Epidemiology of Childhood Tuberculosis in a Hospital Setting

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Abstract

Two hundred paediatric cases of tuberculosis were stud led over two years. The children usually presented with fever, cough, weight loss or failure to thrive and pallor, The diagnosis was based on history, clinical examination, chest and other relevant radiographs, Mantoux test, erythrocyte sedimentation rate (ESR) and where necessary cerebrospinal, pleural and ascitic fluid examinations and lymph gland histopathology were done. The most commonly affected age group was between 2-5 years and pulmonary tuberculosis was the most frequent diagnosis followed by tuberculous adenitis (JPMA 48:90, 1998).

Introduction

Tuberculosis (TB) caused by Mycobacteriuni tuberculosis primarily affects the lungs but can also affect any system/organ of the body resulting in extra pulmonary tuberculosis. The disease is usually chronic with varying clinical manifestations. It is a droplet infeCtion which spreads from sputum positive patients with pulmonary tuberculosis. The incubation period may be weeks, months or years[1].

TB has become an important public health problem[2]. in today's world whereas, previously it was considered a nuisance associated usually with the developing countries[3]. But various factors during the 1990's have made tuberculosis a global issue[4]. With the out-break of the human immune deficiency virus (HIV) epidemic. the western world saw re-emergence of tuberculosis[5], which according to World Health Organization (WHO) is the principal killer of HIV positive cases today[4,6]. Alongwith this and due to inadequate treatment. several outbreaks of multi-drug resistance tuberculosis have been reported around the world[7]. Tuberculosis is a major cause of morbidity and mortality in all age groups. According to an estimate approximately 170,000 children die from tuberculosis annually, worldwide[8]. In developing countries most affected individuals are below 50 years of age, which is indirectly having a large negative impact on the economies of such nations[9].

In Pakistan. only limited data is available, however, the prevalence of tuberculosis is estimated to be as high as 250,000 cases annually[10]. According to the official estimates, the rate of open bacillary cases among adult population.(1 5 years and above) was l7% and among children 5 to 9 years of age, 13% were infected with tuberculosis[10]. It is thought to be the fourth major cause of all deaths in Pakistan[10]. We present hospital based epidemiological data of children suffering from tuberculosis.

Patients and Methods

Data regarding tuberculosis was collected in children upto 12 years of age presenting to the pediatric department of Federal Government Services Hospital, Islamabad. Two hundred consecutive children were identified from outpatient and inpatient departments who suffered from various forms of tuberculosis. A history of contact witha case of tuberculosis, history of measles or recurrent respiratory infections was obtained. Assessment of nutritional status on the basis of weight for age (Gomez Classification) was done. Each child. had a complete blood picture, erythrocyte sedimentation rate

(ESR), chest radiograph and Mantoux test with five tuberculin unit (TU). When necessar cerebrospinal (CSF), pleural and ascitic fluids were Sent for biochemical examination, microscopy, gram stairnng and Ziehl Necison staining for acid fast tuberculous bacilli (AFB). Where lymph glands and bones were suspected to be involved, biopsies were also performed. Specific cultures were not done due to non-availability. Children were diagnosed as having tuberculosis in light of suggestive clinical features. history of contact, positive Mantoux test, ESR >30 mm and evidence of tuberculosis in chest radiograph for pulmonary tuberculosis. Mantoux test was considered positive if _10 mm induration without BCG scaror>15 mm indurationwithBCG scarwas present. ForTh meningitis in presence of above, CSF examination showing >100 leukocytes, predominantly lymphocytes, protein >100 mg/dl and sugar <50% of blood sugar was considered suggestive. Ascitic and pleural fluids were exudates (predominantly lymphocytic leukocytes and >3.0 g/dl proteins). TB lymphadenitis was diagnosed by histopathology. In severely malnourished and children with recent history of measles, a negative Mantoux did not exclude the diagnosis of TB.

Results

Of 200 children enrolled, most belonged to large families with low socioeconomic background. Commonly affected age group was. of 2-5 years (Table I).

Table I. Age and sex distribution of children with tuberculosis.

