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ANALYSIS OF CNS TUBERCULOSIS AMONG THE CHILDREN: A CROSS SECTIONAL STUDY

Paediatrics

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ABSTRACT

Aim: To analyse different types of CNS tuberculosis among the children.
Material and method: The present was conducted from July 2017 to June 2018 in Department of Paediatrics, JLN Medical College and associated group of Hospitals, Ajmer. All the selected patients were subjected to detailed history, general physical examination, systemic examination, hematological investigations (level of hemoglobin, total leukocyte count, and differential leukocyte count, and erythrocyte sedimentation rate), radiological investigations (chest X-ray, USG cranium, cranial CT, and magnetic resonance imaging), tuberculin sensitivity test (performed by intradermal injection of 0.1 ml purified protein derivative [PPD] containing 5 tuberculin units [PPD-5] into the volar [ventral] surface of forearm by a disposable plastic tuberculin syringe), and CSF for culture and sensitivity (gold standard).
Results: 67.7% of the cases presented with Tubercular Meningitis, 18.4% had Tuberculous Encephalopathy, 6.3% had TB Vasculopathy, 4.6% with CNS Tuberculoma, 1.5% presented with Tuberculous Brain Abscess while,1.5% with Pott's spine & Pott's paraplegia.
Conclusion: The results of the present study showed that CNS tuberculosis was most commonly diagnosed in children aged <5 years and tubercular meningitis was the most common diagnosis.

KEYWORDS

CNS, Tuberculosis, Children

INTRODUCTION:

Central nervous system (CNS) tuberculosis, particularly Tuberculous Meningitis (TBM), is the severest form of Mycobacterium tuberculosis infection, causing death or severe neurological defects in more than half of those affected, in spite of recent advancements in available anti-tuberculosis treatment. TBM results in the highest rates of morbidity and mortality out of all forms of tuberculosis[1]. A large proportion of TBM cases remain undetected and probably die without access to appropriate treatment[2]. Outcomes of CNS Tuberculosis infection include death in up to 50% of cases[3]. Survivors can suffer substantial neurological sequelae including developmental delay in children, seizures, hydrocephalus, and cranial nerve palsies[4,5].

In children, CNS TB is often the result of recently acquired infection after close contact with an infectious TB case in an adult. The epidemiology of TB in young children (<5 years old), a vulnerable population where diagnosis and treatment are most challenging, is not well understood, especially in countries with limited public health resources. Hence the present study was conducted to analyse CNS tuberculosis among the children in this part (Ajmer) of the country.

MATERIAL AND METHOD:

The present was conducted from July 2017 to June 2018 in Department of Paediatrics, JLN Medical College and associated group of Hospitals, Ajmer. The study was approved by the ethical committee of the institute. A written informed consent was obtained from the parents of the children. The subjects were included and excluded based on the following criteria's:

Inclusion Criteria:

Subjects with suspected case of CNS TB either sex who met the following criteria:

1. Patient with clinically present with vague ill health lasting 2-8 weeks prior to the development of meningeal irritation. These non specific symptoms include malaise, anorexia, fatigue, fever, myalgia and headache.
2. Child may present with stiffness of neck along with :

a. Focal neurological deficits, behavioural changes and alteration in consciousness.
b. Fever with weight loss or no weight gain
c. History of contact in last two years
d. Tuberculin skin test positivity
e. Coexistence of precipitating illness
f. Abdominal USG suggestive of tuberculosis
g. CSF findings consistent with tubercular meningitis
h. Cranial CT suggestive of tuberculoma
I. Child present with taking history of Antiretroviral Treatment

3. Patient who has not taken anti tuberculosis drugs.

EXCLUSION CRITERIA:

Subjects already on Antitubercular therapy (ATT) were excluded.

All the selected patients were subjected to detailed history, general physical examination, systemic examination, hematological investigations (level of hemoglobin, total leukocyte count, and differential leukocyte count, and erythrocyte sedimentation rate), radiological investigations (chest X-ray, USG cranium, cranial CT, and magnetic resonance imaging), tuberculin sensitivity test (performed by intradermal injection of 0.1 ml purified protein derivative [PPD] containing 5 tuberculin units [PPD-5] into the volar [ventral] surface of forearm by a disposable plastic tuberculin syringe), and CSF for culture and sensitivity (gold standard). Other relevant investigations were carried out wherever necessary to support the diagnosis. All the details of the examination were recorded on a specially designed pro forma with pre-tested information of study.

STATISTICAL ANALYSIS:

The data were coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 24 (IBM SPSS Statistics Inc., Chicago, Illinois, USA) Windows software program.

