TUBERCULAR PLEURAL EFFUSION IN ADOLESCENTSRamya H. S¹, Mohan Kumar N², Soumya A³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: OBJECTIVE: The aim of this study was to determine the incidence of tubercular pleural effusion over a two year study period in adolescents admitted to a tertiary level hospital. **METHODS:** This observational study was conducted in a tertiary hospital at Bangalore, Karnataka, to study the incidence of Tubercular pleural effusion from 1st January 2012 to 28 February 2014. 30 cases aged 10-18 years admitted and enrolled to RNTCP were included in this study. **RESULTS:** Between January 2012- February 2014, 42 children 1 month- 18 years were diagnosed with various types of tuberculosis. 30 cases aged 10-18 years were enrolled. 19 Cases had pulmonary tuberculosis (63.3%) and 2 cases had military tuberculosis, therefore there were totally 21 cases having pulmonary involvement (70%). TB Lymphadenitis 4 cases (13.33%), abdominal TB 3 cases (10%), CNS tuberculosis and bone tuberculosis one case each (3.33%). Tuberculin skin testing was positive in 33.3% of all cases i.e. >10mm in 10 cases- and significantly positive >20mm in 4 of 30 cases. Chest radiograph in pulmonary Koch's cases showed Pleural effusion in 14 cases (46.67%), of which 8 cases had pleural effusion only (38.09%) and 6 cases had effusion with parenchymal disease (26.67%). Parenchymal disease as sole manifestation was found in 7 cases (33.33%). Cavitation was found in 3 cases (10%). Sputum was positive for AFB in 8 cases (38.09%). Mean ESR was found to be higher in cases of pleural effusion with associated consolidation (M= 71.3) followed by cases with only consolidation (M= 53) and M= 42 in cases with pleural effusion alone. **CONCLUSIONS:** In our study, we found that tubercular pleural effusion was the most common presentation in adolescent population accounting to 46.67%, which is higher than the global incidence of 3-38%. Parenchymal consolidation was found to be the most common associated radiological finding.

KEYWORDS: Tuberculosis, pleural effusion, adolescents.

INTRODUCTION: Tuberculosis continues to be one of the most devastating and widespread infections in the world. About one million cases (11%) occur in children under 15 years of age. The reported incidence of all tuberculosis cases occurring in children worldwide varies from 3% to more than 25%. Childhood tuberculosis is a neglected aspect of the tuberculosis epidemic because it is usually smear negative and considered to make a minor contribution to the spread of TB.¹

Pleurisy with effusion develops as a complication of primary pulmonary tuberculosis (TB) in 2 to 38% of children with pulmonary disease.²⁻⁷ Effusion is not a common feature of primary pulmonary TB in young children and it is more likely to be observed in adolescents and adults.^{3,7}

In this study we aim to determine the following:

- (1) The age distribution of adolescent patients with TB;
- (2) The main clinical and laboratory findings;
- (3) Incidence of tubercular pleural effusion in adolescent patients
- (4) Association of Tubercular skin testing and ESR in pulmonary tuberculosis.

ORIGINAL ARTICLE

MATERIALS AND METHODS: In this observational study, all cases of Tuberculosis aged 10years -18 years adolescent population admitted to KIMS hospital from January 2012 to February 2014 were enrolled. We defined a case of TB if (1) Mycobacterium tuberculosis was detected from a clinical specimen, or (2) a child had clinical evidence of current disease and any of the following: (a) a history of contact with an adult case of TB; (b) positive tuberculin skin test >10mm; (c) suggestive appearances on chest radiograph; 8Clinical, laboratory, bacteriologic, radiologic, and treatment data were reviewed.

