

Original article:

Study of pulmonary tuberculosis in infants and children

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Abstract:

Introduction: Tuberculosis was declared a global emergency in 1993 by the World Health Organization (WHO). The World Health Organization estimates that one third of the world's population is infected with mycobacterium tuberculosis, with the highest prevalence of tuberculosis being in Asia .

Methodology: All infants and children between 2 months to 14 years of age suspected to have pulmonary tuberculosis admitted in a tertiary health care centre were enrolled of last one year.

Results: Chest X-ray was done in all patients. The most common finding on chest radiography was mediastinal lymphadenopathy in 28 patients (57.10%) especially in the age group of 5 to 10 years. The next common finding was consolidation occurring in 36% of patients mostly in 10 to 14 years of age. CT scan has shown 88.89% sensitivity and 75% specificity. Pearson Chi-Square, Continuity Correction and Fisher's Exact test has shown significant association.

Conclusion: Pulmonary tuberculosis in children is more symptomatic and the risk of severe and life threatening complications such as tuberculous meningitis or miliary tuberculosis is higher. Therefore, early diagnosis and prompt treatment are very important.

Introduction:

Tuberculosis was declared a global emergency in 1993 by the World Health Organization (WHO) ⁽¹⁾. The World Health Organization estimates that one third of the world's population is infected with mycobacterium tuberculosis, with the highest prevalence of tuberculosis being in Asia ⁽¹⁾. It is estimated that the global incidence is 1.3 million TB cases with a mortality rate of 450,000 cases per year in children less than 15 years. Developing countries carry the highest risk with more than 90% of the cases and more than 95% of the deaths. Children less than 5 years are most affected with a sharp decline until the mid teens. The lifetime risk of developing the disease after infection is 43% in infants , 24% in children between 1 to 5 years and 15% in adolescents, compared to immunocompetent adults who have a lifetime risk of 5% to 10%. Younger children also experience more severe disease like neurotuberculosis or disseminated disease ^(2,3) Tuberculosis remains an important cause of mortality and morbidity worldwide.⁽⁴⁾ Tuberculosis is a major public health problem in India. India accounts for one-fifth of the global TB incident cases. Each year nearly 2 million people in India develop TB of which around 0.87 million are infectious cases. Children represent one of the high risk groups in the resurgence of this disease. It is estimated that annually around 330,000 Indians die due to TB. In India nearly 3-4 million children have tuberculosis and another 94 million are at risk for this disease. The annual infection rate is about 3%.^(3,4)

Children can present with TB at any age, but the most common age is between 1 to 4 years. Case notifications of childhood TB depend on the intensity of the epidemic, the age structure of the population, the available diagnostic tools and the extent of routine contact tracing.

Material and methods:

A prospective observational study done in a tertiary health care centre of a large metropolitan city.

Inclusion criteria :

All infants and children between 2 months to 14 years of age suspected to have pulmonary tuberculosis admitted in a tertiary health care centre were enrolled of last one year.

Exclusion criteria :

1. Patients with non-tuberculous pulmonary lesions.
2. Patients already on anti-tuberculous treatment (ATT).

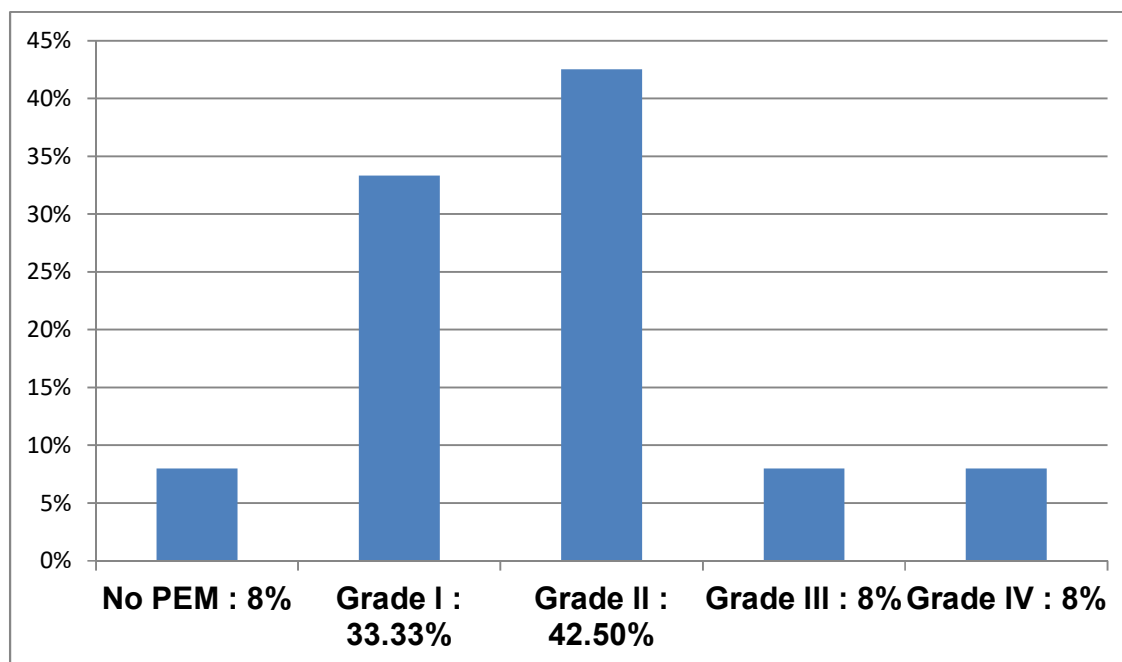
Approval of Institutional Ethical Committee was obtained. In all enrolled cases history, presenting symptoms, physical examination findings, history of contact with tuberculosis patient, history of receiving BCG vaccine; as well as, bacteriological and radiological findings were assessed and collected/entered in a predetermined proforma.

