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Clinical Profile of Tuberculosis in Children in A Tertiary Care Hospital in Western Maharashtra

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Abstract

Aim and objectives: Paediatric tuberculosis is often underdiagnosed due difficulty in obtaining microbiological diagnosis and variable and diverse presentations. The aim was to study the clinical profile of tuberculosis in children. **Methods:** This is a prospective study of children (0-18 years), diagnosed as active tuberculosis (microbiologically confirmed or clinically proven) in the IPD/OPD of a tertiary care hospital in Pune. **Results:** Total 110 cases (Males- 43) were studied out of which 32.7% had pulmonary, 50% extrapulmonary and 17.27% had disseminated disease. Of the patients with extra pulmonary disease, TB lymphadenopathy (32.7%) was the most common presentation followed by TB Pleural Effusion (23.6%) and TB Meningitis (12.7%). 3 cases of reactivation tuberculosis in previously treated cases were found. Fever (68.18%) was the most common presenting complaint followed by constitutional symptoms (appetite loss- 40%, weight loss-36.6%). 23 patients (20.9%) were known contacts of TB cases. 24.5% of the cases were undernourished and 8.18% had immunocompromised. 1 case was HIV positive; 4 cases were unimmunised with BCG. **Conclusion:** The clinical profile of paediatric TB was found to be highly variable and diagnosis requires higher index of clinical suspicion.

Keywords: pediatric, tuberculosis, clinical profile

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Introduction

Tuberculosis (TB) is one of the most important public health issues worldwide with India forming a significant part of the disease burden. Pediatric tuberculosis forms almost 11% of all new TB cases in 2021 however this disease burden is not quantified well.(1) Even though significant advances have been made in understanding and management of adult TB, Paediatric tuberculosis is relatively ignored owing to difficult diagnosis.

Of an estimated global incidence of new cases of Tuberculosis (TB) to be 10.6 million, 6.4 million were diagnosed and officially reported in 2021. India formed a significant part of the disease burden (28%). Paediatric tuberculosis forms almost 11% of all new TB cases in 2021 although this disease burden is not quantified well, owing to difficult diagnosis.(2) Pediatric TB is a sentinel event within a population as it usually indicates recent transmission from an infectious adult and is therefore a reflection of TB control in a population.(3) Disease in the pediatric age group is paucibacillary and difficult to confirm microbiologically. Moreover, there are significant challenges in obtaining an adequate sample in the pediatric age group.(4) Newer rapid molecular diagnostic methods like cartridge-based nucleic acid amplification tests (Xpert-RifTM /TruenatTM) and Line Probe Assays (LPA) which have been approved and employed by the National TB elimination Program (NTEP), rapidly identify Mycobacterium tuberculosis with higher sensitivity compared to conventional smear testing and has thereby aided in otherwise difficult diagnosis of tuberculosis in children.(5)

Materials And Methods

This Cross-sectional observational and analytical study was carried out in a Tertiary care hospital in Pune, Maharashtra. Children (0-18 years of age) visiting the pediatric OPD and IPD diagnosed as an active case of tuberculosis were included in the study.

Inclusion criteria:

All children (0-18 years of age) diagnosed as active cases of TB based on

1. Microbiologically confirmed and/or
2. Clinically proven (History, Clinical findings, radiological and lab investigations consistent with diagnosis of TB but microbiological confirmation not available)

- All forms of Paediatric TB cases: Pulmonary and extrapulmonary TB were included.

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The collected data were coded and entered in a Microsoft Excel sheet. Descriptive statistics were utilized to summarize the data.

Results

The age of the patients ranged from 0.25-18 years. The mean age of the children enrolled was 10.51 years (SD ± 5.14), and the median was 12 years. In the present study, female preponderance (60.91%) was observed.

The most common form of tuberculosis in children was found to be extrapulmonary tuberculosis (n-55, 50%) while pulmonary tuberculosis was seen in 32.7 % (n-36) cases. 17.27% (n-19) had disseminated disease at presentation. Of extrapulmonary tuberculosis, TB Lymph node (n-18, 32.7%) was found to be most common followed by TB Pleural effusion (n-13, 23.6%).

Table 1: Distribution of cases of pediatric tuberculosis.

