Original Article

Rickettsial fever in tertiary care hospital in rural Bengaluru: Clinical profile and complications

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ABSTRACT

Background: Rickettsial fever is a major health concern in different districts of Karnataka with serious complications, including morbidity and mortality, if diagnosed late. **Objective:** The objective of the present study was to know the clinical profile of Rickettsial fever in children. **Materials and Methods:** A descriptive study was conducted on all the laboratory-confirmed cases of Rickettsial fever in children admitted to a tertiary care hospital from December 2018 to November 2019. **Results:** Among 103 children studied, majority were males (66%) in the age group of 3–6 years. All the children presented with history of fever (100%) followed by decreased appetite (94%). The least common symptoms noticed were altered sensorium (1.9%), breathlessness (6.5%), and bleeding tendencies (6.5%). The most serious complications seen were shock (38.8%), hepatic dysfunction (7.7%), and myocarditis (3%). There were no deaths reported. The least common complication was renal failure. A single case had cranial nerve palsy with meningitis. **Conclusion:** It was concluded that male children in the age group of 3–6 years were more affected. The common symptoms observed were fever, decreased appetite, abdominal distension, and skin rash and the common complications were shock and myocarditis.

Key words: Clinical profile, Rashes, Rickettsial fever, Shock

Rickettsial fever is a re-emerging disease of south East Asian countries [1,2]. A high index of suspicion is necessary to diagnose them. Many children have non-specific manifestations like viral illness and may present without classical rashes or eschar. Rickettsial fever is endemic in north Karnataka, Tamil Nadu, and Andhra Pradesh [3-6]. In Karnataka, the cases have been reported from both rural as well as urban areas [7-10].

There are numerous clinical manifestations such as fever, headache, rashes, gastrointestinal, and respiratory symptoms [3,10,11]. Difficulty in diagnosis is due to variations in the antigenicity of infecting strains [7,12,13]. Oriental tsutsugamushi has several antigenic types because of the variation in the 56-kDa protein on the outer membrane [14-16]. Rickettsial diseases are Zoonoses where human beings are accidentally involved in a chain of transmission between chiggers and animals. Endemic habitats are rice fields, deserts, and riverbanks as these ecological patches attract the natural host of mite [17].

Children commonly present with fever, calf muscle pain, and gastrointestinal symptoms. The classic triad is fever, rashes, and unremitting headache. Initially, the rashes are discrete, after several days, there may be petechiae, ecchymosis, or necrosis [9]. Eschar is seen in a few cases in the hidden areas of the body [18-20].

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MATERIALS AND METHODS

This was a hospital-based descriptive study carried out at a tertiary care teaching hospital, in south India, including all clinical and laboratory-confirmed cases of children with Rickettsial fever admitted during the period from December 2018 to November 2019.

Purposive sampling technique was used with a total sample size of 103. The inclusion criteria were children in the age group 0–18 years, admitted with symptoms suggestive of Rickettsial fever based on RATHI criteria, immunoglobulin (Ig)M scrub typhus antibody-positive cases by ELISA technique and Weil Felix test. Children with dengue, Malaria, and other PUO were excluded from the study. Ethical committee clearance was obtained from the institutional ethical committee and consent was taken before the study (Table 1).

Data collection was done using a structural protocol, including symptoms, signs, complications, relevant investigations, treatment, duration of stay, and outcomes. These were the primary outcome variables assessed.

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The data were entered and analyzed using Microsoft Excel. The results were presented using descriptive statistics. $p<0.05$ was considered statistically significant.

RESULTS

A total of 413 cases were enrolled for the study. Among them, 103 children were positive for Rickettsial fever based on Rathi criteria, Weil Felix test, and enzyme-linked immunosorbent assay (ELISA) for IgM scrub typhus. There were majority of males (66%) and 34% females. Most (29%) of the children were in the age group of 3–10 years, followed by 26.2% (27/103) in the age group 10–18 years. The complications seen were shock 38.8% (40/103), breathlessness 7% (7/103), hepatic dysfunction 7.7% (8/103), myocarditis 3% (3/103), and the least common complication was renal failure 0.9% (1/103). There was no mortality observed in the study.

On investigations, 64% (66/103) were positive for Weil Felix, 35% for IgM scrub typhus, and 20 were positive for both (Table 2).

