Original Research Article

Clinical profile of pediatric patients with tuberculosis in a tertiary care centre in India

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ABSTRACT

Background: India has one of the highest TB burden globally. Children contribute a significant proportion of TB burden, in whom the diagnosis can be challenging because many childhood diseases mimic TB. Therefore, a high index of suspicion is required for early diagnosis of childhood tuberculosis to prevent poor outcome. Objectives was to evaluate the prevalence and profile of childhood tuberculosis cases and to determine the risk factors

Methods: An observational cross-sectional study was conducted over a period of 6 months at a hospital in north India and the prevalence and profile of the children admitted with the clinical suspicion of tuberculosis was studied. Case specific diagnostic approach was used for diagnosis and the appropriate treatment was instituted.

Results: The prevalence of childhood TB was 2.3% among hospitalized children. Of these, 66.5% were males and 33.49% were females. The majority of cases were more than 8 years. The history of contact was present only in 31.1%. Tuberculin skin test was positive in 53.11%. Pulmonary tuberculosis was the most common type of childhood tuberculosis (45.45%) followed by neurological tuberculosis (42.8%), abdominal tuberculosis (6.45%), tuberculous lymphadenitis (2.63%), others (2.61%). Malnutrition was a potent contributing factor present in 91.86%. The mortality rate observed in the study was 9.56%.

Conclusions: Owing to the high burden of tuberculosis among pediatric population in India, there is an alarming need to develop more economical and advanced diagnostic methods for better patient management and above all there is urgent need of the hour to educate the masses about the transmission and risk factors for this disease.

Keywords: CBNAAT, Gene Xpert, Pulmonary TB, Tuberculosis, Tuberculin skin test

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease that can affect any organ of the body. Global TB report 2018 reports that in India, an estimated 2.2 lakh children become ill with TB each year (22 % of global TB burden), with a slightly higher burden among males.[1] Pulmonary TB is the most common form in children.

Each year around 8 million people worldwide develop TB. Of these 95% cases are in the developing countries. Childhood TB has been neglected in the global efforts to control TB.[2] This neglect is because childhood TB is considered to be rarely contagious and difficult to

diagnose due to less sputum production and low acid fast bacilli positivity in children.[3] Thus the data available is usually an underestimation of the actual burden of TB in children.

The WHO report of 2012 showed that the estimated TB incidence in children aged <15 years accounted for 6% of the total 8.7 million TB burden in the year 2011.[4] Similar to other high burden countries, India faces challenges in capturing childhood TB cases to be treated under the National TB Control Program.[3]

Access to accurate diagnosis and effective treatment in countries with endemic TB, is essential to reduce the

morbidity and mortality associated with childhood TB.[5] With the advent of Gene Xpert prompt, easy and confirmed diagnosis of TB in children is possible. It appears promising though it remains challenging among under 5 due to its limitations. Generally, however due to inequitable resource spread and limited accessibility, diagnosing confirmed TB cases in India remains difficult and therefore a high index of suspicion is required.

The goals of this study were to document the prevalence and profile of childhood TB cases and to determine the various risk factors leading to clinical TB.

METHODS

This was an observational cross-sectional study conducted at SMGS hospital, an associated hospital of GMC, Jammu, a tertiary care academic institute in the Jammu province of J&K for a period of one year from Jan2018 to Dec 2018. All the children admitted with a clinical diagnosis of childhood TB were included in the study. The study protocol was reviewed and approved by the institutional ethical committee. Informed consent was taken from the attendants of each patient. Any patient with evidence of TB infection like positive TST, radiological evidence, CSF examination or FNAC suggesting TB were included in the study. Patients on empirical ATT were excluded from the study.

A detailed clinical history, family history of contact with a patient suffering from TB or on ATT was taken and the physical examination of each suspected TB case was done. CBC, TST and Chest X-Ray were advised to all suspected patients. The interpretation of TST and chest skiagrams was done using standardized methods. FNAC, bone and joint skiagrams, abdominal paracentesis, pleural fluid aspiration, CT scan of the relevant system, CSF examination and other relevant investigations were done depending on the case to substantiate the diagnosis of tuberculosis. Sputum, gastric lavage and FNAC for AFB staining, culture and CBNAAT were also processed wherever possible.

The data was analyzed and presented as percentages and proportions. For all statistical evaluations, a probability value of <0.05 was considered significant.

