ever required)
- Histopathology reports (where ever required)
- Chest x-ray (where ever required)
- USG abdomen and pelvis (where ever required)
- USG neck (where ever required)

RESULTS:

Total of 50 patients were included in the study. All the patients were

diagnosed cases of pulmonary and extrapulmonary tuberculosis (cervical tubercular lymphadenitis, tubercular pleural effusions, TB spine, abdominal tuberculosis etc.) by various means of diagnostic modalities (such as chest radiograph findings, bacteriologically confirmed on basis of sputum examination, CBNAAT, FNAC reports, histopathology reports etc.), who were getting registered under RNTCP were included.

Out of all pulmonary and extrapulmonary tuberculosis among 50 patients, 39 (78%) patients were found to have Mantoux positive.

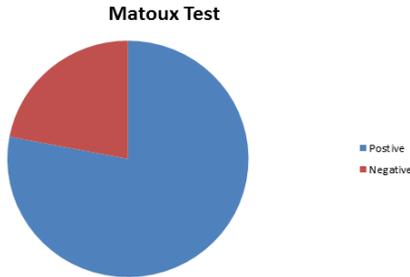


Fig 1: Distribution of patients according to Mantoux positivity among pulmonary and extrapulmonary tuberculosis.

Among 23 sputum positive pulmonary tuberculosis patients, 15(51.7%) patients were found to have Mantoux test positive, and the remaining 10 were Mantoux negative. 2(8.69%) patients who were diagnosed to have pulmonary tuberculosis on the basis of chest radiograph findings and clinical examination were Mantoux positive.

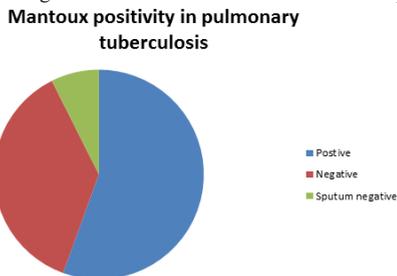


Fig 2: Distribution of patients according to Mantoux positivity among pulmonary tuberculosis.

Among 12 tubercular pleural effusion patients, 9(75%) patients were found to have Mantoux test positive and remaining 3 patients have Mantoux negative.

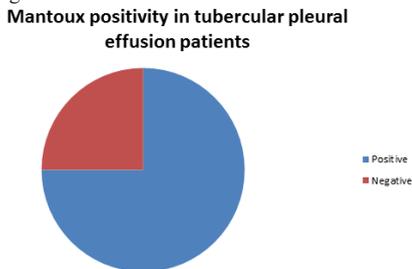


Fig 3: Distribution of patients according to Mantoux positivity among tubercular pleural effusion patients.

Among 9 cervical tubercular lymphadenitis patients, 8(88.89%) patients were found to have Mantoux positive and remaining 1 patient was Mantoux negative.

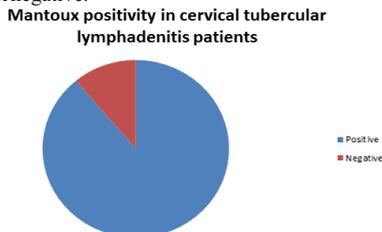


Fig 4: Distribution of patients according to Mantoux positivity among cervical tubercular lymphadenitis patients.

Among 3 patients of abdominal tuberculosis, 2(66.7%) patients were found to have Mantoux positive and 1 patient was Mantoux negative.

Mantoux positivity in patients of abdominal tuberculosis

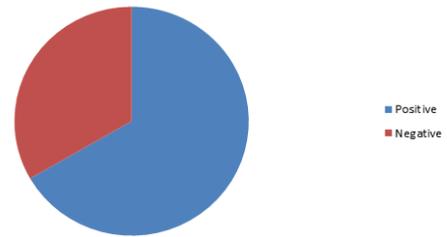


Fig 4: Distribution of patients according to Mantoux positivity among abdominal tuberculosis patients.

One patient of TB spine was included in the study was found to have Mantoux positive.

DISCUSSION:

The prevalence of tuberculosis was estimated to be 10.5 million. In India alone 1.8 million new cases of TB arise annually^(5,6). It is estimated that about 40% of the Indian population is infected with TB bacteria.

Both pulmonary and extrapulmonary tuberculosis contribute to significant burden of morbidity and mortality due to its complex nature and leading to delay in diagnosis. The conventional methods such as AFB cultures are time consuming.

