

## ORIGINAL ARTICLE

## Correlation of Tuberculin Conversion In Children Beyond 5 Years of Age With Active Tuberculous Infection

by

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### ABSTRACT

*Tuberculosis is a serious and crippling disease in children. It can be fatal. It takes a benign or a latent course in childhood, as it lies dormant and may flare up during adolescence. Female children are more prone during onset of menstruation. Contact with a patient of tuberculosis is present in about 22% children. Children with a history of measles in the recent past are more susceptible to get the tuberculous infection. There is no correlation between the size of tuberculin reaction and the severity of the disease. Parenchymatous lesions of the lungs are not that common as those of intrathoracic lymph nodes.*

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Tuberculin testing is an important aid in the diagnosis of tuberculosis in childhood. Tuberculosis remains dormant without producing any recognizable signs and symptoms. The symptoms of active pulmonary tuberculosis like persistent fever, cough and loss of weight as seen in adults are absent in children in early stages. The symptoms appear only when the disease has progressed to a considerable extent.

Early diagnosis is a must to prevent mortality and morbidity from this infection. Tuberculin testing is the main tool in the diagnosis of tuberculosis.

A study was done to this effect in Safdarjang Hospital. 778 children between the age of 5 to 12 years formed the subject of study.

A detailed history with special reference to a past history of measles, pertussis or tuberculosis and a family history of tuberculosis was obtained in every case. A thorough physical examination was done in each child making a specific note of the presence or otherwise of the B.C.G.

#### Vaccination scar.

All the children were given 0.1 ml of P.P.D. (1 Tu per 0.1 ml. containing RT 23 with 0.005% of Tween 80) prepared at the B.C.G. Vaccine Laboratory Madras.

A public health nurse who was specially trained in the technique of doing the Mantoux test assisted in the study. The results were noted independently and cross checked for accuracy at random.

An induration of 10 m.m. or above was taken as positive. The children were classified into two groups for the purpose of follow up.

- (A) Group I. Children with positive Mantoux and symptomatology.
- (B) Children with positive Mantoux but who were asymptomatic.

Children in Group I were investigated fully while nothing further was done for Group II.

Criteria for symptomatic children were unexplained fever, persistent loss of weight, intercurrent upper respiratory tract infections, anorexia, tiredness, change of disposition and abdominal pain or a subjective feeling of 'not feeling well' of more than one month's duration were taken as significant. Manifestations and pointers of extra thoracic tuberculosis like cervical lymphadenopathy, abdominal pain and meningitis were also kept in mind.

Haemoglobin, total and differential leucocyte count, X-Ray of chest P.A. view and if required lateral view, X Rays of bones and abdomen where-ever required were done. Sputum was examined by direct smear and culture methods. Wherever sputum was not available, swallowed sputum by gastric aspiration early in the morning was examined. A gland biopsy or a C.S.F. examination were done whenever required.

### RESULTS

Out of 778 children, 106 had a positive Mantoux.

Eleven children did not report for further investigations. Out of the remaining 95 children, 54 were in good health and had nothing incriminating except a positive Mantoux which measured between 10–20 m.m. and hence were not considered to have active tuberculosis.

Following is the analysis of the remaining 41 children who had symptoms as described above for a period of more than one month. Mantoux was positive measuring 16–20 m.m. in 11 and 21–30 m.m. in 30 of them. Two had ulceration and one had blister formation.

They belonged to class III to class VI of the socio-economic status according to the I.C.M.R. classification.

Symptoms lasting for over a month or more were considered significant.

Cough, fever and loss of appetite were the significant symptoms but many of them had multiple symptoms. Exposure to tuberculosis in the form of a positive family history was present in about 22% of children.

Past history of measles was available in 34% of children and 20% had measles, within 6 weeks of doing the Mantoux test.

Table 1. Radiological Abnormalities

I. Glandular Enlargement	6
a) Paratracheal	5
b) Hilar	1
II. Parenchymatous Lesions	3
III. Glandular and Parenchymatous lesions	3
IV. Calcification	9

Evidence of bone tuberculosis was found in three cases.

Most of the children were underweight. Eighteen children were below the 10-th percentile based on ICMR studies on growth and development of Indian children.

Significant lymphadenopathy was detected in fifteen children. Cervical glands above were enlarged in 20 cases. Matting was found in 3 and sinuses in two of these 10 cases. Generalized *lymphadenopathy* was present in 4 children and two had convulsions.