	No. of cases (n-110)	**Percentage (%)**
Pulmonary TB	36	32.73
Extra Pulmonary TB	55	50.00
Abdominal TB	6	5.45
TB LN	18	16.36
TB Meningitis	7	6.36
Pott's spine	4	3.64
TB Pleural effusion	13	11.82
TB Empyema	3	2.73
TB Abscess	1	0.91
TB Osteomyelitis	1	0.91
Takayasu's arteritis	1	0.91
TB pericarditis	1	0.91
Disseminated TB	19	17.27

In children less than 1 year of age (n-8), disseminated tuberculosis was found to be most common (n-4, 50%) followed by pulmonary tuberculosis (n-3, 37.5%). In children between 1- 5 years of age (n-14), where extrapulmonary tuberculosis was most common (n-8, 57.1 %). All cases with the disseminated disease were found to have pulmonary involvement while CNS involvement was seen in 63.1% of cases.

Table 2: Various organ involvement in disseminated disease.

Disseminated TB (n-19)	**Organs involved**	**Percentage (%)**
Pulmonary	19	100.00
CNS	12	63.16
Bone	2	10.53
Lymph node	3	15.79
Abdomen	5	26.32

Various atypical presentations were seen like TB Abscess, TB osteomyelitis, TB pericarditis, and Takayasu's arteritis. 27 patients (24.5%) were found to be undernourished (<2 SD when plotted on IAP and WHO growth charts).

9 cases (8.18%) were immunocompromised (either due to co-morbidities like HIV co-infection or drug therapy like steroids, or chemotherapy) of which 1 tested positive for HIV.

33.3% of all the immunocompromised cases presented with disseminated tuberculosis while the rest had pulmonary disease.

Only 4 cases (3.6%) were unimmunized with BCG. On clinical examination, 15 cases (13.6%) had hepatomegaly while 7 patients (6.3%) had both hepatosplenomegaly. Anaemia (Haemoglobin <10 g/dl) was seen in 37 cases (33.6%). Mean haemoglobin was found to be 10.4g/dl (SD +/- 1.8 g/dl) with a range from 4.3g/dl to 15.6 g/dl.

Fever was the most common presenting complaint (68.18%) followed by constitutional symptoms- appetite loss (40%) and weight loss (36.6%) followed by cough (36.6%).

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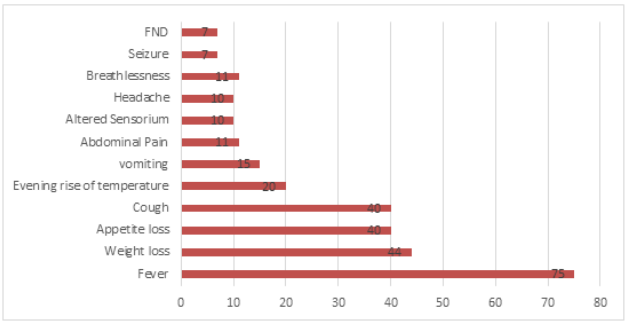

Figure 1: Positive signs and symptoms at the time of presentation.
FND: Focal Neurological deficit.

The mean age of the patients with Pulmonary TB (n-36) was 10.6 years with fever (n-28, 77.7%) as the most common presenting complaint while cough was the second most common presentation (n-24, 66.6%). 11.1% of them presented with dyspnoea and respiratory distress. No cases of paediatric tuberculosis were seen to have haemoptysis. On examination, 22 cases (61%) were found to have reduced air entry while 17 (47.22%) were found to have crepitations.

The most common form of extrapulmonary tuberculosis was found to be TB Lymph node (n-18). The mean age was observed to be 12.57 years (SD-+/- 3.02). Fever was the most common presenting complaint (n-10,55.5%). TB pleural effusion was seen in 13 patients with a mean age of 9.7 years. The most common presentation was fever (n-12, 92.3%) followed by cough (n-7,53.8%) and breathlessness (n-5, 38.4%) with diminished breath sounds on auscultation (n-13, 100%). 3 cases of TB Empyema were seen, with all of them presenting with fever (n-3, 100%).

CNS tuberculosis was seen in 7 cases. The most common presentation was altered sensorium (n-5, 71.4%) followed by fever, vomiting, and focal neurological deficit (n4, 57%) while only 2 (28.5%) cases presented with seizures. Meningeal signs (either neck stiffness, Kernig's sign, or Brudzinski sign) was present in 3 (42.8%) cases at admission.

5 cases of osteoarticular tuberculosis were seen, of which 4 cases presented with Pott's spine while 1 presented with TB osteomyelitis of left foot 3rd metatarsal. All cases of Pott's spine presented with back pain and difficulty in walking while TB osteomyelitis presented with swelling over the left foot. Fever was present in 3 cases (60%).

