Original Research Article

Rickettsial fever in paediatric patients: Clinical profile and laboratory investigations

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Abstract

Background: Rickettsial infections are the most covert re-emerging infections in present times. Initial diagnosis and treatment should be based on a high index of suspicion and appropriate clinical features. **Aim:** To know various clinical manifestations and laboratory diagnosis of Rickettsial disease in different pediatric age group. **Material and Methods:** A total of 43 cases who were admitted with complaints of fever and presence of one or more of the clinical features of Rickettsial infection. Laboratory investigations including Weil-Felix test were done. Rathi Goodman Aghai (RGA) clinical scoring system for spotted fever group was done. **Results:** Fever was seen as major presenting symptom (100%) followed by maculopapular rash (76.7%), the rash appeared 46-96 hr after fever in 72.1% of cases, conjunctival congestion (55.8%), rash on palms and soles (34.9%), pedal edema (34.9%),purpura (14%) were seen. Laboratory findings showed thrombocytopenia and hyponatremia in 30.2% each. Weil Felix positivity was seen in 72.10% of the case. **Conclusion:** A proper history and careful physical examination help in the diagnosis of Rickettsial disease. Laboratory tests can be carried out to support the diagnosis. Weil-Felix test can be carried out for early detection of suspicious case in resource limited set up.

Key Words: Rickettsial infection, maculopapular rash, thrombocytopenia, Weil-Felix test.

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INTRODUCTION

Rickettsial infections are the most covert re-emerging infections in present times. They are incapacitating and notoriously difficult to diagnose, if untreated fatality rate is as high as 30-35%. If diagnosed properly they are easily treatable. Because of nonspecific signs and symptoms and non-availability of sensitive and specific diagnostic tests, these are difficult to diagnose.[1] The diagnosis of a rickettsial illness is confirmed by serological testing. But serological evidence of infection occurs not earlier than second week of illness and hence a specific diagnosis may not be available until after the patient has fully recovered or worsened.[1-3]Immunofluorescence Assay (IFA) is the gold standard test for serodiagnosis of rickettsial disease which detects IgG and IgM antibodies, but main drawbacks of IFA is that it is very expensive and not widely available.[2,3] Weil-Felix (WF) test is classic serological test which is widely available but not widely acceptable because of its low sensitivity and specificity. But in developing countries where specific diagnostic tests are not widely available WF can be used as screening test.[4] The test should be interpreted in conjugation with history and clinical presentation. Initial diagnosis and treatment should be based on a high index of suspicion and appropriate clinical features. The present study was conducted to know various clinical manifestations and laboratory diagnosis of Rickettsial disease in different pediatric age group so that it can be diagnosed early with high index of suspicion and specific treatment is initiated to prevent mortality.

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MATERIAL AND METHODS

Data was collected from patients and/or their reliable informants who were admitted in Pediatric ward/Pediatric Intensive Care unit at SSMC hospital, Tumkur. A total of 43 cases who were admitted with complaints of fever and presence of one or more of the following clinical features: Rash, edema, eschar, hepatosplenomegaly, lymphadenopathy, History of contact with pets and history of tick bite. Tick exposure was said to occur when ticks were seen on clothes of child or inside the house or history of playing in an area where ticks were seen.

Inclusion Criteria

- Children less than 18 yrs of age
- Hospitalized children with fever and presence of one or more of the following clinical features: Rash, edema, eschar, hepatosplenomegaly and lymphadenopathy.
- History of contact with pets or livestocks and history of tick bite.

Exclusion Criteria

- When cause of fever is established.
- Reliable informant not available.
- Refusal for admission

Questions were asked regarding symptoms and signs to patients and relevant investigations carried out based on Rathi Goodman Aghai(RGA) clinical scoring system for spotted fever group.[5]

Statistical Analysis: Data collected was entered in Microsoft excel and analysed using EpiInfo 3.5.3 software. Descriptive statistics like proportion was calculated. Chi-square test was used as test of significance.