**Laboratory Investigations**

68% of the children had a haemoglobin value of less than 10 Gm% and E.S.R. was raised above 30 m.m. in 51% of children. Sputum was positive for acid fast bacilli in 5% of children. One had a cavity on the left side and the other had diffuse parenchymatous lesion on both sides of the chest. C.S.F. smear showed A.F.B. on direct smear examination in one child. Shiagrams of the chest were abnormal in 51% of cases. The analysis is shown in Table 1.

Table 2. Distribution of parenchymatous Lesion.

Heterogenous shadows	2
Consolidation	2
Broncho-pneumonia	1
Cavity formation	1

Lymphnode biopsy was done whenever there was significant lymphadenopathy. Out of the 15 cases, it was unsuccessful in 3. Analysis showed tubercular lymphadenitis in 7, chronic inflammation with fibrosis in 1 and reactive hyperplasia in 4 of them.

Family survey was carried out in all the 41 children. X-Ray of the chest was

taken in all adult members of the family and Mantoux test was done in all children in addition to X-Ray Chest. In 25% children one or the other member of the family had radiological evidence of the disease. In one family all the four brothers had a positive Mantoux's test and mother was being treated for tuberculosis.

**COMMENTS**

Incidence of positive Mantoux in the present study in children above the age of 5 years was 18.3%. Similar results are reported by Miller et al (1960), Ukil (1933) and Basy et al (1959).

History of contact with a patient was available in 22% of cases. Tuberculous disease in children is always the outcome of adult tuberculosis. In 80% of cases contact was not detectable but it does not exclude the possibility of occurrence of the disease. Incidence of male children is more in the present study. 19.4%, were male reactors whereas female reactors were only 16.4%.

34% of children belonged to the age group of 11–12 years. The females outnumbered the males and is probably due to hormonal disturbances accompanying sexual

development and onset of menstruation. All the children belonged to Class III to Class VI of socio-economic status. (I.C.M.R. Classification). This is in conformity with the studies of Manchanda, (1962) Ramachandran et al (1966) and Chandu (1966). It shows poverty predisposes to high incidence of tuberculosis in this country as compared to western figures. This is probably due to unreliable history and ignorance of parents about the disease. Hence a family survey becomes mandatory in every case.

History of measles in the recent past was available in 34.1% cases. Ramachandran (1968) Basu et al (1959) and Bhakoo et al (1969) reported similar findings. Whether measles acts as a precipitating factor or added risks is not clear. Cough was the commonest symptom and was present in 62.4%

of children. Fever was present in 47.6% of cases. All the children were brought to the hospital with one or the other complaint. Symptoms were considered significant only if duration was more than one month. Many of them had more than one presenting symptom. Unexplained fever with loss of weight, recurrence of episodes of upper respiratory infection, anorexia and tiredness persisting for a period of over one month were the few common complaints.

Cervical glands were enlarged in (21.1%) while 2.5% presented with generalized lymphadenopathy. The incidence of cervical glands enlargement is because of the fact that they are the first barrier which meet the tubercular bacilli and are situated near the portal of entry. Most of the children in the study were underweight. 85.4% were below the 50th percentile. Radiological changes in the skiagram of the chest were seen in 51.2% cases. They are shown in Table 3.

Table 3. Radiological Changes of the chest.

Radiological Change	% age of cases
Glandular (Paratracheal & Hilar)	14.6
Parenchymatous Lesion	7.3
Glandular & Parenchymatous	7.3
Calicified Shadows	7.3
Pleural Effusion	2.4

Incidence of clinical glandular enlargement is higher as compared to radiological enlargement of lymphnodes. It suggests that resistance met by the older children at the portal of entry of the tubercular infection is much higher than in the younger age group. There was no correlation between the severity of the tuberculin reaction and the radiological evidence of the disease. Para tracheal and hilar lymphadenopathy was present in 14.6% cases. Manchanda et al (1962) repor-

ted the incidence of intrathoracic lymphadenopathy & parenchymatous lung disease as 40% and 17.2% respectively. Shah et al (1968) reported parenchymatous lesions in 15.5% and glandular enlargement in 13.3%. These findings are quite consistent with our study.

Pleural effusion was observed in 2.4% cases. This compares well with Udani's figures (1968) & Ramachandran et al (1968) 0.27% and Bhakoo et al (1969).

## CONCLUSION

Tuberculosis is a serious and crippling disease in children. It can be fatal. It takes a benign or a latent course in childhood. It lies dormant. Symptoms of adult type of tuberculosis may be absent in children. Symptoms are vague. Diagnosis is mainly done by tuberculin testing and other aids.

Adolescents especially adolescent girls are more prone to tuberculous infection. Those children who live with an open case of tuberculous infection and those who have got a history of measles in the recent past have more chances of tuberculous infection.

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