

TUBERCULOUS DISEASE IN A PEDIATRIC REFERRAL CENTRE: 16 YEARS EXPERIENCE

N. Somu
D. Vijayasekaran
T. Kavikumar
A. Balachandran
L. Subramanyam
A. Chandrabhushan

ABSTRACT

Children with evidence of tuberculous disease registered at the TB Clinic, Institute of Child Health, Madras during the years 1977 to 1992 were analyzed. Progressive primary complex, is the commonest thoracic form of tuberculosis while tuberculous meningitis is the commonest extra thoracic form. The overall prevalence of various clinical forms of tuberculosis has decreased over the last 16 years. There is an increasing trend in the prevalence of progressive primary complex among the BCG vaccinated group. The prevalence of pleural effusion, bone tuberculosis and abdominal tuberculosis is almost same over the last 16 years and is more in the BCG non vaccinated children. In tuberculous adenitis there is no significant variation between the two groups. The occurrence of tuberculous meningitis is in the ratio of 1 : 3 among BCG vaccinated and non-BCG vaccinated children. Though the prevalence of miliary tuberculosis is negligible, it is significantly more in BCG non-vaccinated children. There is a tendency for slight decrease in overall mortality due to tuberculosis in the last 10 years but the mortality due to tuberculous meningitis continues to be the same over the past 16 years.

Key words: Tuberculosis, Mortality, BCG vaccination.

Tuberculosis in children is an important disease because of higher incidence and mortality, especially in developing and under developed countries. Its prevalence is universal and may manifest as the different forms of tuberculosis at all ages. An estimated 1.7 billion persons, one third of the world's population, are infected with *Mycobacterium tuberculosis*(1). The present risk of infection is 20 to 25 times more in India when compared to developed countries(2). According to WHO, no single country in the world has succeeded in reaching the point of control, which is less than 10% tuberculin positivity among children in the age group 0-12 years(3). The prevalence of tuberculous diseases in India is estimated to be between 2 to 7% and annual incidence about 1.9%(4). In India, 40% of the children by the age of 6 years and 80% by the age of 16 are considered to be infected(5). The published data regarding, the various clinical forms of tuberculosis and relation to BCG vaccination status are limited. Hence, we present in this study our experience with different clinical forms of tuberculosis in children over a period of 16 years.

Material and Methods

Children with evidence of tuberculous disease attending the Tuberculosis Clinic, at the Institute of Child Health, Madras during January 1977 to December 1992, were analyzed to find out the pattern of tuberculous disease and the changing trend in its preva-

From the Department of Pediatric Respiratory Diseases, Institute of Child Health, Egmore, Madras 600 008.

Reprint requests: Dr. N. Somu, Additional Professor of Pediatric Respiratory Diseases, F-49, 1st Main Road, Anna Nagar, Madras 600102.

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lence. Progressive primary complex, pleural effusion, tuberculous meningitis, tuberculous adenitis, bone tuberculosis, abdominal tuberculosis and miliary tuberculosis were analyzed. The diagnosis of these different forms of tuberculosis was made as per the scoring system suggested by Nair and Philip(6). Children with primary complex were excluded. BCG vaccination status was recorded and scar formation was taken as evidence of BCG vaccination. The occurrence of different forms of tuberculosis among BCG vaccinated and non BCG vaccinated children was also studied. The mortality due to tuberculosis, was also evaluated. Chi-square test was used to assess the statistical significance.

Results

The different clinical forms of tuberculosis encountered over the last 16 years are

shown in *Table I*. The prevalence appears to be constant all these years. The mean yearly prevalence of progressive primary complex was 372 (51.4%), pleural effusion was 29 (4.0%), tuberculous meningitis was 148 (20.4%), tuberculous adenitis was 86 (12.0%), bone tuberculosis was 58 (8.0%) abdominal tuberculosis was 25 (3.5%) and miliary tuberculosis was 5 (0.7%).

From *Table I* it can be seen that among the thoracic forms of tuberculosis, the prevalence of both progressive primary complex and pleural effusion was not significantly different in both BCG vaccinated and non-vaccinated children ($p = 0.23$). Among the extra thoracic forms of tuberculosis, tuberculous meningitis constituted about 20% and it was the second commonest form of tuberculous disease while miliary tuberculosis was the least

TABLE I-Prevalence of Different Forms of Tuberculosis Over a Period of 16 Years and Distribution Among BCG Vaccinated and Non-vaccinated Children

Type		BCG					
		Prevalence		Vaccinated		Non-vaccinated	
		n	%	n	%	n	%
Thoracic forms ($p=0.23$)	PPC	5955	52	2416	41	3539	59
	Pleural effusion	465	4	175	38	290	62
<i>Tubercular type</i>							
	Meningitis	2363	20	666	28	1697	72
	Adenitis	1379	12	659	48	720	52
	Bone	931	8	288	31	643	69
Extrathoracic forms ($p<0.001$)							
	Abdominal	396	3.4	152	38	244	62
	Miliary	79	0.6	20	25	59	75

Total tubercular disease = 11568.

common (0.6%). The prevalence of these two severe forms showed a statistically significant difference ($p < 0.001$) among BCG vaccinated and non-BCG vaccinated children. Though tuberculous adenitis occurred equally in both BCG vaccinated and non vaccinated groups, the occurrence of bone tuberculosis and abdominal tuberculosis was more (>60%) in the BCG non-vaccinated group.

