Original Article

Paediatric tuberculosis: A decade-long experience in a tertiary care centre

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ABSTRACT

Background: The World Health Organization estimates in 2013 revealed that up to 80,000 children die from tuberculosis (TB) each year and children account for over half a million new cases annually. The incidence of extrapulmonary TB (EPTB) is also on the rise. **Aims:** To study and note the total pediatric TB cases reported over a decade. Analysis of EPTB at the center was also attempted. **Methods:** Retrospective analysis of TB cases diagnosed during the past decade was attempted, through information registered in the hospital TB registry. Cases aged <18 years were identified as pediatric TB. Pulmonary TB and EPTB cases were analyzed. **Results:** All of 289 pediatric TB cases were identified from a total of 1389 TB cases in general. Pediatric TB comprised 20% of the diagnosed. Among these, 176 patients were pulmonary TB, amounting to 60% of all cases of TB. The remaining 113 cases were identified to be that of extrapulmonary TB constituting 40% of the total study populace. Among EPTB, lymph node TB was the most common subtype amounting for 42% of all cases of EPTB. This was followed by skeletal TB (23%), pleural TB (12%), gastrointestinal TB (11.5%), nervous system TB (5%), and cutaneous and genitourinary TB accounted for 2.6% each. **Conclusion:** Childhood TB is an underdiagnosed entity in India. EPTB is alarmingly on the rise, and clinicians need to be wary of the presentations and pitfalls in diagnosis. Awareness of the same is quintessential.

Key words: *Childhood, Extrapulmonary, Tuberculosis*

Tuberculosis (TB) is among the top 10 causes of death among children worldwide; however, children with TB are given low priority in most national health programs and are often found to be a neglected populace in terms of being adequate beneficiaries of the national health services [1]. The World Health Organization (WHO) estimates in 2013 revealed that up to 80,000 children die from TB each year and children account for over half a million new cases diagnosed annually. It should be noted that these estimated deaths are only inclusive of those belonging to the human immunodeficiency virus-negative population. In fact, the actual burden of TB in children is likely to be much higher, especially given the challenge in diagnosing childhood TB. Compounding this difficulty in diagnosis is the fact that children with TB often come from families that are poor, lack knowledge about the disease and live in communities with limited access to health services. In this regard, our study aims to look at the pattern of various subtypes of TB among children in India and compare this with literature reported elsewhere, as well as with that of adult data. A better understanding of the changing trends will definitely aid in early identification and improve prognostication in pediatric TB.

METHODS

The present study was a retrospective analysis of pediatric TB cases over a decade, spanning the years 2006–2016. We analyzed TB cases diagnosed in our tertiary care hospital TB registry, the cases being diagnosed as per revised national TB control program guidelines [2]. We included cases aged <18 years as pediatric TB cases from the registry. A total of 1389 TB cases were analyzed and 289 pediatric TB cases were identified. Gender wise distribution of pediatric TB cases was noted. Furthermore, pulmonary and extrapulmonary TB (EPTB) cases were also identified. EPTB cases were further subdivided as lymph node TB, pleural TB, skeletal TB, nervous system TB, abdominal TB, genitourinary TB, and cutaneous TB.

RESULTS

After analysis of a decade-long data from the TB registry, 289 pediatric TB cases were identified from a total of 1389 TB cases in general. Pediatric TB comprised 20% of the TB burden in our center. Among these, 176 patients were noted to be pulmonary TB, including four cases of disseminated TB, amounting to 60% of all cases of TB. The remaining 113 cases were identified to be that of EPTB constituting 40% of the total study populace. Of the 289 cases, 155 were females to the tune of 53.6%, the remnant being males accounting for 46.4% of the total, with 134 cases. Among the pulmonary TB sub-group, females significantly outnumbered males with 102 cases (57.95%), whereas males

accounted for only 74 cases (42.05%). In the EPTB group, males were more afflicted, accounting for 60 (53.1%) cases among total 113 cases of EPTB (Table 1). Furthermore, among the patients diagnosed to have pulmonary TB, only 38 (21.6%) were noted to be sputum positive; the remaining 138 (78.4%) being sputum negative. The age range distribution of both pulmonary TB and EPTB is as given in Table 2.

