A Study of Interpretation of Mantoux Test in Pediatrics age Group (5-18 Years of Age)

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Abstract

Objective: To establish the role of Mantoux test in diagnosis of tuberculosis in children.

Methods: The age group selected for this study was 5-18 years and period of study was Aug 2018 to Feb 2020.

Children attending to our OPD with the c/o fever & weight loss for > 2 months were advised to undergo Mantoux test along with CBC & ESR , CHEST X-RAY & Sputum Examination for AFB after taking detailed history including contact history of tuberculosis & clinical examination .

Result: Out of 100 cases 64 (64%) were to be found to be suffering from tuberculosis disease. Rest 36(36%) were improved with symptomatic treatment and antibiotic treatment.

According to age these children were divided into two group i.e,5-10 years and 10-18 years. It showed association between Mantoux test and tuberculosis was more in age group between 5-10 years in comparison to age group between 10- 18 years .

Conclusion: Childhood tuberculosis is an indirect index of the prevalence of tuberculosis in the community. Clinical presentation may be atypical and leads to delay in diagnosis. Children can present with TB at any age, but the majority of cases present with TB at any age, but the majority of cases present between 1 and 4 years. Disease usually develops within 1 year of infection- the younger, the earlier and the more disseminated. A positive tuberculin test does not indicate the presence or extent of tuberculosis; it only indicates infection. Mantoux has to be interpreted carefully. A careful history, complete physical exam, and focused laboratory evaluation are essential for determining the cause and initiating treatment. Occasionally A positive Mantoux test may be the only evidence of disease.

Keywords: *TU(Tuberculin Unit), TB(Tuberculosis), ATT(Anti Tubercular Treatment), Mx(Mantoux), AFB (Acid Fast Bacilli)*

Introduction

Tuberculosis remains a leading cause of morbidity and mortality in the world especially in the developing country. The tuberculin skin test is one of the few investigations dating from the nineteenth century that are still widely used as an important test in diagnosing tuberculosis. The present study was conducted upon 100 children to correlate interpretation of Mantoux test.Tuberculosis is caused by mycobacterium tuberculosis, an aerobic acid fast, non spore forming non motile slow growing bacillus. The actual global

disease burden of childhood tuberculosis is not known but it has been assumed that 22% of the actual tuberculosis case is found among children. A global estimate of 1.5 million new cases & 1,30,000 deaths due to tuberculosis among children is reported[1,2].

Objective:

This prospective study was conducted:

1. To establish the role of Mantoux test in diagnosis of tuberculosis in children.

Methodology

Mantoux Test was performed in all children who are attending to our outpatient and inpatient department.

A standard dose of 0.1 ml of 5TU (Tuberculin unit -PPD) was injected intradermally into the skin and read 48-72 hours later. We used 26or28gauge needle and tuberculin syringe from which 0.1ml was delivered accurately.

The age group selected for this study was 5-18 years and period of study was Aug 2018 to Feb 2020

Observation & Result

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 the future risk of developing TB disease[6].

There is no correlation between the size of post vaccination Mx reaction and protection against TB diseases and routine post BCG Mx testing serves no purpose.

Materials & Methods

STUDY PROCEDURE: The Present study was conducted upon 100 children in whom Mantoux test was positive

(n=100). These children were coming to our OPD, Saraswathi institute of medical Sciences, pilkhuwa ,Hapur ,U.P children attending to our OPD with the c/o fever & weight loss for > 2 months were advised to undergo Mantoux test along with CBC & ESR , CHEST X-RAY & Sputum Examination for AFB after taking detailed history including contact history of tuberculosis & clinical examination .

Results

Out of 100 cases 64 (64%) were to be found to be suffering from tuberculosis disease. Rest 36(36%) were improved with symptomatic treatment and antibiotic treatment.

