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Original Research Article

To Examine the Clinical Characteristics and Laboratory Tests Used to Diagnose Rickettsial Fever in Paediatric Patients

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Abstract

Aim: To examine the clinical characteristics and laboratory tests used to diagnose rickettsial fever in paediatric patients.

Material and Methods: This is a retrospective study was conducted in the Department of Pediatrics, MGM Medical College, Jamshedpur, Jharkhand, India. clinical suspicion, supportive lab evidence Weil Felix, positive leukocytosis, thrombocytopenia, Clinical Suspicion was based on history of fever, non-confluent maculopapular or purpuric rash involving palms and soles, and neurological symptoms and Weil Felix test for (OX-19, 0X-2, 0X-K strains) was done on each patient of clinical suspicion. It is a slide agglutination test done according to manufacturer's instructions, from Plasma tech laboratories, Bridfort, UK. The kit tests serum dilutions from 1:20 to 1:320. Significant titer is 1:80, those with positive titer were included in our study.

Results: In our study of 9 months period, 60 patients satisfied our inclusion criteria, age ranged from 6 months to 12 years, maximum incidence in 2 to 7 years age group (70%), and male to female ratio was 1.2:1. CBC-Mean Hb was 9.3 gm/dl; Leukocytosis (>10,000 cells/mm) in 66%, thrombocytopenia (<1 lakh) was seen in 56%. CSF analysis done in 25 patients of which 10 were abnormal, sugar low in 6 cases, proteins high in 8 cases, pleocytosis in all cases with mean cell count 78 cells/mm. PT. APTT was prolonged in 5 out of 20 cases, FDP D Dimer was positive in 4 cases. Echocardiography was done in 10 cases exhibiting tachycardia with gallop rhythm, 5 of them showed myocardial involvement in form of reduced EF<50%. CT/MRI scan was done in 18 patients, of which 8 were normal, 7 had cerebral edema, and 3 with features of meningitis.5 children required mechanical ventilation, out of it 3 expired and 2 recovered well. Responses to doxy, chloramphenicol was quite good and most were afebrile by 48-72 hours. Out of total 60 cases 55 (92%) recovered well, 7% expired and 3 cases went AMA.

Conclusions: Rickettsial fever does exist in our area and its incidence is rising. The diagnosis of rickettsia should always be kept in mind for workup of exanthema Tous fever.

Keywords: laboratory tests, rickettsial fever, paediatric

Introduction

Rickettsial fever, an infectious disease caused by Rickettsia species, presents a significant health concern in paediatric populations, especially in tropical and subtropical regions. Rickettsial diseases include a variety of illnesses such as Rocky Mountain spotted fever, Mediterranean spotted fever, and typhus, which can result in severe morbidity if not promptly diagnosed and treated. The clinical presentation of rickettsial fever in children can be quite variable, often mimicking other febrile illnesses, which poses a diagnostic challenge. This necessitates a comprehensive understanding of its clinical characteristics and the application of specific laboratory tests for accurate diagnosis. [1-4] The clinical manifestations of rickettsial fever in paediatric patients are often nonspecific, leading to potential misdiagnosis. Common symptoms include high fever, headache, myalgia, and a characteristic rash that typically appears several days after the onset of fever. The rash, which can be maculopapular or petechial, often begins on the wrists and ankles before spreading centrally to the trunk. However, the presence and pattern of the rash can vary significantly, and in some cases, it may be absent altogether. [5-7] Additionally, children may exhibit gastrointestinal symptoms such as nausea, vomiting, abdominal pain, and diarrhoea, further complicating the clinical picture. Neurological manifestations, including altered mental status and seizures, can occur in severe cases, emphasizing the need for prompt recognition and intervention. Laboratory testing

plays a crucial role in the diagnosis of rickettsial fever, especially when clinical presentation is ambiguous. Initial laboratory investigations typically include complete blood count (CBC), liver function tests, and renal function tests. Common findings may include leukopenia, thrombocytopenia, and elevated liver enzymes, though these are nonspecific and can overlap with other febrile illnesses. Serological testing remains a cornerstone in the diagnosis of rickettsial infections. Indirect immunofluorescence assay (IFA) is considered the gold standard, allowing for the detection of specific antibodies against Rickettsia species. A fourfold increase in antibody titers between acute and convalescent samples is diagnostic. However, serological tests often show positive results only after the first week of illness, limiting their utility in early diagnosis. Polymerase chain reaction (PCR) has emerged as a valuable tool for the early detection of rickettsial DNA in blood or tissue samples. PCR provides a rapid and specific diagnosis, facilitating early initiation of appropriate antibiotic therapy. Additionally, PCR can differentiate between various Rickettsia species, aiding in epidemiological tracking and understanding of disease patterns. [8-12]

Material and methods

This is a retrospective study was conducted in the Department of Pediatrics, MGM Medical College, Jamshedpur, Jharkhand, India for one year. clinical suspicion, supportive lab evidence Weil Felix, positive leukocytosis, thrombocytopenia, Clinical Suspicion was based on history of fever, non confluent maculopapular or purpuric rash involving palms and soles, and neurological symptoms and Weil Felix test for (OX-19, 0X-2, 0X-K strains) was done on each patient of clinical suspicion. It is a slide agglutination test done according to manufacturer's instructions, from Plasma tech laboratories, Bridfort, UK. The kit tests serum dilutions from 1:20 to 1:320. Significant titer is 1:80, those with positive titer were included in our study. On admission, data of age, sex, local residing area, exposure to animals, etc. was recorded and, -complete blood count, -malarial parasite, -urine exam. was done on all patients. CSF, electrolytes, chest –X-ray, USG, dengue IgM, CT scan done as and when needed. All patients were treated with: chloramphenicol (100 mg/kg/day) in 3 divided doses. or doxycycline (5 mg/kg/day) as single dose or in some cases both drugs were given.