EPTB cases were studied and the profile noted. Lymph node TB was the most common subtype amounting for 42% of all cases of EPTB. This was followed by skeletal TB (23%), Pleural TB (12%), gastrointestinal TB (11.5%), nervous system TB (5%), and cutaneous and genitourinary TB accounted for 2.6% each. Of the skeletal TB cases, hip joint was the most commonly involved (n=9), accounting for 34.6% of all cases. Spine and knee joints (n=4, 15.3%) were equally involved. Of the central nervous system (CNS) TB cases, 50% were found to be due to be tuberculous meningitis. Lymph node TB showed near equal gender distribution with 25 and 23 cases, and similar trend was appreciated in skeletal TB with 15 males and 11 females among a total of 26 cases. Among the skeletal TB cases, 21 of 26 were Mantoux positive (80.7%). 9 of 14 (64%) and 38 of 48 (79%) of pleural effusion and lymph node TB, respectively, were Mantoux positive. Among the other subtypes, 67% of CNS TB and genitourinary TB were Mantoux positive. Ninety two percent of abdominal TB cases were observed to be Mantoux positive, as were all 100% of cutaneous TB cases. Taken together, therefore, 79% of EPTB cases were Mantoux positive. Pleural effusion due to TB was predominant among males, 11 out of 14 cases being male. Other EPTB's were too small in number, to note any significant gender variations (Table 3).

Table 1: Distribution of pulmonary and EPTB on gender basis

Gender	Pulmonary TB	EPTB	Total
Males	74	60	134
Females	102	53	155
Grand total	176	113	289

EPTB: Extrapulmonary tuberculosis, TB: Tuberculosis

Table 2: Age range distribution of pulmonary and EPTB

Age range distribution (years)	Pulmonary TB	EPTB
<5	42	08
5–12	44	30
12–18	90	75
Total	176	113

EPTB: Extrapulmonary tuberculosis, TB: Tuberculosis

Table 3: Sub-classification of EPTB on gender basis

Type of EPTB	Male	Female	Total
Lymph node TB	23	25	48
Skeletal TB	15	11	26
Pleural TB	11	3	14
Gastrointestinal-TB	5	8	13
Nervous system TB	5	1	06
Genitourinary TB	0	3	03
Cutaneous TB	1	2	03
Grand total	60	53	113

EPTB: Extrapulmonary tuberculosis, TB: Tuberculosis

DISCUSSION

Pediatric TB has always been an entity that has probably not been given the importance it deserves, compared to its adult counterpart. This is partly attributable to the fact that the actual burden of pediatric TB is unknown. However, it has been postulated that 10% of total TB burden is probably found in children. Worldwide, approximately 1 million new cases of pediatric TB are believed to occur every year; in itself accounting for as much as 10–15% of all TB cases; with more than 100,000 estimated deaths being attributed every year [3]. In the Indian context, a study published in the year 2009 that utilized data from the Chennai-based National Institute for Research in TB found that only an appalling 14% of child contacts were actually screened and only 19% of these were actually initiated on subsequent isoniazid preventive therapy [4]. The present study revealed that paediatric TB accounted for over 20% of the TB burden in our center, which validates the viewpoint that there exists an unidentified pediatric TB populace. Due to the ever-increasing rates of TB, India has initiated a National Strategic Plan for TB Elimination that aims to attain its goals from 2017 to 2025. It is an ambitious plan with respect to its target of TB notification aiming to reach 35 lakh TB patients annually, i.e., at least 2 times that of the current scenario. Stratagems and interferences designed under this initiative utilizing patient-centered approaches, with its dedication to a synergistic public-private patient partnership can make it possible to accomplish the real aim of reaching out to the unreached, by extending various available patient support systems and social protection schemes and initiatives to affected communities [5].

While it has been well established that children are much more likely to develop EPTB, extensive literature search by the authors to study the relative prevalence of various forms of extrapulmonary TB in Indian children has proved a difficult exercise. It has been noted that as many as 25% of childhood TB cases are essentially extrapulmonary cases, compared with only 16% among the adult populace. The lack of an accurate "gold standard" diagnostic test, coupled with a misdirected faith in the efficacy of the Bacille Calmette–Guérin vaccine has been thought to contribute to the underdiagnosis of this entity [3]. Another factor is that diagnosis of TB is very challenging in young children, and current tools are inadequate. The rates of extrapulmonary and meningeal TB are very high in this vulnerable populace, making the task of definitive diagnosis even more challenging [6]. Children with severe forms of TB are inaccurately reflected in community-based surveillance data. The accuracy of surveillance data must be taken into consideration when reporting on the epidemiology of childhood TB or when determining the effectiveness of public health interventions [7].

TB infection and disease are much more prevalent in developing countries, where resources for TB control are scarce [8].It is

estimated that in developing countries the annual risk of TB infection in children is 2 to 5% and in India, it has been reported to be 1.5% [9]. Mukherjee *et al*. have postulated that the prevalence of EPTB has increased over past two decades [10]. Furthermore, Lahane *et a*l. have noted that there has been an increased incidence of drug-resistant EPTB, which further complicates the scenario [11].

