

A STUDY OF CHEST RADIOGRAPHIC ABNORMALITIES AND MANTOUX TEST IN PEDIATRIC NEUROTUBERCULOSISRashmi Alva¹, Prem Alva²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: Tuberculosis in children is a major health problem especially in developing countries. Neuro-tuberculosis is generally associated with higher mortality and morbidity, has variable presentation and is difficult to diagnose. **OBJECTIVE:** To determine the chest radiographic findings and Mantoux positivity in children with neuro-tuberculosis. **STUDY DESIGN:** Descriptive study. **SETTING:** Pediatric wards of teaching hospitals affiliated to J. J. M Medical College, Davanagere. **METHODS:** A total of 45 patients fulfilling pre-defined criteria of neuro-tuberculosis were included. Chest radiographic abnormalities (CXR) and its pattern along with the Mantoux test result were evaluated in these patients. **RESULTS:** Of the 45 patients with neurotuberculosis, radiographic abnormalities were seen in only 8.88% patients with the patterns being consolidation (50%), right middle lobe collapse (25%), and mediastinal lymphnode enlargement (25%). Mantoux test was positive in 13.33% patients. **CONCLUSION:** The chest X-Ray may be normal in majority of cases of pediatric neuro-tuberculosis and Mantoux may be non-reactive for a various reasons.

KEYWORDS: Pediatric neurotuberculosis, chest X-Ray, Mantoux.

INTRODUCTION: Tuberculosis (TB) has always been a major Global health problem and still continues to be a public health issue of considerable magnitude. According to WHO estimate in 2012, 8.6 million people developed TB among whom 1.3 million died¹ of the total 8.6 million cases worldwide 2.3 million occurred in India.²

The incidence of central nervous system (CNS) TB is generally directly proportional to that of tuberculosis incidence. It is estimated that among the patients with tuberculosis about 10% have CNS involvement.³ CNS tuberculosis generally occurs as a complication, immediate or remote, of the primary infection in lung. It may also develop during the course of chronic tuberculosis. In both, the infection reaches the CNS via blood stream.⁴

Generally about 50% of those with TBM have findings of active or previous TB infection. Multiorgan involvement is strongly suggested by military TB and hence is very helpful when shown on chest radiograph.⁵ Mantoux test is a useful adjunct in the diagnosis of tuberculosis but can be negative in many scenarios. This study was done to evaluate the chest radiographic findings and Mantoux test positivity in children with CNS tuberculosis.

MATERIALS AND METHODS: This descriptive study was carried out on 45 children between 6 months to 18 years of age admitted in a teaching hospital over 2 years. The demographic data, clinical symptoms and signs, were recorded in a standardized proforma. All patients were worked up and diagnosed according to a predesigned protocol, which included detailed history, physical examination and relevant investigations. The British Medical Council staging was used for clinical grading at the time of presentation for all patients.⁶

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Chest X Ray (CXR), Mantoux test and CT scan were carried out on all patients. All chest Radiographs and CT scans were read by a senior radiologist. Chest radiographic features were classified as normal and abnormal. The abnormal radiographs were further categorized as hilar adenopathy, consolidation or collapse. Mantoux test was done using 0.1ml of 1 TU of PPD- RT 23 with Tween-80 and the result was read after 48 to 72 hours.

RESULTS:

Investigation	No. (n = 45)	Percentage (%)
Abnormal X-ray	4	8.88
Consolidation	2	4.44
Mediastinal lymphnode	1	2.22
Right middle lobe collapse	1	2.22
Normal X Ray	41	91.12
Positive Mantoux test	6	13.33

TABLE 1: chest X-Ray abnormalities and Mantoux test result

A total of 45 patients with neurotuberculosis were enrolled in our study. Chest X-ray was abnormal in 4(8.88%) cases and showed consolidation in 2 (4.44%), mediastinal lymph node 1(2.22%), right middle lobe collapse in 1 (2.22%) case, and was normal in 41 (91.12%) cases. Mantoux test was positive in 6 (13.33%) out of 45 cases. Of the 4 patients with abnormal chest radiographs, 2(50%) had positive Mantoux test. 3(75%) of the patients with abnormal chest radiograph were in clinical stage 3 with only 1(25%) in clinical stage 2.

