Pediatric Tuberculosis-The Grim Reality

Dr. Madhura Panditrao[1], Dr. Sunil N. Mhaske[2], Dr. Ganesh Misal[3]

[1]Post Graduate Student, [3]Senior Resident, Department of Pediatrics, Dr. Vithalrao Vikhe Patil Foundation's Medical College & Hospital, Ahmednagae - 414111

[2]Dean & Professor, Department of Pediatrics, Dr. Vithalrao Vikhe Patil Foundation's Medical College & Hospital, Ahmednagae-414111

Corresponding Author : Dr. Madhura Panditrao

Mail id : madhurapanditrao15@gmail.com

Mobile No.: 9552385053

Address : Department of Pediatrics, Dr. Vithalrao Vikhe Patil Foundation's Medical College & Hospital, Ahmednagae - 414111

Abstract :

Globally, tuberculosis (TB) continues to exact an unacceptably high toll of disease and death among children, particularly in the wake of the HIV epidemic. Increased international travel and immigration have seen childhood TB rates increase even in traditionally low burden, industrialized settings, and threaten to facilitate the emergence and spread of multi-drug resistant strains. While intense scientific and clinical research efforts into novel diagnostic, therapeutic and preventive interventions have focused on TB in adults, childhood TB has been relatively neglected. However, children are particularly vulnerable to severe disease and death following infection, and those with latent infection become the reservoir of disease reactivation in adulthood, fueling the future epidemic. Further research into the epidemiology, immune mechanisms, diagnosis, treatment and prevention of childhood TB is urgently needed. Advances in our understanding of TB in children would provide wider insights and opportunities to facilitate efforts to control this ancient disease.

Keywords: Paediatric Tuberculosis, Risk Factors, Tests for Detection

Introduction : "Children are the pioneers of our tomorrow, safeguard them to fortify their future". How often does our mind trail to the thoughts that of an otherwise squealing baby now muffling uncomfortably might possible be sign of imminent malady?

We usually have the tendency to neglect certain undoubted incidences and then bewail later when adversity finally strikes. A very evident alteration in behavior and appearance is the first sign to raise our guards. Reduced playfulness, apparent weight loss, persistent fever, and breathlessness are the prominent prodromes of thriving illness. Children are more prone to getting infections because they yet have not developed their protective immunity. Also, toddlers are exposed to the risk as they are always surrounded by people and are in contact with many other children, thus transmission of infection becomes easy. One such threat which is arising predominantly among the young is Tuberculosis termed as Paediatric TB.

Paediatric TB has always been an entity that has probably not been given the importance it deserves, compared to its adult counterpart. This is partly attributable to the fact that the actual burden of pediatric TB is unknown. However, it has been postulated that 10% of the total TB burden is probably found in children. Worldwide, approximately 1 million new cases of pediatric TB are believed to occur every year; in itself accounting for as much as 10–15% of all TB cases; with more than 100,000 estimated deaths being attributed every year.[(1)] In the Indian context, a study published in the year 2009 that utilized data from the Chennai-based National Institute for Research in TB found that only an appalling 14% of child contacts were actually screened and only 19% of these were actually initiated on subsequent isoniazid preventive therapy.[(2)] The present study revealed that Paediatric TB accounted for over 20% of the TB burden in our center, which validates the viewpoint that there exists an unidentified pediatric TB populace. Due to the ever-increasing rates of TB, India has initiated a National Strategic Plan for TB Elimination that aims to attain its goals from 2017 to 2025.

TB is an airborne infection caused by the inhalational of droplet nuclei contaminated with an acid-fast bacillus, Mycobacterium tuberculosis, which are disease causing

pathogens. Although TB is preventable and curable disease, most of the cases go unrecognized and are left untreated due to nonspecific symptoms and difficulty in diagnosis. Owing to this, childhood TB has been termed as "hidden epidemic" as per the World Health Organization [WHO] about 10 lakh children are being infected with TB each year.[3]

Adults-primary cause of Paediatric TB : Young children are prone to infection because their immune system is not as strong and developed as the adults. When such infant and children are exposed to an adult with active TB, they contract the TB bacilli. Childhood tuberculosis is usually considered as a primary infection because they are exposed to the bacilli they are a higher risk of developing disseminated i.e. miliary TB, TB meningitis and extrapulmonary manifestation. If a child is diagnosed with active TB it is advised to investigate the family to analyze the source of infections.[4]

Risk factors : High causing lows ! Children are at a higher risk of contracting the TB infection and developing active YB.[5]

- contract with infected adults, with active TB
- poor hygienic conditions
- Having latent stage TB infections HIV patients with a weakened immunity
- Infants below 3 years of age, and adolescents before or during puberty are more prone.

