Clinical profile of Children with Mediastinal Tuberculosis

Dr. Manish Kumar Sharma[1], Dr. Prachi Saxena[2]*, Dr. Pooja[3]

[1]Assistant Professor, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

[2]Assistant Professor, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

[3]PG Final Year Student, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

*Dr. Prachi Saxena - Corresponding Author

ABSTRACT

Background: Tuberculosis (TB) is a significant public health issue. India is responsible for one-fifth of all global cases, according to the World Health Organization's (WHO) yearly report .The most common form of tuberculosis in children is lung-only PTB. Extrapulmonary TB (NPTB) is the term for the condition in which the TB bacteria spreads the infection outside of the lungs.(EPTB)

Aim & ojectives: To study clinical profile of children with mediastinal tuberculosis (TB).

Methods and Materials: This retrospective study was undertaken between January 2015 and March 2018 in children diagnosed with mediastinal TB. Clinical history, examination and radio imaging, such as chest X-ray and HRCT chest, were done in every patient at the start of therapy. The prevalence of mediastinal TB was calculated. Factors associated with mediastinal TB and associated pulmonary TB (PTB) were analysed.

Results: Out of total 406 patients with TB, 58 (4.12%) had mediastinal involvement. Fever was seen in 49 (84.5%) patients, positive Mantoux test (MT) in 16(80%), cough in 40.13%, loss of appetite in 43.75% and weight loss in 28.4%). Associated PTB was present in 35.2% patients. Associated extrapulmonary TB (EPTB) was observed in 22.7% patients. 11.25% patients had an abnormal X-ray. Baseline HRCT chest was done in 89.32% patients and all of them showed necrotic caseous mediastinal nodes. Treatment duration of patients who completed treatment with first-line anti-tuberculous therapy was 11.42 months. 17 patients (29.3%) were diagnosed to have drug-resistant TB (DR-TB). Cough was seen more commonly in patients with associated PTB (80%) as compared to isolated mediastinal TB (42.68%) ($p = 0.034$).

Conclusion: Mediastinal TB is common in children with EPTB. Associated PTB is seen in only about one-third of the patients. X-ray chest is abnormal in half the patients; hence, HRCT chest may be required to make a diagnosis. Bacteriological confirmation is necessary due to high incidence of DR-TB in these patients. Most of the patients require treatment for a longer duration as resolution takes a longer time. Computed tomography imaging on follow-up helps to determine the treatment duration.

Keywords: mediastinal tuberculosis, extrapulmonary tuberculosis, mediastinal widening

INTRODUCTION

In India, tuberculosis (TB) is a significant public health issue. India is responsible for one-fifth of all global cases, according to the World Health Organization's (WHO) yearly report [1]. The most common form of tuberculosis in children is lung-only PTB. Extrapulmonary TB (NPTB) is the term for the condition in which the TB bacteria spreads the infection outside of the lungs (EPTB). However, in a tiny proportion of kids, TB distributes throughout the body and affects the other organs; this condition is known as progressive or disseminated TB. This occurs more frequently in extremely young children, particularly those under 4 years old [1]. In kids, EPTB

is common. Children are more susceptible to developing tuberculosis-related illnesses such lymph node, abdominal, and skeletal TB than adults are. The majority of cases of mediastinal TB in adults are extremely rare, with just a small number of cases having been documented thus far [1, 3-5]. It typically co-occurs with lung parenchymal abnormalities. Most adults who present with these symptoms are right-sided paratracheal lymphadenopathy without parenchymal lesions, cough, fever, and weight loss [3]. This occurs more frequently in extremely young children, particularly those under 4 years old [1]. In kids, EPTB is common. Children are more susceptible to developing tuberculosis-related illnesses such lymph node, abdominal, and skeletal TB than adults are. The majority of cases of mediastinal TB in adults are extremely rare, with just a small number of cases having been documented thus far [1, 3-5]. It typically co-occurs with lung parenchymal abnormalities. Most people who appear with these symptoms are right-sided paratracheal lymphadenopathy without parenchymal abnormalities, cough, fever, and weight loss [3]. All children with a positive Mantoux test and a cough lasting more than 15 days (MT). The Gene Xpert and growth of Mycobacterium tuberculosis (MTB) on Mycobacteria Growth Indicator Tube (MGIT) test on lymph node biopsy sample, gastric lavage (GL), or sputum analysis were used to confirm the bacterial diagnosis.