Results:

Total 50 children between 2 months to 14 years of age suspected to have pulmonary tuberculosis were included in the study. Twenty four (48%) were between (28%) between 10 to 14 yrs and twelve (24%) were less than 5 yrs of age.

On examination, in children < 5 years (n = 12), 1 (8%) had no malnutrition, 4 (33.33%) had Grade I PEM, 5 (42.50%) had Grade II PEM, 1 (8%) had Grade III PEM, and 1 (8%) had Grade IV PEM (Figure No.5). In children 5 years or older (n = 38), 35 (92%) were found to be underweight.

Figure No 1 : PEM distribution among cases (age group < 5 years) :



BCG scar was present in 31 cases (62%%.).

Eleven patients (22%) had cervical lymphadenopathy.

Mantoux test was performed in all patients and showed positive results in 39 patients (78%). One patient was found to be HIV positive.

USG abdomen was done in 18 patients and found to be normal in 9 patients (50%), 5 patients had hepatomegaly (27.8%), 2 had splenomegaly (11.1%), 1 had hepatosplenomegaly (5.6%) and 1 had mesenteric lymphadenopathy (5.6%).

Chest X-ray was done in all patients. The most common finding on chest radiography was mediastinal lymphadenopathy in 28 patients (57.10%) especially in the age group of 5 to 10 years. The next common finding was consolidation occurring in 36% of patients mostly in 10 to 14 years of age.

CT scan has shown 88.89% sensitivity and 75% specificity. Pearson Chi-Square, Continuity Correction and Fisher's Exact test has shown significant association.

Discussion:

Most pulmonary tuberculosis cases seen in infants are due to primary infection. It begins when the respiratory secretion from a patient with TB is inhaled and reaches the lung alveoli which then causes parenchymal inflammation. The primary focus is the initial inflammation which is produced by localized alveolar consolidation.⁽⁵⁾ This primary focus of TB is usually not visible on chest X-ray but may progress to involve a segment or an entire lobe.⁽⁶⁾ Infection then spreads to the central lymph nodes from the primary focus via draining lymphatic vessels

(appearing as a linear interstitial pattern on chest radiographs) and results in regional lymphadenopathy. Ranke complex is the primary infection focus of TB in the lung accompanied by regional lymphadenopathy and intervening lymphatic channels. In most cases, these parenchymal lesions and the accompanying lymphadenopathy resolve spontaneously.⁽⁷⁾ In some cases, especially in young infants, the involved lymph nodes continue to enlarge. Some studies report that **mediastinal lymphadenopathy with or without parenchymal abnormality is a hallmark of primary tuberculosis in childhood.**⁽⁸⁾

The study group included 21 boys and 29 girls ranging from age 2 months to 14 years. None of the children were immunocompromised and only one was HIV positive. Thirty one patients were BCG vaccinated. Physical examination of the BCG site and regional lymphnodes revealed no abnormality.

Mantoux test was performed in all patients and showed positive results in 39 (78%). Twenty two patients were exposed to household contacts. Symptoms were fever (56%), poor appetite (50%), cough (36%), weight loss (24%), breathlessness (18%), abdominal complaints (18%), expectoration (10%), chest pain (6%) and seizures (4%).

In our study **mediastinal lymphadenopathy was most common finding on X-ray in 57.1% patients** as well as **on CT thorax in 82%** of patients including necrotic lymphadenopathy. The next common finding was **consolidation in 36% patients on X-ray and 48% patients on CT.**

Leung et al. (1992) in their series of 191 children, reported lymphadenopathy in 92% and parenchymal lesions in 70% of the patients.⁽⁹⁾ Mikovic et al. reported 84.4% lymphadenopathy and 61.3% parenchymal involvement in a series of 204 cases.⁽⁵⁾ In a tomographic study involving 25 children aged <12 months, Kim et al⁽⁸⁾ have observed consolidation in 100% of patients, 59% with mass like presentation, 41% with necrosis and 21% with cavitation intermingled with consolidation. Bronchogenic dissemination was found in 41% of cases.

Conclusion:

Pulmonary tuberculosis in children is more symptomatic and the risk of severe and life threatening complications such as tuberculous meningitis or miliary tuberculosis is higher. Therefore, early diagnosis and prompt treatment are very important.

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