Pulmonary Koch's was diagnosed if the patient showed a chest radiograph interpreted by a radiologist as depicting a pleural effusion/ consolidation/ cavity/ lymphadenopathy and at least one of the following criteria:

- (1) Positive culture for M tuberculosis from sputum, gastric aspirate, pleural fluid, or pleural biopsy specimen;
- (2) Acid-fast bacilli in sputum, gastric aspirate, pleural fluid, or biopsy tissue;
- (3) Pleural tissue histopathology compatible with TB (caseating granulomas with Langhans giant cells, epithelioid cells, and lymphocytes);
- (4) Compatible clinical picture with positive tuberculin test and one of the following: lymphocytic pleural fluid (>50%), exudative fluid (protein>3 g/dL or lactate dehydrogenase [LDH]>200 U/L) or pleural fluid levels of adenosine deaminase activity (ADA)>40 U/L; and
- (5) Radiographic pleural effusion that resolved with appropriate antimycobacterial therapy.⁸

Tuberculin skin testing was made by means of an intradermal injection of 2 tuberculin units of PPD. All skin tests were undertaken by nursing personnel who are familiar with the technique. Induration was measured in 48 to 72 h and recorded in millimeters. A positive test was considered if the palpable induration was > 10 mm and strongly positive if >20mm.

Specimens of sputum, gastric washing, pleural fluid and biopsy tissue were obtained from patients with pleural effusion and studied for acid-fast bacilli detection by Ziehl-Nielsen smear and microscopic evaluation.

Routine blood investigations were done. Other relevant investigations like USG Abdomen & Pelvis, CT Thorax, CT BRAIN, CSF Analysis, FNAC etc were done when required.

RESULTS: Between January 2012 and February 2014, 42 cases were diagnosed with tuberculosis in children 1 month-18 yrs. of age, of which 30 cases were aged 10-18 yrs. comprising 71.43%.

The overall Male: Female ratio in adolescent TB was found to be 1:1.14 and in pulmonary cases Male: Female ratio was 1:1.6. Tubercular skin testing was found to be positive in 50% of cases and significantly positive i.e. >20mm in 10% of the pulmonary cases (Table 2). In a similar study, it was found that 33.3% of children aged 10-18 years with TB had Tubercular skin testing positive.⁹

Of the 30 cases one was a child with Down's syndrome and one case was retropositive. 21 cases (70%) had pulmonary involvement and 9 cases had extrapulmonary (30%), the various type of presentation are shown in chart1. It was found that pleural effusion was seen in 46.67% of cases and consolidation without effusion was seen in 23.33% of cases.

3 cases had cavitory lesion (10%), 8 cases had sputum for AFB positive(26.67%).

Mean Hb and WBC were lower in pulmonary TB and Mean ESR was higher in cases of pulmonary TB.

ORIGINAL ARTICLE

Pleural fluid analysis shows lymphocytic exudative effusion, with mean cell count of 1869 ± 568 , predominantly lymphocytic 96.36 ± 2.9 , proteins 5.3 ± 0.35 , glucose 96.9 ± 5.04 , LDH of 308.3 ± 56.7 . ADA levels were sent for 5 patients with mean of 61.8 ± 3.7 .

DISCUSSION: Published reports describe Tubercular pleural effusion (TPE) as a complication of primary pulmonary TB in 2 to 38% of children with pulmonary disease.^{2-4,6,7} Effusion is the sole radiographic manifestation of primary pulmonary TB in 38 to 63% of cases.³ In our study, TPE accounts for 14 of 30 cases (46.67%) of primary pulmonary TB, pleural effusion is the sole radiographic manifestation of primary pulmonary TB.

TPE is very uncommon in young children and is more likely to be observed in adolescents and adults.^{3-5,7} Mean age of patients with TPE was 15.10 ± 2.3 in our study.

TPEs are usually unilateral.^{2,3,7} Studies have shown unilateral pleural effusion in 100% of cases and consolidation in 11.1%.⁹ In our study 13 cases (92.9) had unilateral effusion and one case (7.1%) had bilateral effusion. Pleural effusion accompanied by underlying parenchymal disease was seen in 28.6% of our patients (chart 1). Parenchymal consolidation was the most common associated radiographic manifestations.