Pulmonary tuberculosis : A condition where the child's lungs are infected. The manifestations are shown according to specificity. Endobronchial TB, it is the infections of tracheobronchial tree i.e. branching tree from the larynx to lungs. Symptoms include bronchial obstruction, vocal cord paralysis and hemi-diaphragmatic paralysis. Progressive primary pulmonary TB, it is infections of functional parts of the pulmonary system and its sign and symptoms include pneumonia air trapping.[6]

Extrapulmonary tuberculosis (EPTB) : It is infections outside the lungs; children appear to have higher tendency of developing this form of TB. The manifestations are shown according to specificity-Lymphadenopathy it involves anterior or posterior cervical and supraclavicular lymph nodes. TB meningitis it develops mostly in children younger than 2years moderately acute signs occurs after 3 to 6 months of initial infections anorexia, weight loss, fever, vomiting, seizures and alterations in sensory apparatus. Extreme conditions may cause major neurological defect including coma and abnormal movements.[6]

WHO estimated that out of 13 lakh pediatric TB cases only 13% turn out to be eligible for preventive measures.[5] These statistics showcase the seriousness of early diagnosis because earlier infections are detected, the better will be its treatment and prognosis.

Tests for detections of TB includes[7]

1) Radiology this method is not specifically diagnostic but radiological finding are important for TB meningitis. Lymphadenopathy, hilar adenopathy are the most common abnormalities identified by chest radiography.

2) Immunology :

- Tuberculin skin test (Mantoux test)-detects presence of tuberculosis infections by studying the reaction of the patient's body to PPD upon injecting an in tradermally small amount of tuberculin protein (PPD).
- TB culture and drug susceptibility test- culturing of mycobacteria improves to be more sensitive than smear microscopy, and it can also allow subsequent characterization of the strain and drug susceptibility testing(DST).
- TB PCR, it is a nucleic acid based test which detects specific DNA of M TB, and technique has greater sensitivity than conventional diagnostic technique. Along with sputum, it can also be used for EPTB sample such as gastric aspirate, plural fluid and CSF.
- CBNAAT (gene expert MTB /RIF) is an automated, TB specific that uses real time PCR for rapid detection of TB, as well as rifampicin resistance which counts as a surrogate marker for MDR TB. Sample preparation, amplification done by automation and results are rapid. It aids in diagnosing pulmonary TB.

- MDR / XDR – line probe assay technology detects genetic mutation associated with resistance to rifampicin, isoniazide (1st line MDR), fluroquinolones and amino glycosides (2nd line XDR).

The relationship between children and every other family member is based on pillars of care and law, and our support is based we can give in such a critical time of our lives. At our extent awareness and knowledge is a crucial factor for precautionary measures. TB is a curable disease and its early diagnosis is the path to wellbeing!

References :

1. Gedam DS, Patel U. Childhood tuberculosis: Current scenario in India. Pediatr Rev Int J Pediatr Res 2014;1.
2. Banu Rekha VV, Jagarajamma K, Wares F, Chandrasekaran V, Swaminathan S. Contact screening and chemoprophylaxis in India's Revised Tuberculosis Control Programme: A situational analysis. Int J Tuberc Lung Dis 2009;13:1507-12.
3. Gupta D. Strategy and way forward for TB elimination. Indian J Tuberc 2018;65:4-5.
4. Swaminathan S, Rekha B. Pediatric tuberculosis: Global overview and challenges. Clin Infect Dis 2010;50
5. Global tuberculosis report 2017.Geneva: World ealthOrganization;2017.Licence:CCBY-NCSA3.0 IGO
6. Childhood TB, World Health Organization, 2016, December
7. "Childhood TB: Training Toolkit", WHO, Geneva, 2014