ORIGINAL RESEARCH PAPER
Volume-9 | Issue-1 | January-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICAL PROFILE OF PEDIATRIC TUBERCULOSIS PATIENTS WITH REFERENCE TO DIFFERENT DIAGNOSTIC SCORING SYSTEMS.

Pediatrics

Dr. Kinjal Patel Pediatric resident
Dr. Anil Katara* MD Pediatrics *Corresponding Author

ABSTRACT

Tuberculosis is one of the most common cause of morbidity and mortality among worldwide mainly in developing countries. The World Health Organization reported that about 1 million children develop TB each year out of total 10 million TB cases.
Aims: to study clinical profile of patients of tuberculosis and applicability of different scoring systems.
Material and methodology: cross sectional study performed over a period of 2 years. 40 hospitalized pediatric patients of tuberculosis were evaluated in accordance with 4 different diagnostic scoring systems.
Results: more incidence of TB in less than 5 year of age. Most common presenting complain was fever followed by cough and weight loss. Around ¾ children were severely malnourished. Moderate anemia and high value of ESR was observed in almost all cases. Amongst 4 scoring systems MKJS showed good reliability and sensitivity (95%).

KEYWORDS

pediatric tuberculosis, scoring systems.

INTRODUCTION

Tuberculosis (TB) is an old disease – studies of human skeletons show that it has affected humans for thousands of years – but its cause remained unknown until Dr Robert Koch announced his discovery of the bacillus subsequently named Mycobacterium tuberculosis[1].

Tuberculosis is one of the top 10 causes of death worldwide and the leading cause of death from a single infectious agent (ranking above HIV/AIDS)[2].

World Health Organization (WHO) reports that about two billion i.e. nearly one third of the world's population is currently infected with mycobacterium tuberculosis. Developing countries account for 95% of the burden of tuberculosis (TB) and 99% of the TB mortality reported worldwide[3].

According to India TB report 2019 0.1 million paediatric TB cases were notified from 2.1 million total Tb cases[4].

The consolidated goal for health is SDG 3, which is defined as "Ensure healthy lives and promote wellbeing for all at all ages". Thirteen targets have been set for this goal and one of these targets, Target 3.3 explicitly mentions TB[5].

Diagnostic tests for TB disease include sputum smear microscopy (developed more than 100 years ago), rapid molecular tests (first endorsed by WHO in 2010) and culture-based methods; the latter take up to 12 weeks to provide results but remain the reference standard. TB that is resistant to first-line and second-line anti-TB drugs can be detected using rapid tests, culture methods and sequencing technologies[6].

The number of TB cases occurring each year (and thus the number of TB-related deaths) can be driven down by reducing the prevalence of health-related risk factors for TB (e.g. smoking, diabetes and HIV infection), providing preventive treatment to people with a latent TB infection, and action on broader determinants of TB infection and disease (e.g. Poverty, housing quality and undernutrition)[3].

Adequate diagnosis of paediatric tuberculosis is difficult because of the lack of sputum production and paucity or absence of organisms in respiratory secretions, since tuberculosis bacilli typically remain confined to perihilar nodes that do not rupture into the bronchus[7].

Even today we still mainly depend on tools available since the 1950s to presumptively diagnose paediatric tuberculosis: purified protein derivative (PPD) skin test, chest radiography, history and physical examination usually without bacteriological confirmation[7].

Compounding this difficulty with diagnosis is the fact that children with TB often come from families that are poor, lack knowledge about the disease and live in communities with limited access to health services. Another compelling reason is that TB is important in the context of children's overall survival. We do not know the extent to which TB is a cause of childhood deaths that are reported in global statistics as deaths due to HIV, pneumonia, malnutrition or meningitis, but the number is likely to be substantial. Physicians often rely on poorly validated scoring systems for TB diagnosis.

Therefore this study was done to evaluate various paediatric tuberculosis score charts for their effectiveness in the diagnosis of TB in the paediatric department of my institution.

Aims and Objectives:

a) To study the clinical profile of pediatric Tuberculosis patients.
b) To study the validity and sensitivity of different scoring systems.

Materials and methodology:

It was a cross sectional study, performed during a period of 2 years.

