

Pediatric Tuberculosis – What has Changed?

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In 1966, the June issue of *Indian Pediatrics* published four observational studies (clinical profile of children with lower respiratory tract disease, clinical profile of pediatric tuberculosis, histopathological profile of hepatic lesions in tuberculosis, and significance of radiological findings in evaluation of maturity in newborns). For this write-up, we selected the research paper on Tuberculosis (TB) [1]. We shall be discussing the diagnostic approach and clinical profile of pediatric TB in relation to what it was fifty years back and how these aspects have evolved over the years.

THE PAST

The study contents: Authors from Thanjavur Medical College in Tamil Nadu (India) presented data from a retrospective observational study of children (age 0-12 y) attending their outpatient TB Clinic in 1964 [1]. Children with suspected TB underwent a detailed clinical evaluation followed by a tuberculin skin test (TST) and chest radiograph. A child was registered as a case of TB if at least two of the following criterion were satisfied: clinical history suggestive of TB, positive TST and/or evidence of TB on chest X-ray. Although 450 children were registered during the 10 month study period, data were presented for 365. Maximum number of TB cases (46.8%) was observed in children aged between 0 to 2 years, followed by 43% in the 2 to 6 year olds and 10.2% in the 6- to 12-year-olds. Only 10% had a positive history of contact with TB. The clinical manifestations were: not gaining weight, decreased appetite or loss of weight (60%), irregular episodic fever (44.6%), chronic diarrhea (37.6%), lymphadenopathy (29.8%), repeated respiratory infections (27.6%), meningitis (11.8%), wheezing (9.8%), hepatomegaly (7%), lung signs (3.8%), hepatosplenomegaly (1%) and splenomegaly (0.8%). The majority (87.9%) were TST positive. Radiological



features suggestive of TB included superior mediastinal adenitis (27.1%), hilar adenitis (15%), primary complex (8.7%), progressive primary TB (24.1%), miliary mottling (0.2%), pleural effusion (0.2%) and pneumothorax (0.2%). The authors stated that a triad of failure to thrive, irregular fever and chronic diarrhea warranted tubercular workup as did more than 4 to 5 episodes of cough and cold in a year. In the article it was emphasized that a negative TST did not rule out TB, as this could be due to faulty technique, poor nutritional status or steroids. The authors stated that even radiological findings considered typical of TB were inconclusive when taken in isolation as they were also found in non-tubercular pulmonary infections. Authors concluded that children are extremely susceptible to infection from infected adults, children less than 2 years are more prone to military and meningitic TB, and dormant disease flares up with malnutrition or debilitating disease.

Historical background and past knowledge: In 1966, TB was a major health problem worldwide. In India, the overall burden was gauged by indirect parameters like an annual mortality of 500,000 people from TB [1]. Conventional means of diagnosing TB were well developed by this time. TST was discovered in the end of the nineteenth century. The Ziehl-Neelsen stain for acid-fast bacilli (AFB) was developed by the bacteriologist Franz Ziehl (1859-1926) and pathologist Friedrich Neelsen (1854-1898). The Lowenstein Jensen media was being used for culture. Radiographs started being used extensively by 1925. All these methods were being used in adults, but for children the diagnostic approach was primarily clinical. This included suspicion (evidence of contact, suggestive history and examination findings) and investigations limited to TST and the chest radiograph.

The National Tuberculosis Control Program (NTCP) was the first nationwide organized effort that was launched to tackle TB in India in 1962 that emphasized on BCG vaccination and TB treatment [2]. However, childhood TB was not given equal importance as adult TB as it was considered non-infectious, was difficult to diagnose, was assumed to be much less in magnitude, and it was assumed that effective control in adults would prevent childhood TB [3]. A lot of scientific interest was generated that was reflected by the numerous scientific papers on TB that were published in Indian Pediatrics in the mid-sixties.

THE PRESENT

Globally, pediatric TB accounts for 1 million cases per year, comprising 10-15% of all cases of TB, and is associated with more than 100,000 deaths annually. The status of a reliable public health surveillance system in India is still dismal, and till date the exact magnitude of incidence, prevalence, morbidity and mortality remains unknown. Hopefully now that the Government of India has declared Tuberculosis a 'notifiable disease' in 2012, surveillance will gradually improve [4].

Present scientific literature substantiates the observations made that tubercular infection rapidly progresses to disease in children less than 2 years of age, and children between 5-10 years are at low risk [5]. Currently the most common presentations of pediatric TB are pulmonary parenchymal disease and intrathoracic lymphadenopathy, accounting for 60-80 % cases. Over the last 50 years, several modifications of conventional methods (microscopy and culture) and many newer diagnostic tests have emerged. Despite this, accurate diagnosis of pediatric TB still remains elusive. The major challenges are difficulties in obtaining samples for bacteriological confirmation (inability to expectorate sputum), frequency of conditions that closely mimic TB, and the paucibacillary nature of childhood TB. TST is now known to have only limited application in endemic countries where most individuals acquire infection and become TST positive during childhood and adolescence.

Nonetheless, it is still included in diagnostic algorithms. Radiographs are still largely supportive and need to be correlated clinically; till date not a single pathognomonic radiological feature for TB has been found.

In 2012, the Updated National Guidelines for Pediatric Tuberculosis were formulated [3]. Besides other changes, existing diagnostic algorithms were modified to include other types of extra-pulmonary TB and the use of Cartridge-based nucleic acid amplification tests (CBNAAT) like GeneXpert, wherever available. The advantages of CBNAAT is that it detects TB within 2 hours, and also determines Rifampicin sensitivity. Presently, there are more than 600 CBNAAT machines throughout India that offer prioritized testing for pediatric samples along with patients with suspected multidrug-resistance and HIV.

The more things change, the more they remain the same! This stands true for the circumstances in which pediatricians diagnosed TB 50 years ago, and nowadays. The diagnostic approach used in pediatric TB is still a combination of epidemiological and clinical information supported by the results of a few limited investigations. However, structured diagnostic algorithms are being used and more sophisticated diagnostic modalities are available. We can only hope for a brighter TB-free future if all of us help in surveillance by diligently notifying our cases to the requisite authorities.

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