6 cases of abdominal TB were seen with abdominal pain (n-4,66.6%), fever and weight loss (n-3, 50%), and abdominal distension (n-2, 33.3%). 1 case presented with inguinal swelling which was diagnosed based on histopathology of the hernial sac. 3 cases had free fluid in the abdomen with abdominal distension at admission.

Discussion

Mean age noted in the present study was 10.51 years (SD ± 5.14) and the most common affected age group was 5-18 years of age (80%). This is in contrary to the natural history of the disease and can be explained by diagnostic limitations and variable presentation of TB in younger age groups and the fact that children with sputum smear-positive illness and those with persistent and/or obvious disease signs are mostly included in the disease spectrum.(6) These results were comparable to that seen in Shrestha et al and Gupta et al.(7,8)

In the present study, a history of close contact was present in 20.9% of patients (n-23). Similar findings were seen in other studies from TB endemic areas (India and abroad) like Panigatti et al, Goyal et al, Shah et al, Shreshtha et al, Garg et al, Gupta et al and Marais et al with an average of 34.09% cases with positive contact history with a range between 26.3%-58.5%. (7–13)

The presence of childhood Tb indicates recent transmission most commonly from an infected adult.(14)The majority of transmission in children under the age of three occurs within a household; but, in older children, and highly endemic regions, a significant amount of transmission can occur outside the home.(13) Emphasis should be laid on the active tracing of children exposed to an adult index case and early initiation of prophylaxis.

In our study, we found 24.5% of all the cases diagnosed with active tuberculosis to be undernourished which was lower than that seen in other Indian studies.(9) The lower rate of undernourishment seen in our study could be explained by the fact that the study setting was a private hospital and most of the patients seen were from a higher socio -economic strata. It is however difficult to establish causality because TB, by itself, causes wasting. 9 cases diagnosed with tuberculosis were found to have immunocompromise due to various reasons out of which 33.3% of the cases were found to have disseminated disease while the rest had pulmonary disease, indicating a higher prevalence of disseminated disease in immunocompromised cases when compared to immunocompetent cases (15.8%; 16/101).

Pulmonary tuberculosis was the most common form of tuberculosis noted as demonstrated by various studies in the Indian context.(7,8,12,15,16) The most common form of tuberculosis in children noted in our study was however extrapulmonary tuberculosis (n-55, 50%) followed by Pulmonary (n-36, 32.73%) and disseminated disease (n-19, 17.27%). These findings were like that noted by Vijaysekaran et al (extrapulmonary – 79.8%), Goyal et al (68.2%), and Panigatti et al (62.4%).(9,10,17) Higher rates of extrapulmonary tuberculosis in our study could be attributed to the fact that our hospital is a tertiary care referral centre and cases referred are difficult to diagnose and require a level of care higher than a primary centre. Children <1 year presented more commonly

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with disseminated disease (50%) which can be explained by immature host immune response in infants leading to more advanced disease.

The mean age of children with pulmonary tuberculosis noted was 10.6 years which is similar to the mean age noted in pediatric tuberculosis. Fever and cough were the most common presenting complaint which was also noted by Goyal et al. (10)

The mean age for TB lymph node (12.57 years) was found to be higher as compared to that seen for overall Paediatric TB. Fever and progressive neck swelling were the most common presenting complaints while one case presented with axillary swelling.

7 cases of CNS tuberculosis were noted in our study. The most common presentation was found to be altered sensorium followed by fever, vomiting, and focal neurological deficit. More children presented with altered sensorium in our study (71.4%) which was also reported in various other studies in the Indian setting, hence showing late presentation and delayed pickup in cases of CNS tuberculosis. (18)However, recent studies showed shifting trend due to increasing awareness and accessibility of radiological modalities to aid in diagnosis. (19)

Conclusion

The clinical profile of paediatric TB was found to be highly variable. Extrapulmonary tuberculosis was more common in children as compared to tuberculosis in adults. Disseminated and extrapulmonary disease was more common in younger or immunocompromised children. Significant number of patients had a history of close contact with diagnosed case of tuberculosis. Active tracking of children exposed to an adult index case and the early start of prophylaxis should be prioritized. A high index of suspicion is warranted for diagnosis of tuberculosis in children to avoid advanced or complicated disease condition.

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