- **Inclusion criteria-**

Patients between ages 1-12 years with clinically suspected tuberculosis.

(-Children with more than three weeks of respiratory symptoms, with chest X-ray (CXR) findings suggestive of TB, and persistence of CXR findings after 10 days of antibiotic therapy were diagnosed with pulmonary TB.

- Lymphocytic exudative fluid in serous cavity with clinical signs was considered as TB of that particular serous cavity (pleural, pericardial, meningeal, or ascites).
- TB lymphadenopathy was confirmed by FNAC and demonstration of acid fast bacilli (AFB).
- Miliary TB was diagnosed by typical clinical picture, miliary shadow in CXR, and absence of peripheral blood eosinophilia.
- Disseminated TB was diagnosed when diseases involved more than two noncontiguous organs, and TB was confirmed in at least one organ.)

- **Exclusion criteria**:

Infants and children above 12 years of age.

After taking verbal informed consent of guardians of subjects, proforma was filled with case file details, symptomatology and subjects were examined for generalized and localized signs.

- Various scoring systems were applied for diagnosis and results compared.
- Conclusions was drawn using appropriate statistical methods.
- Total 40 hospitalized patients of tuberculosis were evaluated in accordance with 4 different diagnostic scoring systems,

(1) Keith Edward score system
(2) Score system for diagnosis of pulmonary tuberculosis in children.

Ministry of Health, Brazil.
(3) International Union Against Tuberculous Lung Disease score system.
(4) Modified Kenneth Jones Scoring Criteria.

Observations and analysis:
Total 40 patients were included in my study. Almost all patients were coming from class 3 & 4 socioeconomic status according to modified Prasad scale.

Table 1: gender distribution of subjects according to age group:

Age	1-5years	>5years	Total
Male	17(81%)	4(19%)	21(52.5%)
Female	12(63.2%)	7(36.8%)	19(47.5%)
Total	29(72.5%)	11(27.5%)	40(100%)

Male: female ratio was 1:1.1.occurence of TB was more common in children less than 5 years of age because younger children are more prone to get infected.

Table 2: presenting symptoms according to age group:

clinical features (n=40)	1-5 years	>5 years	Total
High grade Fever	10(34.5%)	5(45.5%)	15(37.5%)
Low grade fever	19(65.5%)	6(54.5%)	25(62.5%)
Cough	27(93%)	9(81.2%)	36(90%)
diff. in breathing	17(58.6%)	3(27%)	20(50%)
weight loss	22(75.8%)	8(72.7%)	30(75%)

Fever was present in all cases. Most common presenting complain was fever followed by cough and weight loss in both age group.

13(44.8%) children from 1-5 year age group and 3 (27.3%) children from >5 years age group had history of TB contact.

Table 3: general examination in association with age group:

SIGNS	1-5 years	>5 years	Total
Pallor	28(96.6%)	8(72.7%)	36(90%)
Cynosis	0	0	0
Clubbing	1(3.4%)	0	1(2.5%)
Jaundice	1(3.4%)	1(9%)	2(5%)
Edema	1(3.4%)	7(63.6%)	8(20%)

Pallor was present in 90% of cases. Edema was present in 63.6% children >5 years of age.

10 (34.5%) children were PEM grade 3 and 9(31%) were PEM grade 4 according to IAP classification in less than 5 year old children ,8 (72.7%) children were very severely underweight in > 5 year old children. Malnutrition increases the susceptibility to TB and TB causes more malnutrition.

BCG scar was present in 21(72.4%) children in 1-5 year age group, and in 10(91%) children in >5 year age group.

Table 4: systemic involvement in different age group:

Systemic signs	1-5 years	>5 years	Total
RS	25(86.2%)	7(63.6%)	32(80%)
CVS	2(6.9%)	2(18%)	4(10%)
PA	0	1(9%)	1(2.5%)
CNS	12(41.4%)	5(45.4%)	17(42.5%)

Pulmonary TB (80%) was most common followed by CNS (TBME) (42.5%) involvement.