Table 1: Rathi criteria

Clinical criteria	Score	Lab criteria	Score
Rural	1	Hb <9 g/dl	1
Pets	1	Platelets <1.5 lacs	1
Tick exposure	2	CRP >50 g/dl	2
Tick bite	3	Serum albumin <3 g/dl	1
Non-exudative conjunctivitis	2	Urine albumin >2+	1
Maculopapular rash	1	SGPT >100 mg/dl	2
Purpura	2	Sodium <130 mEq/l	2
Palpable purpura/necrotic rash	3		
Rash appear in 48–96 h after fever	2		
Pedal edema	2		
Rash on palms and soles	3		
Hepatomegaly	2		
Lymphadenopathy	1		
Total	25	Total	10

Table 2: Signs and symptoms of rickettsial fever

Signs, symptoms, and complications	Number (n=103)	Percentage
Fever	103	100
Appetite	97	94
Skin rash	70	67.9
Myalgia	67	65
Altered sensorium	2	1.9
Breathlessness	7	6.5
Bleeding tendency	7	6.5
Skin rash	70	67.9
Splenomegaly	40	38.8
Ascites	38	36.8

DISCUSSION

Rickettsial infections are rampant in southern India. Rickettsial infections are reported from South East Asian countries [2,7,12,21,22]. It is an emerging group of zoonosis [4,9,10]. In the present study, most cases were reported during the months of March–June as against post-monsoon [18,20]. Molecular methods have confirmed greater diversity in the strains, causing infection [1,23,24].

Many cases are missed due to lack of awareness, non-specific presentation like any viral illness, and false-negative Weil Felix tests. In our study, children presented with skin rashes in 70% of the cases and none of them had eschar, similar to the finding from the study done in Northern India [1,7] and Southern India [6,12,23]. Many infections do not present with rashes and one has to check for the appearance of the rashes during the hospital stay. As per the study done by Kalal *et al*., only 36% of their children had maculopapular rashes on the extremity or trunk and eschar was an infrequent feature [22].

The reason for this may be the disappearance of eschar or detailed examination of hidden areas is rarely done [24]. We could not prove any children with murine typhus as laboratory-specific investigation for the same was not easily available. One has to suspect Rickettsial infection in the absence of eschar, rashes, or spots [4,19,22]. Fever was a universal symptom in accordance with the study done by Dasari *et al*., where all patients had fever [25]. In the study done by Rathi and Rathi, only 24% had fever [4]. Breathlessness was seen in 6.5% of patients as against 18% in Varghese *et al.* study [12]. In our study, few cases had mild acute respiratory distress syndrome (ARDS), requiring oxygen support and diuretics in 10 children and three needed noninvasive ventilation. The mortality rate was higher in Varghese et al. study, as multiorgan dysfunction was reported.

The incidence of renal impairment was 18%, 23.2%, and 66.4%, as reported by Mahajan *et al*., and Varghese *et al*., respectively [11,13], while only one had renal impairment in our study. The incidence of meningoencephalitis was 2.8%, of which one had facial nerve palsy with raised intracranial pressure when compared to Khan *et al*. study, where 24% presented with meningoencephalitis [2]. In endemic areas, one can consider Rickettsial infection as a differential diagnosis of acute encephalitis syndrome. Life-threatening complications are ARDS, shock, meningitis, and multiple organ dysfunction syndrome with central nervous system involvement associated with morbidity and mortality [11,12,26,27].

In India, diverse strains of oriental tsutsugamushi have been reported [13], although case fatality is as high as 30–40% [9], as compared to our study, there was no mortality. It may be due to early recognition, less complications, and timely initiation of doxycycline. Indian studies have shown varied mortality ranging from 2% to 17.2% [7,11,14].

Laboratory tests have limitations in interpretations like the Weil Felix which may be false negative, lack of easy availability, expensive costs of gold-standard diagnostic methods

such as polymerase chain reaction, IgM scrub typhus, and immunofluorescence assay.

The ELISA is the rapid and objective test amenable testing of large numbers of sera, often obtained in seroepidemiological investigations. Scrub typhus specific IgM ELISA has shown equal specificity and sensitivity. In our study, 64% of children were Weil Felix positive, 35% for IgM scrub typhus, and 19.5% for both as against the studies by Roopa *et al*. [28], Sharma *et al*. [29], Kamarasu *et al*. [30], Bithu *et al*. [31], and Prakash *et al*. [32], in which 9%, 33%, 38%, 49.1%, and 44% were positive for Weil Felix, respectively.

The study had a few limitations. The sample size was small. We could not implement the gold standard immunofluorescence test for the diagnosis of Rickettsial infection due to lack of easy availability and cost, as a result of which some cases would have been missed.

CONCLUSION

This study concludes that male children in the age group of 3–6 years were more affected. One should suspect Rickettsial infection even in "spotless fever." Early suspicion in endemic areas prevents morbidity and mortality.

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