According to age these children were divided into two group i.e,5-10 years and 10-18 years. It showed association between Mantoux test and tuberculosis was more in age group between 5-10 years in comparison to age group between 10- 18 years

TABLE -1: Disease wise distribution of positive Mantoux test (n=100)

TUBERCULOSIS	64%
Disease relieved by symptomatic and antibiotic treatment	36%
TOTAL	100

Table -2: Distribution of cases according to age group

Age group	Total number of cases	Number of TB cases	% of TB cases
5- 10 years	60	48	80%
10- 18 years	40	28	70%
Total	100	76	

After 3 months follow up children who were taken antitubercular drug, become heathy and increase in weight and were advised to continue ATT till six months

Discussion

Mx test interpretation is difficult. It is neither sensitive nor specific with high false positive and false negative results. That is why in this study care was taken while performing Mantoux test. Diameter of induration was measured correctly. Regarding ATT, decision was taken considering all the factors together.

Wenli Pan, et al. in 2009 found that Mantoux test was positive in 430 children(28.4%) in their study. A positive culture, suggestive chest radiograph, and proximity of TB contact were risk factors for a positive test[4]. Henrik Aggerbeck, et al. study in 2013, showed the specificity of PPD was 63% using a cut-off of 15mm[5]. TB incidence in an adolescent cohort in South Africa; Hassan Mahomed,et al. noted in their study in 2013 a positive baseline TST was significant predictor of TB disease[6]. Rekha Bansal and Parveen K. Sharma mentioned in their article that Mantoux has to be interpreted carefully and one should also be aware of unusual presentations like Exaggerated Mantoux Reaction. Patient should be kept under observation.

Our study is similar when compared to the above studies. Among the total 41 cases of Mantoux positive , 16(39%) were found to be suffering from tuberculous disease and anti tuberculous drugs were started (table -1 and figure -1). According to age these cases were divided into 2 groups again i.e. 1 to 4 year and 5 to 12 year. Association betweenMantoux test and tuberculosis is more in the age group between 1 and 4 year and 5 to 12 year. Association Mantoux test and tuberculosis is more in the age group between 1 and 4 year when compared to the age group between 5 and 12 year(table -2, figure -2).

ATT was prescribed after considering all the deciding factors to start ATT like history of contact, clinical picture and other investigations(repeated investigations were done whenever required), opinion of faculty from other departments like radiology, pathology, microbiology. After 3 months follow up children who were under ATT, became healthy and increased in weight and were advised to continue ATT till 6 months. However, this study was conducted in children,who were attending to our hospital. Thus our findings may not represent the etiology of hypertension in the population.

Recommendations:

Making a diagnosis of tuberculosis in children is extremely challenging. A definite diagnosis of tuberculosis requires isolation of the organism from secretions or biopsy specimen. But a presumptive diagnosis of tuberculosis can be made from the following features.

- Positive tuberculin skin test(Mx test)
- Clinical and radiological features suggestive of tuberculosis
- Known contact with an adult case of TB

Although Mantoux test will be positive in latent TB infection, it is not specific. Detection of interferon – gamma (IFN-GAMMA) or T-cells producing interferon -gamma is employed for the diagnosis of latent TB infection or active disease.

- Quantiferon TB Gold test[8]
- T SPOT TB test

If the AFB smear is negative but clinical suspicion is high, nucleic acid amplification may be done.

- MTD (amplified M. tuberculosis direct test)[9]
- AMPLICOR system-amplification of characteristic fragment of bacillary DNA by PCR(polymerase chain reaction).

Conclusion

Childhood tuberculosis is an indirect index of the prevalence of tuberculosis in the community. Clinical presentation may be atypical and leads to delay in diagnosis. Children can present with TB at any age, but the majority of cases present with TB at any age, but the majority of cases present between 1 and 4 years. Disease usually develops within 1 year of infection-the younger, the earlier and the more disseminated. A positive tuberculin test does not indicate the presence or extent of tuberculosis; it only indicates infection. Mx has to be interpreted carefully. A careful history, complete physical exam, and focused laboratory evaluation are essential for determining the cause and initiating treatment. Occasionally A positive Mantoux test may be the only evidence of disease.

Compliance with Ethical standard

Conflict of interest – None

Source of funding – None

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