Clinical profile of tuberculosis in children

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ABSTRACT

Childhood tuberculosis is common in our community. The diagnosis in most cases is still based on clinical evidence alone. The present study was designed to study clinical profile, laboratory investigations and outcome of pediatric tuberculosis. A prospective study was conducted among the children admitted in Nepal Medical College from April 2007 to March 2011. The prevalence of tuberculosis was 1.5%. Pulmonary tuberculosis was common (53.7%) than extra pulmonary (46.3%) tuberculosis. BCG scar was present in 48.8%. History of tuberculosis contact was present in 36.6% and Mantoux test was positive in 39.0%. The most common symptoms were fever (75.6%), cough (63.4%) and weight loss (41.5%). Confirmed diagnosis was made (bacteriological or histological) only in 14.6%. This study supports the use of history and clinical features to diagnose childhood tuberculosis.

Keywords: Tuberculosis, children, clinical presentation, diagnosis.

INTRODUCTION

Tuberculosis is a chronic infectious disease caused by *Mycobacterium tuberculosis*. Tuberculosis is still one of the deadliest diseases in the world killing nearly two million people every year.[1] According to WHO, each year about nine million people develop tuberculosis, of whom about two million die. Of the nine million annual TB cases, about one million (11.0%) occur in children under 15 years of age.[2] Currently 95.0% of tuberculosis occur in developing countries.[3] The South East Asia Region, with estimated 4.88 million prevalent cases and an annual incidence of 3.17 million TB cases, carries one third of the global burden of TB. Estimated annual incidence rate of TB in Nepal is 173 per 100,000 population.[4] Annual risk of TB infection in Patan, a city in Nepal was 4.0%.[5] A survey done in a school in Dharan showed average annual risk of infection is 2.4% in 10-15 yrs age group.[6] Gold standard test for adult with pulmonary tuberculosis is sputum smear microscopy, however there is no such gold standard test in children. So the diagnosis of TB in children is usually presumptive.[7] The objective of this study is to evaluate the clinical and laboratory characteristics of tuberculosis in children and its outcome.

MATERIALS AND METHODS

This is a prospective study conducted in the department of pediatrics in Nepal Medical College from April 2007 to March 2011.The children between 6 month to 15 years who were suspected to have tuberculosis on the basis of clinical presentations were enrolled in the study. The patients were thoroughly evaluated with the detail history, clinical examination and relevant investigations. The patients were also assessed for BCG vaccination and presence or absence of BCG scar. Mantoux test was done and indurations e" 10mm after 72 hrs of the test was considered positive.[3] Chest X ray, haemogram and ESR was done in all the patients. In the relevant cases sputum smear microscopy for AFB was sent for 3 consecutive days, lymph node biopsy and pleural fluid test was also done. Confirmed cases were treated according to WHO guidance for national tuberculosis programme on the management of tuberculosis in children.[2] Malnutrition was classified according to Indian Academy of Pediatrics (IAP) classification.[1] Patients were followed up regularly. All the information was recorded in the Performa. Analysis of data was done manually.

RESULTS

During the period of study, out of 2696 admitted patients, tuberculosis was diagnosed in 41 (1.5%) cases and

Table-1: Spectrum of types of tuberculosis in children. (n=41)

Serial No.	Type of tuberculosis	n		(%)	
1	Pulmonary	22		53.7	
2	Extra pulmonary	19		46.3	
	a.Pleural effusion		6		14.6
	b. Abdominal		5		12.2
	c. Disseminated		3		7.3
	d. Lymph node		5		12.2
	Total	41		100	

Table-2: Clinical profile of tuberculosis in children.

Presenting features	Symptoms	n	(%)	Signs	n	(%)
Non-specific	FeverAnorexia and weight loss	31 17	75.6 41.5	Malnutrition Lymphadenopathy	20 5	48.8 12.2
Abdominal	Abdominal distension Pain abdomen Altered bowel habit	6 6 3	14.6 14.6 7.3	Hepatomegaly Ascites	8 5	19.5 12.2
Respiratory	Cough Chest pain Breathing difficulty Hemoptysis	26 10 7 1	63.4 24.4 17.0 2.4			
Others	Oedema Discharging wound in leg	3 1	7.3 2.4			

received anti tubercular therapy. Thirty five (85.4%) were diagnosed to have probable tuberculosis on the basis of clinical evidence and investigations while diagnosis was confirmed (bacteriologically or histopathologically) only in six (14.6%) cases.

Twelve (29.3%) patients were less than 5 years, 3 (7.3%) were between 5-9 years age and 26 (63.4%) were between 10-15 years (Fig. 1). Twenty four (58.5%) cases were males and 17 (41.5%) were females (Fig. 2). Pulmonary tuberculosis was seen in 22 (53.7%) and extra pulmonary in 19 (46.3%) cases (Table-1). Among the extra pulmonary cases, pleural effusion, abdominal tuberculosis and disseminated tuberculosis were the common ones.