RESULTS

Of the total 17684 admissions during the study period, 418 were admitted with a clinical diagnosis of TB. Of these, 278(66.5%) were males and 140(33.49%) were females. The number of children in the age group of 1-5 years were 23% (97), 5-8 years were 24.40% (102) and 51.19% (214) were more than 8 years. Only 1.19% (5) were less than 1 year.
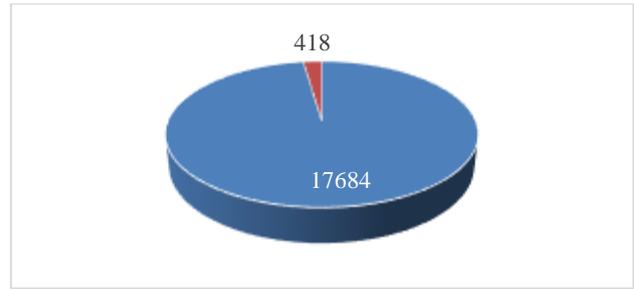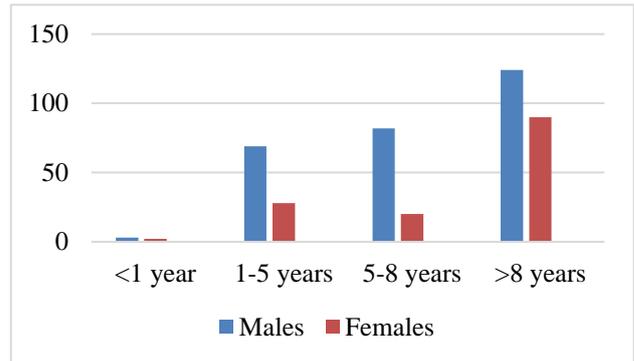

Figure 1: Burden of TB.
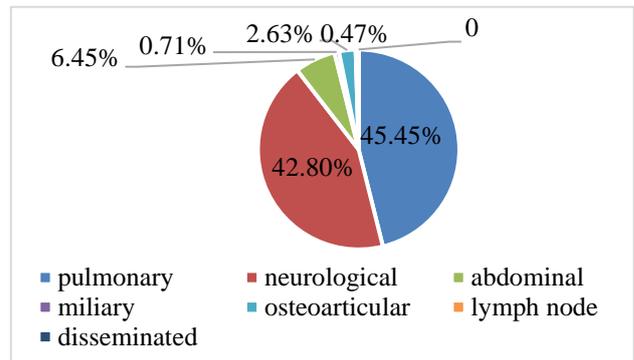

Figure 2: Age distribution

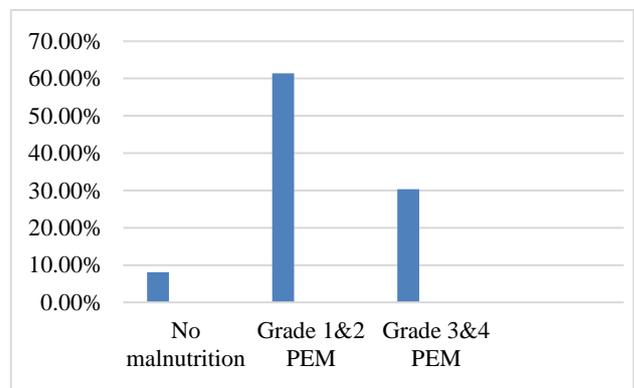**Figure 3: Spectrum of chidhood TB.**

Figure 4: Burden of malnutrition.

History of contact was present in 31.1% (130) patients, of which 66.33% (86) were in the age group of 1-8 years. TST was positive in 222(53.11%).

The spectrum of childhood TB included pulmonary TB in 45.45% (190). Extra-pulmonary TB included neurological TB constituted 42.8% (179), abdominal TB 6.45% (27), miliary TB 1.43% (6), osteoarticular TB 0.71% (3), tubercular lymphadenitis 2.63% (11) and disseminated TB 0.47% (2).

There were 91.86% (384) of the total patients were malnourished, with 66.92% (257) falling in grades 1 and grade 2 of PEM and 33.07% (127) having grade 3 and grade 4 PEM. There was a significant relationship between the malnutrition and the occurance of clinical tuberculosis with a p value of <0.05. A significant relationship was seen between the age group <5 years and the occurance of neurological TB compared to other forms of tuberculosis.