RESULTS

In the present study maximum number of cases[23] were in school going age group i.e., 53.5%. In sex wise distribution, more number of cases i.e., 67.4% were male as compared to 32.6% females. Maximum percentage of cases i.e., 88.4% were from rural areas whereas urbans contributed to only 11.6%.

Table 1: Distribution of cases

Characteristics	Frequency	Percentage
Age		
Infant	1	2.3%
Preschool	19	44.2%
School going	23	53.5%
Sex		
Male	29	67.4%
Female	14	32.6%
Residence		
Rural	38	88.4%
Urban	5	11.6%
Tick exposure		
Yes	38	88.4%
No	5	11.6%
Tick bite		
Yes	19	44.2%
No	24	55.8%

Thirty-eight (88.4%) cases had exposure to ticks in the present study and 11.6% were not exposed to ticks. Tick bite could be demonstrated in 19 (44.2%) cases and in 55.8% cases it was not present.

Table 2: Clinical manifestations

Clinical Features	Present	%	Absent	%	Total
Conjunctival congestion	24	55.8%	19	44.2%	43
Maculopapular rash	33	76.7%	10	23.3%	43
Purpura	6	14%	37	86%	43
Rash 46-96hr after fever	31	72.1%	12	27.9%	43
Pedal edema	15	34.9%	28	65.1%	43
Rash on palms/soles	15	34.9%	28	65.1%	43
Hepatomegaly	21	48.8%	22	51.2%	43
Lymphadenopathy	37	86%	6	14%	43

Based on clinical features, lymphadenopathy was seen mainly 86%, followed by maculopapular rash 76.7%, rash appearing 46-96 hrs after fever (72.1%), conjunctival congestion (55.8%), hepatomegaly (48.8%), rash on palms and soles, pedal edema (34.9%) andpurpura in 14% of cases.

Table 3: Laboratory Investigations

Investigations	Present	%	Absent	%
Hb<9gm%	5	11.6%	38	88.4%
Platelet <1.5 lakh	13	30.2%	30	69.8%
CRP>50mg	11	25.6%	32	74.4%
Serum albumin <3gm/dl	5	11.6%	38	88.4%
Urine albumin >2	3	7%	40	93%
SGPT>1000u/l	5	11.6%	38	88.4%
Serum Na<130 meq/l	13	30.2%	30	69.8%
Positive Weil-Felix test	31	72.1%	12	27.9%

In hematological reports, platelets < 1.5 lakh was seen in 30.2% cases followed by Hb<9 gm% in 11.6%. Biochemical investigations showed serum Sodium <130meq/L in 30.20%, serum albumin <3 gm/dl in 11.6%, SGPT >1000U/L in 11.6% and urine albumin >2 in 7% of cases. CRP>50 in 25.60%. In the study, out of 43 suspected cases, Weil-Felix test was positive in 31 cases (72.1%) and negative in 12 cases (27.9%).

DISCUSSION

Rickettsial infections are one of the important causes of fever of unknown origin (FUO) and this needs to be differentiated from other febrile illnesses. Rickettsial diseases may pose a serious threat to public health if not diagnosed or misdiagnosed. Rickettsial diseases have been reported from various districts in Karnataka[2,6,7] i.e.,