Age in	Male		Female		Total	
months	n	%	n	%	n	%
0-23	26	13	12	6	38	19
24-59	32	16	33	16.5	65	32.5
60-83	16	8	12	6	28	14
84-144	26	13	43	21.5	69	34.5
	100	50	100	50	200	

History of contact with a TB case was present in 129 cases (64.5%), 38 (19.0%) children had recent history of measles, whereas 3 (1.5%) had history of whooping cough.
Duration of illness varied and 38. 5% had symptoms for upto 2 months, 31% for 2-6 months and 30.5% had symptoms for more than six months. Fever was the most common presenting complaint (80,5%), followed by weight loss or failure to thrive (69.5%).

Table II. Presenting signs and symptoms in tuberculosis.

	Number of cases	%
Signs*		
Pallor	153	76.5
Malnutrition	120	60
Adventitious sounds on auscultation	48	24
Visceromegaly	48	24
Lymphadenopathy	38	19
Neurological signs#	35	17.5
Meningeal irritation	17	8.5
Hepatomegaly	37	18.5
Splenomegaly	11	5.5
Symptoms**		
Fever	161	80.5
Weight loss/failure to thrive	139	69.5
Cough	130	69.7
Glandular swelling	33	16.5
Tiredness	31	15.5
Breathlessness	28	14.0
Sweating	27	13.5
Convulsions	12	6
Drowsiness/confusion	12	6
Vomiting	10	5
Anorexia	10	5

9 children had irritability, 5 physical deformity, 4 oedema, 3 heamoptysis, 8 limb weakness, 5 headache, 8 diarrhoea, 3 constipation and 2 had abdominal distension.

* 6 children had bone involvement, 2 had ascites and 2 had hydrocephalus.

** Total percentages may be more than 100, because children had more than one symptom or sign.

12 children had varying degree of paresis, 8 had papilloedema, 7 had cranial nerve involvement and 6 had optic atrophy.

Table II. Pallor (76.5%) and malnutrition (60%) were common findings. Thirty-eight children had matted non-tender lymphadenopathy, of whom 31 were in cervical region. Meningeal irritation was present in

17 children on initial examination. 11(5.5%) of whom were diagnosed on investigations as tuberculosis

meningitis. All 11 cases had varying degrees of paralysis of limbs. Six children had vitamin D deficiency rickets.
Pulmonary tuberculosis was the commonest (79%) followed by tuberculous lymphadenitis (19%) (Table III).

Table III. Types of tuberculoses.

Diagnosis	Number of Patients
Pulmonary TB	158
Tuberculous adenitis	38
Tuberculous meningitis	11
Bone TB	6
Miliary TB	5
Abdominal TB	2
Phylactanular conjunctivitis	1

Six children with spinal tuberculosis presented with bony deformities. In this group of children with bone involvement, one had paraplegia and another had swelling of fingers of both hands and feet, later diagnosed as tuberculous dactylitis on radiology and bone biopsy. Fifteen (7.5%) children were asymptomatic and were detected during the course of contact tracing (Data not shown).
Sixty percent (120/200) of all children were below third percentile of weight forage, 33% were female and 27% male. Among 103 less than five years, 68 were malnourished and 27 had signs of clinical severe malnutrition (Data not shown).
Tuberculin reaction was positive in 166 (83%) cases, 59% showed an induration of atleast 20 nun and a few developed ulceration and necrosis. There was no relationship between tile severity of the disease and intensity of tuberculin reaction. Ninety-four percent of children above 7 years showed a positive tuberculin reaction. Of the 34 non-reactors to tuberculin, 16 children had severe malnutrition, six had a recent attack of measles, two had miliary tuberculosis and one had history of repeated respiratory infections. Of remaining nine, seven had varying degree of malnutrition but no definite cause of non-reactivity to tuberculin could be established. ESR was raised in 162 (81%) children and in 119 (59.5%), it was more than 30 mm. Haernoglobin was less than 11 g/dl in 153(76.5%) and was less than 9 g/dl in 76(38%) children.