BCG scar was present in 20 (48.8%) cases. History of tuberculosis contact was present in only 15 (36.6%) cases. Mantoux test was positive in 16 (39.0%) with blister formation in one case. Malnutrition was present in 20 (48.8%) cases, out of that 2 (4.9%) had grade IV malnutrition (Table-4). The patient who had blister formation in mantoux test was associated with grade IV malnutrition and had sputum positive tuberculosis. Out of 6 confirmed TB cases AFB was isolated in sputum in 3 (7.3%) and fine needle aspiration cytology (FNAC) from lymph node showed caseasion necrosis in 3 (7.3%) cases. The most frequent symptom seen in the patient was fever 31 (75.6%), followed by cough 26 (63.4%) and weight loss 17 (41.5%) (Table-2). Most common chest X ray finding was consolidation in 10 (24.4%) followed by non specific finding in 7 (17.1%) and pleural effusion in 6 (14.6%) cases (Table-3). On analysis of pleural fluid, all 6 (100%) cases were exudative with straw color morphology and 4 (66.6%) had lymphocytosis. ESR was raised in 20 (48.8%) cases.

Out of 41 cases, 10 (24.4%) failed to follow up, 1 (2.4%) expired, remaining 30 (73.2%) improved but one (2.4%) case came with relapse pulmonary tuberculosis after 3 months of completion of treatment.

DISCUSSION

The overall prevalence of tuberculosis was 1.5% in our study which is similar to the study done in Dhulikhel Hospital where the prevalence was 1.9%.[8] In developing countries, the annual risk of tuberculosis infection in children is 2.5%.[9] Our study showed male predominance 24 (58.5%) than female 17 (41.5%). A similar study showed more males 68.3% than females 31.7%.[8] The male predominance in the study may be due to their ambulatory nature which make them more expose to the TB infected cases.

In our study, most of the cases (63.4%) were between 10-15 yrs. The mean age was 10 years. This shows older age group had higher prevalence than younger age group. Pulmonary tuberculosis was more common 22 (53.7%) than extra pulmonary 19 (46.3%). Which is similar to the study conducted in Maryland where pulmonary tuberculosis was seen in 75% children.[10] In another study done in Philippines also, the most common diagnosis was pulmonary tuberculosis (40.3%).[11] In our study, 20 (48.8%) patient had malnutrition and most of children with disseminated tuberculosis had grade III malnutrition. This may be because of poor immune

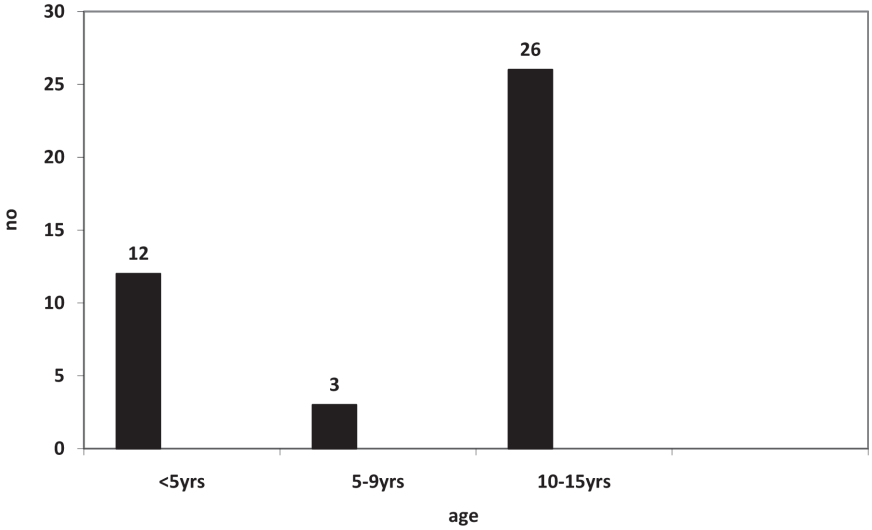

Fig. 1. Age distribution of children with TB

Table-3: Chest radiograph findings.

	n	(%)
Consolidation	10	24.4
Nonspecific finding	7	17.1
Pleural effusion	6	14.6
Hilar lymphadenopathy	5	12.2
Hazy densities	4	9.8
Pericardial effusion	3	7.3
Milliary mottling	2	4.9
Cavitation	3	7.3
Atelectasis	1	2.4
Total	41	100

response to infection in malnourished children.