METHODS & MATERIALS

The clinical characteristics that were noted included the presence of a cough, a temperature, appetite loss, and weight loss. Each patient underwent a thorough clinical history and examination. Each patient's history of TB exposure, prior TB treatment, MT reading, length of treatment, and treatment outcome were noted. When the induration was greater than 10 mm after 48 hours, an MT was deemed positive. Additional EPTB and related PTB were observed. Patients with isoniazid and rifampicin resistance, with or without resistance to additional first-line medications, were deemed to have multi-drug resistant (MDR) TB. The term "extensively drug resistant" (XDR) refers to tuberculosis that is resistant to all three of the second-line injectables, at the very least isoniazid and rifampicin (amikacin, capreomycin and kanamycin). Patients were deemed to have Rifampicin Resistance (RR) TB if they had geneXpert-detected rifampicin resistance but no other medication sensitivity data [10]. The liquid culture, or MGIT method, was used to cultivate TB bacteria. The following were the anti-TB medications tested's critical concentrations for the MGIT drug sensitivity testing (DST): Streptomycin (1 mg/ml), Isoniazid (0.1 mg/ml), Rifampicin (1 mg/ml), Ethambutol (5 mg/ml), Kanamycin (2 mg/ml), Ethionamide (5 mg/ml), PAS (4 mg/ml), Ofloxacin (2 mg/ml), Moxifloxacin (0.25 mg/ml), Amikacin (1 mg/ml), Clofazamine (0.5 mg/ Each patient had radioimaging prior to beginning treatment, including a chest X-ray and a high-resolution computed tomography (CT) scan of the chest. Patients who could afford it had a CT scan of their chest at the end of their treatment. According to the RNTCP [12] standard anti-tuberculous therapy (ATT) guideline, treatment completion was defined as TB patients who finished their course of treatment with clinical and radiological improvement and no signs of failure. A

patient who was lost to follow-up was one who did not begin therapy or whose course of treatment was discontinued for at least two months in a row [10]. Statistic evaluation Using SPSS software version 10, the prevalence of mediastinal TB among all TB patients was determined. Factors associated with mediastinal TB and associated PTB were analysed. Statistical methods were used the chi-square test or Fisher's exact test for proportions and unpaired t-test for comparative data. The association was considered statistically significant if the p-value was < 0.05.

RESULTS

Out of total 406 patients with TB during the study period, 43(10.59%) had mediastinal involvement. The ratio of men to women was 32:26. The patients ranged in age from 3 months to 16 years, with a median age of 7 years [95% confidence interval (CI): 5.9-8.2]. Their mean age was 7.1 6 4.3 years. Fever, positive MT, cough, appetite loss, and weight loss were the clinical signs in 29 (67.44%), 21 (48.83%), 18(41.86), and 12 (27.90%) cases, respectively. A 16.8 6 4.3 mm mean MT reading was recorded. The average length of a cough was 75.5 days, and the average length of a fever was 61.8 days, with a median of 30 days (95% CI: 42.4-82.2). 15 individuals (34.88%) had associated PTB. 10 patients (23.25%) were found to have associated EPTB, of whom 52% had abdominal nodes, three 27% had cervical nodes, 2 (4.65%) had spinal abscesses, and one each (8.1%) had TBM, a pleural abscess, and supraclavicular nodes. All 43 patients got chest X-rays, and (86.5%) of those had abnormal results. 32 (55.2%) patients had paratracheal nodes visible. 19 patients 33.6% had mixed subcarinal and precarinal nodes.

In Table 1, factors related to mediastinal nodes and mediastinal nodes with PTB are shown. A total of 40 patients underwent geneXpert testing, of which 32% revealed MTB presence. The mediastinal node biopsy in 24 patients, of which 20% had MTB growth, the GL in 7 patients, of which 5(10.3%) had MTB growth, and the sputum test in 5 patients, of which 2.3% had MTB growth, were the specimens on which the Xpert test was performed. 33 patients underwent TB MGIT culture, of which 34.6% had MTB. The specimens used for the TB MGIT culture were mediastinal node biopsy in 22 patients, of which 27.2%) had MTB growth, GL in 9 patients, of which 3 (7.7%) had MTB growth, and sputum test in 5 patients, of which 0 had MTB growth. DST was administered to 26.2% patients, of whom 3 (3.32%) had direct contact with an MDR patient, 9.3% had MDR-TB, 9.8% had pre-XDR TB, and 1.93% had poly resistant TB. There were 3 (5.2%) patients without DST who had RR results on geneXpert. First-line ATT, comprising of isoniazid, rifampicin, pyrazinamide, and ethambutol, was administered to 40 patients (or 69%); 18 patients (or 31%) received second-line ATT. 52.8% patients finished their treatment, 34.6% were being followed up on, and 17.3% of the patients were lost to follow-up. Following treatment, a second CT scan of the chest was performed on 35.3% patients, of whom 10 54% had node calcification, 8 (40%) had node enlargement, and 11.23% had a normal CT scan. Treatment time for patients who finished first-line ATT was 11.67 months, followed by 9.26 months, and 6.54 months for patients who were lost to follow-up.