Discussion

In traditional societies like ours there is a stigma attached to tuberculosis[7]. People are afraid to disclose the diagnosis due to fear of discrimination by the community. There has been little effort by the health professionals to educate the communities about preventive measures, symptoms of tubereulosis, reduction of prejudice and encouraging patients to seek treatment and comply with therapy. Adults are the main source of TB in the community[7]. If they are infected and don't seek treatment, they may pass it onto theirchildren. It is estimated that anactive case ofTB will infect 20 to 28 people before he/she recovers or dies from the disease[8]. Children under two years of age are most vulnerable. Tubereulosis affects children directly and indirectly and this disease probably creates more orphans than any other disease even though it is preventable and curable.

Inourstudy the highest prevalence of cases (32.5%) was in 2-5 years age group, similar is reported from United Kingdom and India[11]. Two other studies from India reported higher prevalence in ovcr five year age group[12,13]. The most frequent symptoms in our group were fever, weight loss/failure to thrive and cough. Two studies from India, (Magotra et al)[12] reported dry cough, failure to thrive, low grade fever and weight loss[12], whereas Ramachandran reported repeated respiratory infections, failure to thrive and chronic diarrhoea as commonest presentations[11].. History of contact was present in 129 (64.5%) of our patients. Indian workers have quoted lower figures of 10%[11] and 19.5%[12]. Children suffering from miliary tuberculosis. tuberculous pneumonia and tuberculous meningitis in our study had strong history of contact with one or two family members suffering from tuberculosis.

A total of 60% children in our study were malnourished to some degree and a quarter of under five years of age were severely malnourished. Many children presenting with severe malnutrition may be suffering from tuberculosis and nutrition rehabilitationefforts alone may fail, Lloyd reported 12.5%(5 1 out of 402) cases having severe malnutrition suffered from tuberculosis[14]. Okeahialam also reported that 38% of severely malnourished children in his study had tuberculosis[15]. Nutrition survey data from Pakistan showed that 42% were stunted among under five year old children, 35.8% were underweight and 9.3 were wasted[16]. Many of these children might in fact have tuberculosis but remain undiagnosed.

The data we collected had its limitations. First, it was hospital based and cannot provide a community picture of disease epidemiology. Second, cases were a consecutive group of patients and not randomly selected so, it does not fulfil the criteria for a controlled study. Third, there may be some criticism about establishing the diagnosis of tuberculosis inourpatients. As it is, diagnosing tuberculosis in children is difficult. Many a times they present with non-specific symptom like failure to thrive. In malnourished children diagnosis becomes more difficult. Children with tuberculosis are not usually infective to others, rarely produce sputum which can be checked for TB bacillus. So they remain unidentified and untreated. It is reasonable to assume that a child with an appropriate clinical picture, a positive tubereulin test and histo7 of contact with an infected untreated adult has tuberculosis[17]. Fourth, 34 of our children had a negative Mantoux test. Mantoux test is one of the most important diagnostic tools for tuberculosis in children. A positive test below three years of age in children without BCG vaccination is diagnostic for tuberculosis[17,18]. A negative test can be present in severe malnutrition, measles, occasionally after measles vaccination, very recent infections, chicken pox and in advanced terminal or miliary tuberculosis[18,19]. A negative Mantoux test has also been documented in bacteriologically proved cases of tuberculosis.

With intensive therapy, TB spread can be prevented by proper treatment and good compliance even for three weeks when patients become AFB negative[8]. To improve tuberculosis cure rates and minimize development of multi-drug resistant (MDR) strain, WHO is promoting directly observed therapy, short course (DOTS)[7]. Good results have been reported from China[10] and Tanzania, Bangladesh, Guinea,

Peru and Kenya[7,8]. DOTS provides a strategy through which supervised effective medicines are provided to the patients regularly until cured[7]. It is recommended that every country affected by tuberculosis including Pakistan should implement DOTS as their tuberculosis treatment policy as effectively as possible.

Pakistan has had a National TB Control Programme (NW) since 1965 which has not been given high priority by the government[20]. In 1996, this programme has been revised and DOTS has been adopted as a strategy. The Planning Commission document for NTP states that in collaboration with other primary health care programmes, i.e.. EPI, Leprosy, AIDS control programme and Prime Minister's Family Planning and Priniary Health Programme. the NTP will try to prevent tuberculosis and will try to expand and provide full treatment coverage by 2000-2001.[10] There is a dire need for all health professionals to join hands with the national TB progranune to control the menace of tuberculosis.

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