In our study, BCG scar was present in 20 (48.8%) cases. This was similar to a study done in a government school of Nepal where BCG coverage was 38.3%.[6] In the present study all types of TB was seen in children who had received BCG immunization. This indicates that there is still a significant chance of developing complicated TB even in the presence of BCG vaccination. Mantoux test was positive in 16 (39.0%) cases. A similar results were seen in other studies where mantoux test was positive in 48.3%[8], 34.7%[12] and 31.9%.[13] Only 15 (36.6%) cases give the history of tuberculosis contact in our study. This may be because of the family members not giving true history due to the social stigma attached to this disease. In other studies also, the range of exposure to tuberculosis varied from 13.1% to 77.7%.[14,15] Tuberculosis in children is a general disease which may appear in any part of body.[7] In our study nonspecific symptoms like fever 31 (75.6%), cough 26 (63.4%) and weight loss 17 (41.5%) were the most common findings. Similar findings were seen also in other studies.[8,11] The most common pulmonary findings were decreased air entry 15 (36.6%) and crepitation 11 (26.8%). This is consistent with the finding in another study where crepitation was found in 40.0% and decreased breath sound in 18.0% cases.[11] The most common chest X ray finding was consolidation (24.4%) in our study which is similar to the findings in other study where hilar lymphadenopathy was seen in 23.3%, unilateral pleural effusion in 23.3%, non-specific finding in 21.7% and consolidation in 15.0% cases.[8] The result of one of the study demonstrated unsatisfactory sensitivity and specificity of chest x ray in the diagnosis of pulmonary tuberculosis.[16] Finding of predominant lymphocytosis (66.6%) on analysis of pleural fluid in our study is

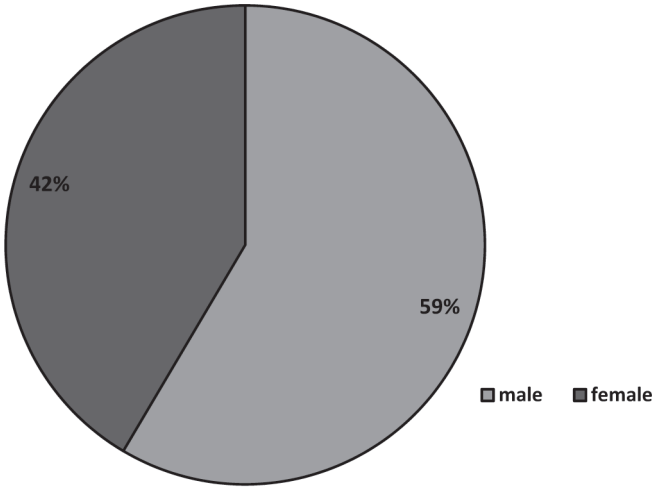

Fig. 2. Sex distribution of children with TB

similar to the finding in another study where pleural fluid showed lymphocytosis in 85.8%.[17]

Diagnosis of tuberculosis in children is very difficult. Children under 10 years old with pulmonary tuberculosis rarely cough up sputum because they swallow their sputum, which means bacteriological confirmation is usually not possible.[7] Diagnosis of TB in children usually follows discovery of a case in an adult, and relies on tuberculin skin testing, chest radiograph, and clinical signs and symptoms. However, clinical symptoms are nonspecific, skin testing and chest radiographs can be difficult to interpret, and routine laboratory tests are not helpful. Although more rapid and sensitive laboratory testing, in molecular biology, immunology, and chromatography, is being developed, the results for children have been disappointing.[18] Nucleic Acid amplification technique offer rapid results.[19] Serology and polymerase chain reaction (PCR) based diagnostic method have failed to help a clinician working at the peripheral level.[20] In our study AFB was isolated in sputum in only 3 (7.3%) cases and other 3 (7.3%) cases had histological evidence of TB. While evaluating the age distribution of new smear positive cases in Nepal, children of 0-14 yrs occupied only 2.3% of the total cases.[21] In a study done in North India also only 14.0% cases were confirmed (bacteriologically or histologically) to harbor the disease.[17]

In conclusion, childhood tuberculosis is common in our setting with the pulmonary TB being the most common one. The diagnosis of tuberculosis is very difficult in children. There is no gold standard test for the diagnosis

Table-4: Association with malnutrition.

	n (%)	Grade I	Grade II	Grade III	Grade IV
Malnutrition absent	21 (51.2%)	-	-	-	-
Malnutrition present	20 (48.8%)	7 (17.1%)	5 (12.2%)	6 (14.6%)	2 (4.9%)

of childhood TB. Most of the cases were diagnosed on the basis of epidemiological and clinical suspicion supported by various investigation results. With difficulty in confirming childhood tuberculosis by culture, this study supports the use of history and clinical features to diagnose TB in children. As the diagnosis of TB in children usually follows discovery of a case in adult, a contact investigation of the house hold should be initiated immediately when a child is suspected of having TB. As the source of transmission of TB to children is usually an adult, control of tuberculosis in adult is necessary to decrease the prevalence of TB in children. An evaluation of the public health strategies to control the disease should be done as childhood TB signifies recent and ongoing transmission in the community.

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