Table 5: Investigations in different age groups:

Investigation	1-5 year	>5years	Total
Anaemia			
Mild	2(6.9%)	2(18%)	4(10%)
Moderate	19(65.5%)	6(54.5%)	25(62.5%)
Severe	7(24%)	3(27.3%)	10(25%)
High ESR	29(100%)	10(91%)	39(97.5%)
Abnormal CXR	20(68.9%)	10(91%)	30(75%)
Abnormal USG	11(37.9%)	5(45.5%)	16(40%)
Abnormal CT scan	14(48.3%)	7(63.6%)	21(52.5%)
Abnormal CSF	11(37.9%)	1(9%)	12(30%)
GA	0	3(27.3%)	3(7.5%)
FNAC	0	1(9%)	1(2.5%)
Mantoux test			
Positive	6(20.7%)	4(36.4%)	10(25%)
Negative	23(79.3%)	7(63.6%)	30(75%)

Moderate anemia and high value of ESR was observed in almost all cases.

Only 25% had positive Mantoux test.

Table 6: Different scoring systems in association with different age group:

		1-5 years	>5years	Total
Brazil score	Very likely	9(31%)	2(18.2%)	11(27.5%)
	Possible	7(24.1%)	4(36.4%)	11(27.5%)
IUATLD score		16(55.2%)	7(63.6%)	23(57.5%)
K.E score		20(69%)	7(63.6%)	27(67.5%)
M.K.J score	Probable	5(17.2%)	1(9%)	6(15%)
	unquestionable	23(79.3%)	8(72.7%)	31(77.5%)

Results showed that MKJSC has very favourable points for the applicability in resources limited developing countries like ours for early detection TB in children.

Table 7: sensitivity of different scoring systems:

Scoring system	sensitivity	95% CI	
		Lower	Upper
Brazil score	83.3%	69.8%	92.5%
IUATLD score	71.4%	57.8%	82.7%
K.E score	76.9%	63.2%	87.5%
M.K.J score	95.2%	83.8%	99.4%

In my study it was observed that Modified Kenneth Jones Scoring Criteria was having good reliability among all 4 scoring systems. Validity was also more observed in Modified Kenneth Jones Scoring Criteria with sensitivity of 95%.

Compared to Farid A et al and Mathur et al sensitivity of MKJS was 73.9% and 93%, my study it was 95%[8,9].

CONCLUSION:
For rapid and early diagnosis of TB in children, Modified Kenneth Jones Scoring Criteria is a simple and cost effective tool, which can easily be applied to improve case detection rate in children.

Present study does not support the hypothesis that MKJSC is a good alternative to confirmatory tests to diagnose tuberculosis in children. However, it concludes that it is a simple tool, which can be applied to improve the case detection rate in the absence of sophisticated tests.

REFERENCES:

1. Hershkovitz I, Donoghue HD, Minnikin DE, May H, Lee OY, Feldman M, Galili E, Spigelman M, Rothschild BM, Bar-Gal GK. Tuberculosis origin: the Neolithic scenario. Tuberculosis. 2015 Jun 1;95:S122-6.
2. Grange JM, Gandy M, Farmer P, Zumla A. Historical declines in tuberculosis: nature, nurture and the biosocial model. Int J Tuberc Lung Dis. 2001;5(3):208–12
3. WHO Report: WHO report Global tuberculosis control surveillance, Planning, financing. 2003
4. India TB report 2019
5. Assembly G. sustainable Development goals. SDGs), Transforming our world: the. 2015;2030.
6. Kumar A, Gupta D, Nagaraja SB, Singh V, Sethi GR, Prasad J. Updated national guidelines for pediatric tuberculosis in India, 2012. Indian Pediatrics. 2013 Mar 1;50(3):301-6.
7. Nelson LJ, Wells CD. Global epidemiology of childhood tuberculosis [Childhood TB]. The International journal of Tuberculosis and lung Disease. 2004 May 1;8(5):636-47.
8. Farid A, Iqbal SM, Hanif A, Sultan MA. Diagnostic accuracy of Modified Kenneth Jones Scoring Criteria (MKJSC) in confirmed cases of Tuberculosis in children. Annals of King Edward Medical University. 2013;19(2):160-.
9. Mathur HC, Saxena S, Bhardwaj RM. Evaluation of Kenneth Jones' criteria for diagnosis of childhood tuberculosis. The Indian Journal of Pediatrics. 1974 Nov 1;41(11):349-55.