Davangere, Chitradurga, Bellary and Bangalore which are neighbouring districts of Tumkur where the present study was conducted. In the present study fever was present in all cases i.e., 100%, the duration of fever was usually for 3-5 days, high grade. All other causes of fever were ruled out. This was consistent with a study done by Palanivel *et al* were fever was seen in all children i.e., 67 cases.[8]A study done by Inamdar S *et al* also said that fever was most common symptom.[6] Another study by Udayan U *et al* said that most common clinical symptom was fever.[9]Study by Dass R *et al* also concluded that fever was most common clinical presentation.[10] Rathi N *et al* did a study which showed that fever of undetermined origin was most frequent presentation of Rickettsial Fever.[1] In the current study lymphadenopathy accounted for 86% of cases next to fever. This was consistent with a study done by Rathi N *et al*[1]and Sirisanthan V *et al.*[11] Study by Palanivel S *et al* had observed lymphadenopathy in 59.7% of cases in their study.[8]A study by Inamdar *et al* reported lymphadenopathy in 52.5% of cases.[6]Maculopapular rash was seen in a total of 33 cases i.e., 76.7% in present study, though rash is more consistent with Rickettsial Fever it appeared only after 46 – 96 hr which accounted for 72.1% of cases. This feature was similar to the studies done by Rathi N *et al*,[1,5] Walker DH *et al*,[12] Sexton DJ *et al*.[13]Study by Kulkarni A observed that skin rash is usually not present till 2-4 days of illness.[2]Rash was noted over palms and soles in 34.9% of cases. A study by Rathi N quoted that presence of rash over palms and soles was typical of rickettsial disease.[1]This feature of rash was also supported by Murali N *et al*.[14]Conjunctival congestion was seen in 55.8% of cases in present study, which was contrary to a study by Dass R *et al* where it was noted only in 8.3% of cases and Kamarasu K *et al* which reported in 25% of cases.[10,15] In the present study hepatomegaly was seen in 48.8% of cases. No cases of splenomegaly were noted in present study. Palanivel S *et al* conducted a study which reported hepatosplenomegaly in about 80% of cases.[8]Rathi N also reported hepatosplenomegaly in majority of their cases.[1]but Dass R *et al* reported hepatomegaly in 33.3% and splenomegaly in 45.8% separately.[10]Another study by Inamdar *et al* reported hepatomegaly alone in 52.5% of cases.[6]Pedal edema accounted for 34.9% of cases in present study, which was also reported in studies done by Kulkarni A and Palanivel *et al*.[2,8] Purpura was observed in 14% in present study. Other associated symptoms included mainly headache, mainly frontal and myalgia. In laboratory investigations, platelet count of <1.5 lakh was seen in 30.2% of cases. According to a study done by Dass R *et al* thrombocytopenia was noted in 26% of cases.[10]Thrombocytopenia was also noted in a study by Rathi N *et al*.[1]Palanivel S *et al* conducted a study which showed thrombocytopenia.[8]Thrombocytopenia was also reported by Kulkarni A.[2] A Study by Udayan U *et al* also reported thrombocytopenia in 22% of cases.[9]Hemoglobin <9 gm% was seen in 11.6% in present study. Anemia was reported in 8.8% of cases in a study by Rathi NB *et al*,[5] Kulkarni A also reported anemia in his study.[2]Hemoglobin 11gm% was reported in 83.58% in a study done by Palanivel S *et al*.[8] Hyponatremia is seen in 30.2% in present study. A study by Rathi N *et al* also reported hyponatremia, reflecting increased vascularperme bility.[1] A study by Rathi NB *et al* reported hyponatremia in 48% of cases.[5]Kulkarni A also reported hyponatremia in his study.[2]Dass R *et al* also reported hyponatremia in 66.7% of cases in their study.[10]Hypoalbuminemia was present in 11.6% in present study. The presence of hypoalbuminemia was reported in a study done by Rathi N *et al*.[1]Dass R *et al* reported hypoalbuminemia in their study.[10]Elevated CRP and Urine albumin>2 was present in 25.6% and 11.6% of cases respectively in present study. Rathi NB *et al* also reported elevated CRP and urine albumin in their study.[5] Weil - Felix test was done in the study and a value of 1:80 or more was considered as significant. Though WF test is not gold standard, in resource limited set up where Immunoflouroscence Assay cannot be carried out because of non-availability or cost factor WF test seems to be the standard diagnostic test for rickettsial fever. Moreover, IFA becomes positive only after a period of 5-7 d of illness, the time by which complications may set in. Dass R *et al* suggested that WF test helps to detect more cases than misdiagnosed and when positive it is reasonably specific. They also suggested its use in resource limited setup.[10] Study by Kulkarni A[2]and many other studies from India as quoted by Dass R *et al*suggested a titre of 1:80 as significant and also its use in resource limited setup as diagnostic for rickettsial when other tests are not available.[10] Udayan U *et al* suggested WF Test as useful and cheapest available tool for laboratory diagnosis of rickettsial disease.[9] Rathi N *et al* suggested use of WF test is justified when definitive diagnostic test is not available.[1] Issac *et al* demonstrated sensitivity of WF test as 30% at a breakpoint titre 1:80,and specificity and positive predictive value as 100%, hence it is not completely obsolete and has to be interpreted with correct clinical context.[15]