DISCUSSION

Lymph node TB is the most typical form of EPTB in children. The prevalence of mediastinal TB in our study was 4.12%, which is comparable to the cervical lymph node TB prevalence that we previously reported [13]. This finding suggests that mediastinal lymph node involvement in paediatric TB is as common as cervical lymph node involvement, and that children who present with fever and cough should be given a higher level of suspicion for mediastinal involvement. The prevalence of mediastinal TB has never been reported in a study of this nature before. Only 13 children were diagnosed with mediastinal TB between January 1995 and December 2002 according to a UK study, which suggests that children from developing countries are more likely to have the disease. As per a study in India, frequency of associated pulmonary involvement varies from 5% to 62% [14]. This is consistent with our result which showed an association of 36.8% of mediastinal TB with PTB. In our study, 19.2% of patients had other organs involved in EPTB mainly the lymph nodes.

Table 1: Factors associated with mediastinal nodes with PTB and mediastinal nodes with PTB

Age (years)	**Mediastinal + PTB (n =20)**	**Mediastinal nodes without PTB (n = 32)**	**p-value**
0–5	13(65%)	10(31.25%)	
6–10	4(20%)	15(46.85%)	0.178
>10	3(15%)	7(21.8%)	-
Gender			
Male	12(60%)	18(56.25%)	0.593
Female	8(40%)	14(43.75%)	
Cough	16(80%)	14(43.75%)	0.034
Fever	15(75%)	29(90.62%)	0.715
Weight loss	7(35%)	9(28.12%)	0.763
Loss of appetite	9(45%)	14(43.75%)	0.95
TB contact	8(40%)	13(40.62%)	0.776
Mantoux test +ve	10(50%)	17(53.12%)	0.341
Past TB	4(20%)	2(6.25%)	0.96
Gene Xpert	6(30%)	7(21.87%)	0.95
TB MGIT	3(15%)	9(28.1%)	0.287
Drug-resistant TB	7(35%)	8(25%)	0.94
Treatment completed	12(60%)	15(46.87)	
Lost to follow-up	4(20%)	3(9.3%)	
On follow-up	5(25%)	12(37.5%)	

Although isolated mediastinal lymph node involvement may also represent a TB presentation, over 51% of the patients had isolated mediastinal TB involvement. The prevalence of solitary mediastinal involvement without a parenchymal lung

lesion ranges from 0.25 to 5.8%, according to the literature [15]. It may be challenging to distinguish mediastinal TB from parenchymal lung TB based on the symptoms of these individuals, which included fever, coughing, and appetite loss. A research conducted in South Africa found that 49.1% of the kids with TB tested positive for Mantoux [16]. However, 68.1% of the patients in our study got a positive MT test. However, compared to individuals without mediastinal TB, people with PTB had greater cough. Hence, If a child has radiographic evidence of mediastinal expansion along with coughing, one should also be suspicious of an accompanying parenchymal lung lesion. Contrary to our findings, which indicated a male majority, the literature claims a female predominance (2:1) [17]. (1.32:1). In our study, 48.3% of patients with chest X-rays had mediastinal widening, and 5.17% of patients had a mediastinal mass, suggesting that mediastinal involvement may not be visible in more than half of patients on a chest X-ray and that a CT chest scan or other methods of evaluating mediastinal nodes may be necessary in these patients to diagnose mediastinal TB. There are a number of complications that mediastinal nodes can lead to, such as incomplete bronchial obstruction (ball valve), inflation of the middle and lower lobes, complete bronchial obstruction and collapse of the right lower lobe without consolidation, collapse after partial consolidation, erosion into the bronchus leading to tuberculosis bronchopneumonia, and pericardial effusion due to node rupture through the pericardium. Wheezing symptoms and a chronic cough are frequently linked to glaring roentgenographic indications of swollen lymph nodes [18]. Early detection is crucial because, if the nodes have not undergone extensive caseation, prompt treatment may cause them to shrink and disappear. Even though clinical samples taken from comparatively difficult-to-access areas may be paucibacillary, lowering the sensitivity of diagnostic testing, diagnosing EPTB is still difficult.

CONCLUSION

In our study, mediastinal node biopsy resulted in the growth of MTB by geneXpert in 19% of patients and in 26.8% of patients who had lymph node biopsy by MGIT culture. However, DR-TB was identified in 12 out of 18 patients who completed DST testing. Therefore, it is essential to attempt bacteriological confirmation in these individuals in order to develop the proper diagnostic and treatment regimens. Although the RNTCP recommends a 6-month treatment course, theoretically the chance of recurrence is higher with shorter regimens, thus it's critical to lengthen the course of treatment for EPTB patients [19]. Due to the longer time it took for resolution to show up on imaging, the majority of our patients needed therapy for a longer period of time (mean 11.5 months). Resolution of mediastinal TB might take the form of gland size reduction with a normal hilum or calcification, which was observed in 52% of our patients. The glands completely regressed in a very small number of cases. As a result, merely clinical surveillance or chest X-rays may not be sufficient to establish the length of therapy, and the majority of patients would need a CT scan at a subsequent visit.

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