DISCUSSION: In developing countries tuberculosis still continues to be a major health problem with neuro-tuberculosis contributing to most of the mortality. In this study it was observed that majority (91.12%) of neuro-tuberculosis patients had a normal chest x ray. Chest radiographs are normal in most patients with primary TB, probably because films are obtained after the pulmonary process has resolved⁷. The peripheral lesions are often small in size and hilar or paratracheal lymphadenopathy may initially remain invisible on CXR and may later become evident as small calcified or fibrotic nodules. CXR may be normal initially even in early military tuberculosis, as these tubercles are not visible until these get 1-2 mm in diameter.^{8,9} The small percentage (8.88%) of abnormal chest X-rays in our study may also be explained by the small sample size.

In contrast to our series, a study in Turkey on neuro-tuberculosis in children,¹⁰ reported abnormal chest radiographs in 87%, with a variety of abnormalities including hilar adenopathy (34%), miliary pattern(20%), Pneumonic infiltrates (18%), bronchopneumonic infiltrates (15%) and pleural effusion(1%). Similarly Kondo¹¹ revealed that chest radiological examinations of infants and young children with TB meningitis (TBM) showed swelling of the mediastinal lymph nodes and/or parenchymal infiltration in all patients (100%) which can be explained by the predominance of younger age group in their study. However a study based on neurotuberculosis in adults from Pakistan,¹² had abnormal chest radiographs in 34.4% similar to another group from Pakistan¹³ which studied only the chest radiographic findings in adult neurotuberculosis. It reported abnormal chest radiographs in 30%. Farinha et al¹⁴ also reported chest X-ray abnormalities in (40%) patients.

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In our study the abnormalities on chest radiograph were, consolidation in 2 (50%), mediastinal lymphadenopathy 1 (25%), right middle lobe collapse in 1 (25%) case. The radiographic abnormalities in the Turkish¹⁰ study were hilar adenopathy (34%), miliary pattern (20%), pneumonic infiltrates (18%), bronchopneumonic infiltrates (15%) and pleural effusion (1%). The predominant radiographic patterns of apical infiltrates (26.6%), military mottling (20%) and hilar enlargement (16.6%) were reported by Aurangzeb et al.¹³ In the study by Farinha et al¹⁴ nine (60%) patients had miliary shadowing; four (26%) had mediastinal lymphadenopathy; three(20%) patients had evidence of consolidation and one(6%) had a pleural effusion.

Our study did not show pleural effusions, bronchopneumonic infiltrates or military pattern. In this study 75% of the abnormal X rays were in patients who were in clinical stage 3. In the Pakistan¹² based study also the majority of the abnormal radiographs were seen in stage 3. It may be hypothesized that the overwhelming bacteremia that accompanies advanced grades of neuro-tuberculosis, may explain the higher incidence of positive chest radiographs in these patients. It was also observed that Mantoux test was positive in only 6 (13.33%) out of 45 cases, however 50% of the CXR positive cases had positive Mantoux test. In a study of tuberculosis in children upto 5 years of age,¹⁵ 19% of patients with CNS tuberculosis had Mantoux positivity which is similar to that in our study.

Vijayasekaran opined that Mantoux was least significant in CNS tuberculosis (21.2%).¹⁶ The other studies had a higher rate of Mantoux positivity. The study¹² on adult neurotuberculosis revealed a Mantoux positivity of 55%, of which, 33.3% of CXR positive patients had positive Mantoux. Similarly in the study by Yaramis et al¹⁰ and a study of tuberculosis in early infancy,¹⁷ Mantoux was positive in 30% and 31% of patients respectively. Kalita et al¹⁸ also demonstrated that 45% patients of TBM with pulmonary miliary tuberculosis had negative Mantoux test.

Although, the diagnostic practice in our country gives much value to Mantoux test for the diagnosis of Tuberculosis, it can be negative in severely debilitated or malnourished, immunosuppressed, patients on steroids, and in those with advanced stage of the disease. The higher rate of Mantoux negativity in our present study may be explained by the occurrence of malnutrition in most of our cases.

CONCLUSION: The chest X-Ray may be normal in majority of cases of pediatric neuro-tuberculosis and Mantoux may be non-reactive for a variety of reasons.

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