CONCLUSION

A proper history and careful physical examination help in the diagnosis of Rickettsial disease. Laboratory tests can be carried out to support the diagnosis. Weil-Felix test can be carried out for early detection of suspicious case in resource limited set up.

REFERENCES

1. Rathi N, Rathi A. Rickettsial Infection: Indian Perspective - Review Article. Indian Pediatrics 2010;47:157-64
2. Kulkarni A. Childhood Rickettsiosis - Symposium on protocols old and new. Indian J Pediatr 2011; 78:81-87.
3. Kliegman RM, Behrman RE, Jenson HB, Stanton BF. Rickettsial infections. In: Siberry GK, Dumler JS. Nelson textbook of paediatrics. 20th edition. Pennyslvania: Saunders; 2007. p.1289-301
4. Mittal V, Gupta N, Bhattacharya D, *et al*. Serological evidence of rickettsial infections in Delhi. The Indian Journal of Medical Research. 2012; 135(4):538-541.
5. Rathi NB, Rathi AN, Goodman MH, Aghai ZH.Rickettsial diseases in central India: proposed clinical scoring system for early detection of spotted fever.Indian Pediatr. 2011 Nov 11; 48(11):867-72.
6. Inamdar S, Thunga G *et al*. Study of clinical characteristics and treatment pattern of scrub typhus in tertiary care hospital. J. Pharm.Sci and Res. Vol5 (5), 2013, 107-110.
7. Padbidri VS, Gupta NP. Rickettsioses in India: A Review. J Indian Med Assoc 1978; 71(4):104-7.
8. Palanivel S, Nedunchelian K, Poovazhagi V, Raghunandan R, Ramachandran R. Clinical Profile of Scrub Typhus in Children. Indian J Pediatr 2012 79(11):1459-62.
9. Udayan U,Dias M,Machado S. A hospital based study of rickettsial diseases evidenced by Weil Felix test in a tertiary care hospital. Chrismed J Health Res 2014; 1:150-3.
10. Dass R, Deka MN, Duwarah GS, Barman H, Hoquw R,Mili D, Barthakur D. Characteristics of paediatric scrub typhus during an outbreak in North Eastern Region of India: Peculiarities in clinical presentation, Laboratory findings and complication. Indian J Pediatr 2011; 78(11):1365-70.
11. Sirisanthana V, Puthanakit T,Sirisanthana T. Epidemiological, clinical and laboratory features of scrub typhus in 30 Thai children. Paediatr Infect Dis J 2003; 22:341-5.
12. Walker DH, Raoult D.Rickettsia rickettsii and other spotted fever group rickettsiae. In: Mandell GL, Bennet JE, Doalin R,Editors. Principles and practice of Infectious Diseases.Philadelphia:Churchill Livingstone; 2000. Pp.2035-42.
13. Sexton DJ, Corey GR,. Rocky Mountain ‘spotless’ and ‘almost spotless’ fevers: a wolf in sheeps clothing. Clin Infect Dis 1992; 15:439-448.
14. Murali N,Elizabeth M.Rickettsial Infection in South India. Indian Pediatr 2001; 38:1396-6.
15. Kamarasu K, Malathi M, Rajgopal V, Subramani K, Mathai E. Serological evidence for wide distribution of spotted fever and typhus fever in Tamil Nadu. Ind J Med Res 2007; 126:128-30.
16. Issac R, Varghees GM, Mathai E, Manjula J, Joseph I. Scrub typhus: Prevalence and diagnostic issues in Rural South India. Clin Infect Dis. 2004; 39:1395-96.

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