Despite the availability of effective preventive measures and chemotherapy, the prevalence of tuberculosis is increasing in the developing world and in much of the industrialized world as well⁷.

To reduce the incidence and prevalence, India introduced National Tuberculosis Control Programme (NTP) in 1962, followed by Revised National Tuberculosis Control Programme (RNTCP) 1993 -1996 and with Directly Observed Treatment Short-Course chemotherapy (DOTS) strategy in 1997. WHO released STOP TB STRATEGY in 2006. India adopted it in 2007. There are continuous efforts made to decrease the incidence and prevalence of tuberculosis, continuous change in the strategies under RNTCP are made. Further there was adoption of Goals of NSP with a vision of TB Free India in 12th Five-year plan in (2012-17). The current adoption of END TB STRATEGY has a vision of WORLD FREE OF TB⁸.

Both pulmonary and extrapulmonary tuberculosis contribute to significant burden of morbidity and mortality due to its complex nature and leading to delay in diagnosis. The conventional methods such as AFB cultures are time consuming.

Pulmonary tuberculosis is diagnosed on the basis of clinical examination, chest radiographs, sputum examination for AFB, sputum for CBNAAT, TB-PCR, AFB cultures. Extrapulmonary tuberculosis such as tubercular pleural effusions, cervical tubercular lymphadenitis, abdominal tuberculosis, TB spine are diagnosed with various other biochemical examination, cytological examination, histopathological examination etc.

The tuberculin skin test is one of the few investigations dating from 19th century that are still widely used in diagnosis for tuberculosis. Though very commonly used by physicians around the world, its interpretation always remains difficult and controversial. Various factors such as age, immune status, other co existing illness influence its outcome and its interpretation.

Mantoux test was developed by Koch in 1890 but the intradermal technique currently in use was described in 1912 by Charles Mantoux⁹. The reaction to intracutaneously injected tuberculin test is a classical example of delayed hypersensitivity reaction. T-cells sensitized by prior infection are recruited to the skin site where they release lymphokines. These lymphokines induce induration through local vasodilatation, edema, fibrin deposition and recruitment of other inflammatory mediators. Features of the reaction include its delayed course, reaching peak more than 24 hours after injection of the antigen, its indurated character and its occasional vesiculation and necrosis.

Most recently developed sensitive and specific diagnostic tests for tuberculosis like Bactec, TB-PCR have not found a place in routine evaluation of tuberculosis as they are expensive and not widely available. Mantoux test is widely used by physicians all over the world for diagnosing pulmonary and extrapulmonary tuberculosis. In developing countries such as India, diagnosis of tuberculosis is largely based on indirect epidemiological evidences and Mantoux test still plays an important role.

In a study conducted by D. Vijaysekaran et al on Mantoux and contact positivity in tuberculosis, Mantoux positivity in pulmonary and extrapulmonary tuberculosis in children is 34.7%¹⁰.

Our findings suggest that Mantoux positivity in patients getting registered under RNTCP is 78%. Among which 25 patients (50%) were having pulmonary tuberculosis, 12 patients (24%) were having tubercular pleural effusions, 9 patients (18%) were having cervical tubercular lymphadenitis, 3 patients (6%) were having abdominal tuberculosis, and 1 patient (2%) was having TB spine.

CONCLUSION:

1. Out of all pulmonary and extrapulmonary tuberculosis among 50 patients, 39 patients were found to have Mantoux positive.
2. Among 23 sputum positive pulmonary tuberculosis patients, 15 patients were found to have Mantoux test positive, and the remaining 10 were Mantoux negative. 2 patients who were diagnosed to have pulmonary tuberculosis on the basis of chest radiograph findings and clinical examination were Mantoux positive.
3. Out of 12 tubercular pleural effusion patients, 9 patients were found to have Mantoux test positive and remaining 3 patients have Mantoux negative.
4. Among 9 cervical tubercular lymphadenitis patients, 8 patients were found to have Mantoux positive and remaining 1 patient was Mantoux negative.
5. Out of 3 patients of abdominal tuberculosis, 2 patients were found to have Mantoux positive and 1 patient was Mantoux negative.
6. One patient of TB spine was included in the study was found to have Mantoux positive.

Despite advances in diagnosis of tuberculosis with newer forms of diagnostic modalities (such as CBNAAT, TB-PCR), Mantoux test still plays an important role in diagnosis of pulmonary and extra pulmonary tuberculosis.

Declarations:

Funding: None

Conflict of interest: None declared

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