Results

In our study of 9 months period, 60 patients satisfied our inclusion criteria, age ranged from 6 months to 12 years, maximum incidence in 2 to 7 years age group (70%), and male to female ratio was 1.2:1.

Table No-1: Major presenting symptoms.

Sr.	Clinical features	No. of cases	Percentage
1	Fever	60	100
2	Hepatosplenomegaly	39	65
3	GI upset	15	25
4	Convulsions	20	34
5	Altered sensorium	35	58
6	Pain in legs	6	10
7	Purpuric rash	49	82
8	Upper GI bleeding	4	7
9	Pneumonia	3	5

Table No-2: Investigations.

INV	Value	No	%
Mean HB	9.3%		
Leukocytosis	> 10,000 cell/mm	40	66
Thrombocytopenia	>100,000	33	56

CBC-Mean Hb was 9.3 gm/dl; Leukocytosis (>10,000 cells/mm) in 66%, thrombocytopenia (<1 lakh) was seen in 56%. CSF analysis done in 25 patients of which 10 were abnormal, sugar low in 6 cases, proteins high in 8 cases, pleocytosis in all cases with mean cell count 78 cells/mm.

Table No-3: CSF analysis.

CSF feature	No	%
Sugar low	6	10
Protein high	8	13
Pleocytosis	60	100

Other lab parameters:

Coagulation studies-PT.APTT was prolonged in 5 out of 20 cases, FDP D Dimer was positive in 4 cases.

Echocardiography – was done in 10 cases exhibiting tachycardia with gallop rhythm, 5 of them showed myocardial involvement in form of reduced EF<50%.

CT/MRI- scan was done in 18 patients, of which 8 were normal, 7 had cerebral edema, and 3 with features of meningitis.

Outcome- 5 children required mechanical ventilation, out of it 3 expired and 2 recovered well. Responses to doxy, chloramphenicol was quite good and most were afebrile by 48-72 hours. Out of total 60 cases 55 (92%) recovered well, 7% expired and 3 cases went AMA.

Discussion

Rickettsial diseases are an important but often under recognized cause of febrile illness locally. Of the wide range of rickettsial diseases, typhus disease is the most commonly recognized entity in our area. In our study age of presentation ranged from 6 months to 12 years, with mean age of 7 yrs, there was no statistically significant sex difference. This is similar to Colomba et. al[11] & Nigwekar P et. al [12] who showed median age of 5yrs and 6 yrs respectively with no significant sex deference. Majority of patients presented with fever (100%), purpuric rash was seen in 82%, which is similar to Colomba et. al [11] & Nigwekar P et. Al.[12] Altered sensorium was seen in 58 % which is much more as compared with Mahajan et. al[13] (24%) &. Seizures were seen 34% in comparison to Mahajan et. Al.[13] (19%) & Nigwekar P et. al [12] (36%). Hepatosplenomegaly was seen in 65 % as compared with Mahajan et. al [13](43%) & Nigwekar P et. al [12] (34%). Other investigations: In our study CSF examination was done in 25 patients of which 10 had abnormal findings, 6 showed low sugar and 8 high protein. This proves CNS involvement in rickettsial fever. In our study according to the Weil Felix titers, most probable disease would be tick borne spotted fever or epidemic typhus, since no louse infestation (the scalp and body infestation, lymphadenopathy) was seen in any of the patients, and most of them were from rural areas more chances of tick infestation. Hence tick borne spotted fever is most likely cause but still further definitive investigations like PCR should be done to detect the different rickettsial organisms. Weil Felix test still remains the most commonly used serological test. It may give false positive reactions with Proteus sp., Leptospirosis, Borrelia and severe liver disease. It is negative for R.pox, R. quintana, with brill- zinsser disease. Even though sensitivity and WF test is low there are several reports which suggest good co- relation of it with clinical suspicion and other tests. Immunofluorescent Assay is taken as gold standard test as it is most sensitive and most specific, but it is too costly for us and even not available easily. The patients with late presentation were in altered sensorium, with predominant neurological features. They had poor outcome as compared to those who had received doxycycline prophylactically.

Conclusions

Rickettsial fever does exist in our area and its incidence is rising. The diagnosis of rickettsia should always be kept in mind for workup of exanthema Tous fever. High index of clinical suspicion and good laboratory co- relation are helpful in detection of more no of cases. Early diagnosis and treatment with doxy and chloramphenicol can reduce the hospital stay and cost. Associated mixed infections may mislead diagnosis and are more fatal. Weil Felix test is not diagnostic standard. It should be interpreted in good clinical context, still it is easily available to all & remains good screening test. Use of empirical treatment may be considered to reduce the morbidity and mortality observed with this disease.

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