The diagnosis of childhood TB is based on clinical findings, chest radiography, tuberculin skin testing, and a history of close contact with an adult case of pulmonary TB.⁴ A history of contact with a tuberculous case was present in 22.2% of cases in our study.

Tuberculin tests showed Ten patients (33.3%) had induration of >10 mm. (Table 1). Significant cutaneous reactivity to tuberculin among patients with TPE has been reported in the literature.¹⁰

Pleural fluid analysis usually shows 100% lymphocytes.¹⁰ In our study, 11 of 14 patients had cell typing done, all of them showed lymphocytic predominance. Some reports have shown the importance of the determination of pleural ADA in the differential diagnosis of tuberculous and nontuberculous pleural effusions.¹¹⁻¹⁵ Specificity and sensitivity of the ADA test in TB are very high.¹¹⁻¹³ Mean ADA activity was 61.86 ± 3.7 in our study (Table 3).

Gastric aspirate, pleural fluid, and biopsy material cultures yielded M tuberculosis in 8 of 21 (38.09%). Pleural fluid LDH levels were significantly higher with mean of 308.3 ± 56.7

Chest X ray, tubercular skin testing and ESR are significant in the diagnosis of tubercular pleural effusion.

CONCLUSION: Incidence of Tubercular pleural effusion at KIMS Bangalore, India is 46.67%, which is higher than the global incidence of 3 to 38%. It is reemphasized that the incidence of Tubercular pleural effusion is high in Indian counterparts. Tubercular pleural effusion continues to be the most common presentation of TB in adolescents. In countries with high prevalence of TB it should always be considered in the differential diagnosis for older children suffering from parapneumonic effusion. Hence the need for early diagnosis and early initiation of Anti Tubercular Therapy.

ORIGINAL ARTICLE

Chart 1: TYPES OF PRESENTATION

Chart 2

Pulmonary involvement 8 cases of pleural effusion only, 6 cases of pleural effusion+consolidation->total 14 cases of pleural effusion and 7 cases of consolidation only.

	Pulmonary TB no	Pulmonary TB %	Extrapulmonary TB no	Extrapulmonary TB%
CASES	21	70	09	30
SEX				
MALE	08	38.09	06	66.7
FEMALE	13	61.9	03	33, 3
MEAN AGE, YR, MEAN TUBERCULIN TEST, MM	15.10+/-2.3		15.22+/-2.3	
IMDURATION, MM				
<10	14	66.7	06	66.7
10-20	04	19, 04	02	22.2
>20	03	14.26	01	11.1

Table 1: Epidemiologic and Tuberculin Test Data

CLINICAL DATA	PULMONARY NO	PULMONARY %	EXTRAPULMONARY NO	EXTRAPULMONARY %
Fever	18	60	5	55.6
cough	14	46.7	3	33.3
Weight loss	03	10.0	2	22.2
contact	00	0	2	22.2

Table 2: Clinical findings

ORIGINAL ARTICLE

LABORATORY FINDINGS MEAN+/-SEM	PULMONARY	EXTRAPULMONARY
Hb	10.3+/-0.6	11.42+/-0.99
WBC	10003.3+/-829.9	12128.9+/-2039.9
ESR	54.05+/-25.8	49.94+/-21.34

Table 3: Laboratory findings

LABORATORY FINDINGS	NUMBER	MEAN+/-SEM
Cells/microL	11	1869+/-569
<2000	7	
2001-4000	3	
4001-6000	-	
>6000	1	
Lymphocytes%	11	96.36+/-2.9
<50%	-	
50-90%	1	
90-99%	1	
100%	9	
Proteins g/dl	10	5.3+/- .35
<3	1	
3-4	1	
4-5	-	
5-6	6	
>6	2	
Glucose/dl	10	96.9+/-56.7
LDH	10	308.3+/-56.7
<200	2	
201-300	2	
301-400	3	
401-500	1	
>500	2	
ADA U/L	5	61.86+/-3.7

Table 3: Pleural fluid Analysis

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ORIGINAL ARTICLE

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