Fever, weight loss and anorexia were the main presenting symptoms. Neurological TB or TBM most commonly presented with fever, seizures, altered sensorium and neurological deficits. Abdominal TB presented with abdominal distension, abdominal pain and chronic diarrhea. Pulmonary tuberculosis cases had the chief complaints of fever, cough, malaise, weight loss and chest pain. Tubercular lymphadenitis presented with enlarged matted lymph nodes with pressure effects if they were large enough. Miliary TB presented with the clinical symptoms of fever, cough and miliary shadows on chest x-rays. Osteoarticular form of tuberculosis presented with pain and swelling at the site of the disease with a chronic discharging sinus. The overall mortality was 9.56% (40), with a maximum burden attributed to neurological TB-67.5% (27) followed by pulmonary TB-25% (10), disseminated TB- 5% (2) and miliary TB-2.5% (1).

DISCUSSION

This study describes the epidemiology, clinical profile and spectrum of pediatric tuberculosis in a tertiary care centre. The prevalence of TB in our study was 2.3% of the total in patients with a male: female ratio of 1.98:1.

The prevalence varied from 1.5% to 3.5% and male: female ratio varied from 0.81:1 to 3.42:1 in different studies.[6-8] The figures in our study were correlated to study by Thanvi et al., showing a prevalence of 2.08% and a male: female ratio of 1.58:1.[2]

About 51% of the affected patients were above the age of 8 years which was in contrast to other studies conducted in other areas where the maximum affected patients were below 5years of age.[9-12] This finding may be due to the poor health seeking behavior of the resident population ignoring the common constitutional symptoms and failure to thrive in their children comprising the pediatric population leading to delayed seeking of medical help. Also this could be due to the poor contact tracing of the adults suffering from tuberculosis.[13,14]

In our study the history of active contact was present in only 31.1% of the patients while 47.2% patients revealed a history of contact in the study by Ahmed PA et al., in 2014.[15] There were 91% of the patients were malnourished in our study while only 33.07% had grade 3 and grade 4 malnutrition. Other studies also reported a malnutrition rate of 57%.[3]

The TST (Tuberculin Skin Test) was positive in 53.11% patients while in a study by Mado SM et al., in 2019 showed mantoux test to be positive in 68.7% patients and Kasai et al., showed a TST sensitivity of 78.3%.[16]

The most common presenting symptoms were fever, cough, weight loss and anorexia which were in accordance with other studies by Thanvi et al., in India and Mado SM et al., in Nigeria.[17] The spectrum of TB observed in our study as compared to other studies is as shown in the Table 1.

An Indian study by Kabra et al. from a tertiary care referral centre in North India suggests an increase in the proportion of cases of extrapulmonary TB over the past three decades. The increase was predominantly due to increase in lymph node TB. The severe form of tubercular meningitis decreased over the past three decades.[20] However, in contrast to this our centre reported a high incidence of neurological TB.

Table 1: Spectrum of TB observed in our study as compared to other studies.

Type of TB	Present study (%)	Thanvi RS et al., (%)[3]	Vishwanath et al., (%)[18]	Vijayasekaran et al., (%)[19]	Kabra et al.,(%)[20]	Sharda and Nelliyanil (%)[21]
Neurological	42.8	37.32	13.39	40.4	2.6	23.2
Pulmonary	45.45	32.05	49.10	20	59	10
Abdominal	6.45	12.91	2.67	3.6	2.1	6.5
Miliary	1.43	0.9	0.9	-	1.7	-
Osteoarticular	0.71	3.57	3.57	16.4	2.6	2.1
Lymphadenitis	2.63	0.95	15.17	19.3	26.5	55
Disseminated	0.47	12.91	2.67	-	5	2.2

The mortality rate due to TB noted in this study was 9.56% which was comparable to earlier studies in other countries but the overall case fatality rate was 12% in a study by Thanvi et al, in 2017. The maximum deaths were due to neurological TB (67.5%) which was similar to other studies done in India.[2]

CONCLUSION

This study describes the complete disease spectrum observed in children treated for tuberculosis in a highly endemic area. The prevalence of TB is still very high despite the implementation of RNTCP and TB continues to be associated with a high mortality in children. The rates of extrapulmonary and neurological TB are also very high in this vulnerable population. Taking into account the high case-load and the gross under-reporting of childhood TB cases, the NTB program should give higher priority for childhood TB case management in designated hospitals including a re-emphasis on the need for early diagnosis through advancement of scientific knowledge and technologies including new techniques of laboratory and imaging diagnostic aids.

