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CLINICAL SPECTRUM OF TUBERCULOSIS IN BCG VACCINATED AND UNVACCINATED CHILDREN

Paediatrics

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ABSTRACT

Introduction: Tuberculosis is a major public health problem in India. We evaluated the impact of Bacille Calmette Guerin (BCG) vaccine in the clinical spectrum of tuberculosis in children.

Material & Methods: A study was conducted over a period of one year from July 2015 to June 2016 in The Department of Pediatrics in PMCH Patna. A total of 100 children up to the age of 15 years suffering from various form of TB attending outdoor or indoor were included in the study.

Result: Majority (41%) of children with tuberculosis were below 5 years of age. History of contact with adult tuberculosis was present in 42% of cases. BCG scar was present in 75 % of cases. Pulmonary tuberculosis is seen in 66% and extrapulmonary tuberculosis in 26% cases. Tubercular lymphadenitis was seen in 8% cases of which 87.5% cases were in BCG vaccinated group.

Conclusion: Higher incidence of pulmonary tuberculosis in BCG vaccinated group. Higher incidence of tubercular meningitis in BCG unvaccinated group. The underlying risk factor was low socioeconomic status and poor immunization coverage should be taken into consideration in order to reduce morbidity and mortality due to tuberculosis in children.

KEYWORDS

Tuberculosis, Bacille Calmette Guerin (BCG) vaccine.

INTRODUCTION

Tuberculosis still remains a major public health problem in developing countries like India. There are many programmes for the prevention and control of tuberculosis, the introduction of directly observed treatment short course (DOTS) strategy, still, there is higher morbidity and mortality. According to WHO, one-third of the world population is infected with tuberculosis. Approx 9 million people develop tuberculosis every year, of which about 2 million dies.[1,2] The Bacille Calmette Guerin (BCG) vaccine introduced in 1924 has not made the impact in the prevention of tuberculosis that was expected, however, it modifies the course of the disease [3]. The present study was done to find out the clinical spectrum of tuberculosis in BCG vaccinated and unvaccinated children.

MATERIAL AND METHODS

A study was conducted over a period of one year from november 2015 to october 2016 in The Department of Pediatrics in PMCH Patna. A total of 100 children up to ages of 15 years suffering from various form of TB attending outdoor or indoor were included in the study.

A detail clinical history was taken including BCG status, (child with a history of BCG vaccination and having a scar was considered to be BCG vaccinated), contact history and socioeconomic status. A thorough clinical examination, laboratory investigation was done. Following investigation were done.

1) Complete blood count
2) Chest X-ray
3) CSF examination
4) Isolation of acid-fast bacilli from different specimens and body fluids was done by direct smear examination &culture
5) Cranial contrast-enhanced CT: In suspected cases of tubercular meningitis
6) Mantoux test was done for all cases and induration >10 mm was considered a positive reaction.

RESULTS

In the present study, there were 75 BCG vaccinated and 25 unvaccinated children. Most of the cases were less than 5 years (41%), 36% of cases were in 5 to 10 years of age and 23 % cases were in 11 to 15 years of age. There were 56 % female and 44% male patients. Prevalence of disease was more in low socioeconomic groups (61%). History of contact with adult tuberculosis was present in 42% of cases. There was no significant difference between BCG vaccinated and unvaccinated children ($p>0.05$) with respect to age, sex, socioeconomic status and history of contact in the present study.

Table 1: Mantoux reactivity and radiological profile

Investigation	BCG vaccinated n=75	BCG Unvaccinated n=25	Total n=100
Mantoux test			
<10 mm(Negative)	23(30.67%)	11(44%)	34
>10 mm(Positive)	52(69.33%)	14(56%)	66
Chest radiograph			
Normal	28(37.33%)	10(40%)	38
Abnormal	48(64%)	14(56%)	62

In Present study, 66 % of children had positive Mantoux test with >10 mm induration, of which 52 (69.33%) were BCG vaccinated group and 14 (56%) in BCG unvaccinated group. Chest radiograph was abnormal in the form of hilar lymphadenopathy, non resolving pneumonia and pleural effusion in 62% cases of which 48 (64%) were vaccinated and 14 (56%) unvaccinated.

Table 2: Clincal profile of Tuberculosis in BCG vaccinated and Unvaccinated group

Type of Tuberculosis	BCG vaccinated n=75	BCG Unvaccinated n=25
Pulmonary	48(64%)	18(72%)
Primary complex	16(33.33%)	5(27.78%)
Progressive primary complex	28(58.33%)	10(55.56%)
Pleural effusion	4(8.3%)	2(11.11%)
cavitary	--	1(5.56%)
Extratpulmonary	20(26.67%)	6(24%)
Tubercular meningitis	12(60%)	4(66.67%)
Disseminated tuberculosis	7(35%)	2(33.33%)
Miliary tuberculosis	1(5%)	1(16.67%)
Skeletal	--	1(16.67%)
Tubercular lymphadenitis	7(9.33%)	1(4%)

From table 2, it is apparent that the type of tuberculosis including severe form i.e. tuberculous meningitis, disseminated tuberculosis occurred in an almost equal number in vaccinated and unvaccinated children. In Pulmonary tuberculosis, primary complex and progressive primary complex cases were diagnosed on the basis of blood count and chest radiograph.9 cases of disseminated tuberculosis were diagnosed on basis of the clinical sign, radiological appearance, ultrasonographic finding and in one patient by liver biopsy. Tubercular lymphadenitis was diagnosed by histopathology. The clinical presentation of tubercular meningitis in the vaccinated and unvaccinated children was different. The diagnosis of tuberculous meningitis was based on CSF analysis and CT scan findings.

DISCUSSION

India accounts for the highest TB burden country in the world. There were then 1.8 million new cases of tuberculosis in India every year of which children constitute 6-8%[1].

Primary pulmonary tuberculosis can occur at any age, but children are most often affected in areas of high prevalence and high population density. In the Present study, 41% of the cases were observed in less than 5 years of age indicating a high prevalence of tuberculosis in the younger age group. Narain et al[4] in their study found that the prevalence of tuberculosis in 38.9% children below 4 years of age, while Chakraborty et al[5] reported in 54.333% cases.

In our study, there is female (56%) predominance over male while study done by Kumar B et al[6], Mishra UK et al[7] found a male predominance with 70 %, 74% respectively, is due to socio-cultural bias prevalent in the region against the female child and discrimination in food or something else needs further evaluation.

History of contact was present in 42% of cases, it is in accordance with the study done by Gupta B K et al[8] and Gurses et al[9].However, Waecker and Connor [10] reported that an adult source of contact was identified in 70% of cases of children with tubercular meningitis. Thus it is important that the patient should be questioned persistently about contact with a person with tuberculosis. There was no significant difference in the pulmonary or extrapulmonary type of tuberculosis in the two groups. Our results are comparable with the study done by Raghuraman TS et al[11], Narain R et al[4], and Chakraborty AK et al[5] Somu et al[12] observed that tubercular meningitis was seen in the ratio of 1:3 among the BCG vaccinated and unvaccinated children.

CONCLUSION

Our study showed a higher incidence of pulmonary tuberculosis in BCG vaccinated children. In extra pulmonary group, higher incidence of tubercular meningitis was seen in BCG unvaccinated children. The risk factors are low socioeconomic group and poor immunization coverage. So these factors should be taken into consideration in order to reduce morbidity and mortality due to tuberculosis.

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