Pulmonary TB has been noted to be most common, corresponding to 80–85% of all TB in the general population, followed by lymph node TB (up to 15%). Most children develop pulmonary TB. Nonetheless, the recognition of EPTB is equally important because of its great potential for causing morbidity. The most common forms of EPTB in children is lymph node TB and central nervous system TB [12]. However, in our analysis, it was observed that in the pediatric age group, EPTB is much more prevalent. This may possibly be due to the fact that the study was performed at a tertiary care centre where more diagnostically challenging EPTB cases were referred/admitted. Previously, Jain *et al*. have noted that among children with TB, 46% had the extrapulmonary disease and interestingly, of these, 75% were found to have had TB meningitis [6]. Furthermore, in a study by Shrestha *et al*. in Nepal, extrapulmonary cases accounted for 46% of the total [13]. In the present study, the authors observed EPTB to the tune of 40% that was comparable to studies conducted elsewhere. This underscores the importance to keep TB, and especially EPTB as a common differential diagnosis in a highly TB prevalent country such as ours.

In the present study, it was observed that lymph node TB is the most common form of EPTB constituting approximately 42% of the total. Skeletal TB was the second most common type of analysis, accounting for 23% of EPTB. An interesting observation was that pleural and gastrointestinal TB was more common than CNS involvement, each comprising 12 % and 11.5 %, respectively. This was followed by nervous system TB (5% of all EPTB) and further by genitourinary TB and cutaneous TB (2.6% each). Similar studies in the Indian subcontinent have revealed most common forms of EPTB to be pleural effusion (14.6%), abdominal TB (12.2%), disseminated TB (7.3%), and lymph node TB (12.2%) [13]. It is essential to compare this data with the adult scenario. Sharma *et al*. in their extensive and exhaustive research has noted the overall prevalence rates of different presentations of TB. It has been noted that 75% of cases were those of pulmonary TB whereas 15% were extrapulmonary type. Among the EPTB cases, lymph node TB was found to be most common (35%), followed by pleural effusion (20%), skeletal TB (10%), and genitourinary TB (9%). Tuberculous meningitis and abdominal TB accounted for 5% and 3%, respectively [14]. Gosai *et al*. attempted to describe the observed forms of EPTB in their study populace, and the results were again, varied. It was noted that the distribution of EPTB was highest with TB meningitis (46%), followed by disseminated TB (21%), pleural effusion (12%), abdominal TB (10%), TB lymphadenitis (7%), and osteoarticular TB (4%) [15]. The findings of the present study, however, are in tandem with those reported by Al-Otaibi *et al*., who reported that the most common sites involved were that of lymph nodes (42%), followed by osteoarticular (13.7%), abdominal (13.3%), pleural (12.1%), CNS (4.4%), urogenital (3.6%), and miliary TB (2.1%) [16].

The conclusions thus derived, aim to highlight the ever increasing diagnosis of EPTB, and it is myriad presentations in the pediatric population. A bone of contention here, is that the incidence of skeletal TB is higher than previously thought. It has been stated previously, however, that in nations with a proportionately elevated burden of pulmonary TB, the incidence is anticipated to be proportionately higher. Furthermore, at least 10% of patients with EPTB have been postulated to have skeletal involvement. A possible reason for the apparent higher rates observable now could be the increased availability of magnetic resonance imaging, which has been postulated to be the gold standard for diagnosis and prognostication [17].

The lack of child-appropriate tools to confirm the diagnosis of TB disease, standard case-definitions, and deficits pertaining to the complete recording and reporting of children that are diagnosed with TB disease and put on treatment, continue to pose significant shortcomings to the robust estimation of TB burden among children. In this regard, the present study is a humble attempt to identify various types of TB and to highlight the prominent entity that is EPTB. A significant shortcoming of this analysis is that being a sample collected from a tertiary care hospital; it may not necessarily be representative of the general population. Nevertheless, the findings and implications of the same are no less important.

CONCLUSION

In tertiary care set up, though pulmonary TB is the most common variety, there is a significant rise in EPTB. Treating clinicians have to be aware of the various presentations of EPTB to achieve timely diagnosis and to intervene at the opportune time. The current study aims to add to our existing knowledge of the types, rates, and presentations of EPTB, which is regrettably often overlooked by practitioners. The data must be utilized to augment what is already known and with future literature as well, before extrapolating into accepted guidelines for management.

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