REFERENCES

1. RNTCP Updated Pediatric TB Guidelines 2019. Revised National Tuberculosis Control Program and Indian Academy of Pediatrics Guidance document, 2019. Available at: https://indianpediatrics.net/aug2019/692-693.pdf. Accessed on 3 June 2020.
2. Thanvi RS, Jain A, Patel SM, Patel NH, Gunjan G, Patel K. Clinical profile of different type of tuberculosis in hospitalized children in tertiary care centre. Indian J Child Health. 2017;4(4):530-4.
3. Lawrence RM. Tuberculosis in children. In: Rom WN, Garay SM.eds. Tuberculosis. Boston: Little. Brown, 1996:675-88.
4. World Health Organisation. Global tuberculosis report: World Health Organisation, 2012. Available at: http://Apps.who.int/iris/bitstream/10665/75938/1/9782 41564502_eng.pdf. Accessed on 3 June 2020.
5. Lopes Avalos GG, Prado Montes de Oca E. Classic and new diagnostic approaches to childhood tuberculosis. J Trop Med. 2012:818219.
6. Swaminathan S, Datta M, Radhamani MP, Mathew S, Reetha AM, Rajajee S, et al. A profile of bacteriologically confirmed pulmonary tuberculosis in children. Indian Pediatr. 2008;45:743-7.
7. Garg P. Childhood tuberculosis in a community hospital from a region of high environmental exposure in north India. J Clin Diagn Res. 2008;2:634-8.
8. Gupta CR, Garg A, Venkateshwar V, Kanitkar M. Spectrum of childhood Tuberculosis in BCG vaccinated and unvaccinated children. Med J Armed Forces India. 2009;65:305-7.
9. van Rie A, Beyers N, Gie RP, Kunneke M, Zietsman L, Donald PR. Childhood tuberculosis in an urban population in South Africa: Burden and risk factor. Arch Dis Child. 1990;80:433-7.
10. Marais BJ, Gie RP, Schaaf HS, Hesseling AC, Enarson DA, Beyers N. The spectrum of disease in children treated for tuberculosis in a highly endemic area. Int J Tuerc Lung Dis. 2006;10:732-8.
11. Nelson LJ, Schneider E, Wells CD, Moore M. Epidemiology of childhood tuberculosis in the United States.1993-2001: The need for continued vigilance. Pediatrics. 2004;114:333-41.
12. Harries AD, Hargreaves NJ, Graham SM, Mwansambo C, Kazembe P, Broadhead RL, et al. Childhood tuberculosis in Malawi: Nationwide case-finding and treatment outcomes. Int J Tuberc Lung Dis. 2002;6:424-31.
13. Marais BJ, Gie RP, Schaaf HS, Hesseling AC, Obihara CC, Starke JJ, et al. The natural history of childhood intra-thoracic tuberculosis: A critical Review of literature from the pre-chemotherapy era. Int J Tuberc Lung Dis. 2004;8:392-402.
14. Aisse K, Madhi F, Ronsin N, Delarocque F, Lecuyer A,Decludt B, et al. Evaluation of a model for efficient screening of tuberculosis contact subjects. Am J Respir Crit Care Mes. 2008;177:1041-7.
15. Ahmad PA, Ulonnam CC. Clinical presentation of tuberculosis in adolescents as seen at National Hospital Abuja, Nigeria. Niger J Paed. 2014;41(4):331-6.
16. Kasai ET, Dauly NN, Opara JP, Likele BB, Kadima JN. Spectrum of childhood: Ensuring and making a differential diagnosis by tuberculin skin test and clinical signs in Kisangani. Int J Trop Dis Health. 2017;23:1-10.
17. Mado SM, Isa A, Abubakar U, Onazi SO, Gbemiga AO. Spectrum of tuberculosis in children at Federal Medical Centre, Gusau, Zamfara State, Northwest Nigeria. Sahel Med J. 2017;20:8-12.
18. Vishwanath KG, Siddaraju ML, Jagannatha PS. Spectrum of Tuberculosis in BCG Vaccinated and Unvaccinated Children in Bangalore, India. India: Copyright Priory Lodge Educatio; 2007.
19. Vijayasekaran D, Kumar RA, Gowrishankar NC, Nedunchelian K, Sethuraman S. Mantoux and contact positivity in tuberculosis. Indian J Pediatr. 2006;73:989-93.
20. Kabra SK, Lodha R, Seth V. Tuberculosis in children-What has changed in last 20 years? Indian J Pediatr. 2002;69 Suppl 1:S5-10.
21. Sharda MP, Nelliyanil M. Profile of pediatric tuberculosis patients in Bangalore Mahanagar Palika area. NTI Bull. 2009;45:1-4.