RESULTS:

Table no. 1 shows patients in the age group of 0-5 years are 37, 13 in the age group 5- 10 years and 15 in the age group 10-12 years. 55.4% of cases in our study were male while 44.6% of cases were females. Maximum number of cases belong to lower middle class with 38.5%, 33.8% were in upper lower and only 3.1% cases were of upper class. History of contact was present in 60% cases while absent in 40% of cases.

Table no. 2 shows 67.7% cases presented with Tubercular Meningitis, 18.4% had Tuberculous Encephalopathy, 6.3% had TB Vasculopathy, 4.6% with CNS Tuberculoma, 1.5% presented with Tuberculous Brain Abscess while,1.5% with Pott's spine & Pott's paraplegia.

Table 1: Age, gender, socioeconomic status and history of contact distribution among the study subjects

Age Group	N	%
0-5Years	37	56.9
5-10Years	13	20
10-12Years	15	23.1
Gender		
Male	36	55.4

Female	29	44.6
Socioeconomic Status		
Upper	2	3.1
UpperMiddle	11	16.9
LowerMiddle	25	38.5
UpperLower	22	33.8
Lower	5	7.7
Total	65	100
History of Contact		
Yes	39	60
No	26	40

Table 2: Distribution of cases according to type of CNS tuberculosis

Type	N	%
TubercularMeningitis	44	67.7
TB Vasculopathy	04	6.3
CNS Tuberculoma	03	4.6
TuberculousEncephalopathy	12	18.4
Tuberculous BrainAbscess	01	1.5
Pott'sspine & pott'sparaplegia	01	1.5
Non Osseousspinaltubrculoma	00	00
Spinal Meningitis	00	00
Total	65	100

DISCUSSION:

Despite advances in the control of tuberculosis (TB) worldwide central nervous system (CNS) TB in children continues to have a high risk of death (~20%) and neurologic sequelae in more than one-half of survivors. In the United States, CNS TB affects ~1% to 3% of all pediatric patients with TB. It is most commonly diagnosed in children aged <5 years[6,7]. Similar results were reported in the present study as 56.9% of the cases belonged to 0-5 year of age group. Moyo S et al[8] in their age related tuberculosis incidence and severity in children 5 years of age in Cape Town, South Africa.

In our study of 65 patients, 55.4% were males and 44.6% were females. Goyal G et al[9], Out of 44 patients with TBM it has been observed that 20 were male (45%) and 24 were female (55%), Male: female is 0.8:1. Amit Singh et al[10], in the study conducted among 75 clinically suspected cases of CNS Tuberculosis, male and female ratio is 0.78. Sanjay K Jain et al[11] in their study showed CNS tuberculosis in 46% female & 54% male. Al Marri M.R.H.A et al[12] in their study showed no significant difference as regards to sex distribution in childhood tuberculosis. The observation in our study was similar to previous studies.

Tuberculosis is high in children of low socio-economic groups. This is because of high prevalence of chronic pulmonary tuberculosis in adults, overcrowding, close contact with sputum positive cases, poverty and related disease, poor ventilation and unhygienic living conditions. According to Kuppuswamy Scale, 38.5% belonged to grade III. Patients belonged to grade V, IV, II & I were 7.7%, 33.8%, 16.9%, and 3.1% respectively in the present study. Sanjay K Jain et al[11] in their study showed CNS tuberculosis in 57% belonging to grade III.

In the present study, out of 65 CNS tuberculosis subjects, 67.7% presented with Tubercular Meningitis, 18.4% had Tuberculous Encephalopathy, 6.3% had TB Vasculopathy, 4.6% with CNS Tuberculoma, 1.5% presented with Tuberculous Brain Abscess while,1.5% with Pott's spine & Pott's paraplegia. Garg P et al[13] in a study documented prevalence of pulmonary tuberculosis to be 52.4% and extra pulmonary cases 47.6%.

Close contact with sputum positive cases, overcrowding and poor ventilation are known predisposing factors for tubercular infection. In the selected group of 65 patients, history of contact with CNS tuberculosis was positive in 60% and negative in 40%. Goyal G et al[9] in their study observed Contact history of tuberculosis was present in 16 patients (36%) only. 64% patients have no history of contact with tuberculosis inspite of having TBM. Sheena Gupta et al[14] in their study observed that equal history of contact positive & history of contact negative; 50%. The observations in our study and in the previous study were almost similar.

CONCLUSION:

India as a developing country is faced with challenges including costs of purchase and maintenance, infrastructure at the lower health facilities, and power shortages, thereby hindering the sustainability of this service. The WHO has however revised the purchase costs to cater for resource poor countries including India and also efforts to improve on the diagnosis of paediatric. Tuberculosis can be used as a platform to argue for better government support and commitment in managing tuberculosis among children.

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