The overall admissions and mortality due to tuberculosis showed a decreasing trend over the last 16 years (*Table II*). The usual annual mortality of childhood tuber-

culosis was around 6-8% per year, of which more than 80% was contributed by tuberculous meningitis (*Table II*). However, in the recent four years, the share of tuberculous meningitis mortality has increased to 90-100% inspite of a decrease in the overall mortality due to tuberculosis.

Discussion

Inspite of improved care, evaluation and management, there was no significant reduction in the prevalence of different clinical forms of tuberculosis over the last 16 years. Epidemiological data further

TABLE II-Hospital Prevalence and Mortality of Tuberculous Disease in Children with Special Reference to Tuberculous Meningitis.

Year	Admissions due to tuberculosis	Mortality			
		Total Tuberculosis		Tubercular meningitis	
		n	%	n	%
1977	1371	112	8.2	90	80.4
1978	1177	76	6.5	62	81.6
1979	1217	93	7.6	80	86.0
1980	1175	129	11.0	54	41.9
1981	960	101	10.5	65	64.4
1982	912	68	7.5	46	67.6
1983	1034	87	8.4	54	62.1
1984	1028	63	6.1	52	82.5
1985	1012	47	4.6	41	87.2
1986	1031	45	4.4	42	93.3
1987	981	50	5.1	42	84.0
1988	970	49	5.1	43	87.8
1989	1032	50	4.3	45	90.0
1990	971	38	3.9	38	100.0
1991	846	34	4.0	31	91.2
1992	655	37	5.7	34	91.9

indicates that it is more prevalent in younger population(7).

The average prevalence of progressive primary complex is 372 per year. On further analyses it can be seen that the prevalence of progressive primary complex is increasing in the BCG vaccinated group in recent years, probably because more number of children are vaccinated. The occurrence of pleural effusion is higher among the BCG non-vaccinated children as compared to BCG vaccinated children. However, there is no changing trend in the prevalence of pleural effusion among the BCG vaccinated and non-vaccinated children over the last 16 years.

Tuberculous meningitis is the second commonest tuberculous lesion as observed from *Table I*. It is worth noting that it is the single commonest form of tuberculosis observed in children which carries a very high mortality of more than 80% of the overall mortality due to tuberculosis. Tuberculous meningitis accounts for 50-60% of extra-thoracic tuberculosis. This is a serious form of tuberculosis in children in hospital practice as it claims 80% of the mortality due to tuberculosis. In addition, it is often associated with sequelae. These 16 years of statistics reveal that tuberculous meningitis occurs 2-3 times more commonly in the non-BCG vaccinated group supporting the view that BCG has a protective value against tuberculous meningitis. This can be compared with other work which showed that although BCG has low overall protection, it has good protection against meningeal and disseminated tuberculosis. However, it is important to observe that tuberculous meningitis does occur in a significant proportion even in the BCG vaccinated group. The occurrence of tuberculous meningitis was in the ratio of 1 : 3 among the

BCG vaccinated and non-vaccinated children at Institute of Child Health, all through 16 years irrespective of improved BCG immunization coverage in the community in the recent years. The reason for the reduced prevalence among the BCG vaccinated children could be attributed to the protective value of BCG vaccination, but what could be the reason for almost the same percentage of occurrence of tuberculous meningitis among the BCG vaccinated children irrespective of the improved BCG immunization coverage over the last 16 years? It was also observed that the overall prevalence of tuberculous meningitis was almost the same over the last sixteen years inspite of improved BCG coverage in the recent years. An increasing prevalence of intra-familial contact or increasing referral to this territory institution could be the explanations for the constant prevalence of tuberculous meningitis over 16 years.

The prevalence of tuberculous adenitis is mostly constant over the last 16 years with occasional sporadic spikes. The prevalence of tuberculous adenitis appears to be almost equal in both BCG vaccinated and non-vaccinated children in the last five years. Bone tuberculosis is constantly seen in children with an average contribution of 58%. The overall prevalence of bone tuberculosis was less among the BCG vaccinated children. Although the prevalence of abdominal tuberculosis is almost constant over the last 16 years, the occurrence among the BCG vaccinated children was considerably lower. Abdominal tuberculosis though less in number, is often a frustrating experience both for the parents and the physician because of vague presentation. Of late, an open biopsy or laparoscopy aided biopsy directed at suspicious looking areas gives better results in diagnosing abdominal

tuberculosis(4). The overall prevalence of miliary tuberculosis among children over the last 16 years is negligible (0.9%) as against 2.6% reported by Lei(9), but it does occur in both BCG vaccinated and non-vaccinated groups.

The overall mortality due to tuberculosis ranges between 5-11 % of which tuberculosis meningitis contributes the maximum (about 80%) which is significantly more than the figure reported by Udani (65.5%)(4). The prevalence of hospitalization due to tuberculosis was almost constant except in the last two years. The percentage of mortality has not significantly reduced over the last 10 years and mortality due to tuberculous meningitis is almost the same over 16 years claiming a major share in the overall mortality due to tuberculosis. Improved patient care, multidrug anti-tuberculous regimen and better BCG immunization coverage has not created a dent in the mortality due to tuberculosis in children. So, it must be stressed that the most powerful weapons for controlling tuberculosis and altering the epidemiological situation in a community are case finding and case holding(2).

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