



## Scrub Typhus in Children: Jammu Experience

Sanjeev Kumar Digra, Ghan Shyam Saini, Virender Singh, Sunil Dutt Sharma, Rajesh Kaul

### Abstract

The present retrospective study describes clinical profile of the children hospitalized in SMGS hospital with Scrub Typhus infection in Jammu during period Oct 08 to Sept 09. 21 hospitalized children with clinical features suggestive of Rickettsial disease (fever, generalized rash) who tested ELISA positive for IgM against Scrub Typhus were included in the present study between the age of 5 years and 18 years. 52.4% children belonged to Sunderbani-Naushera - Rajouri belt and majority of them reported during the months of August to November. All children presented with fever and maculopapular rash. 61.9% had lymphadenopathy, 57.12% had edema and 46% patients had conjunctival congestion. 76.13%, 23.8%, 19.04%, 9.2% had hepatosplenomegaly, pain abdomen, altered sensorium and gastrointestinal bleed respectively. All of the 21 children were treated with chloramphenicol. None of them died. Rickettsial infection is quite common in Jammu region and thus, high degree of suspicion, knowledge of geographical distribution and clinical features of Rickettsial disease helps in its early diagnosis and treatment.

### Key Words

Rickettsial, Scrub Typhus, *Orientia tsutsugamushi*, Pediatric

### Introduction

Rickettsial fever is a zoonotic acute febrile illness which is spread by the bite of ticks and mites. It is generally difficult to diagnose and untreated case can have mortality upto 30-35%. However when diagnosed timely, it can be treated easily (1). The devastating epidemics of rickettsial infection among Napoleon's troops forced him to retreat from Moscow. In India rickettsial infections have been documented in Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rajasthan, Assam, West Bengal, Maharashtra, Kerala, Tamil Nadu and Delhi (1-4). Scrub Typhus is a type of Rickettsial disease caused by the bite of an infected larval mite or "chiggers" belonging to the family Trombiculidae, genus and subgenus *Leptotrombidium*. The agent responsible for Scrub typhus in India is *Rickettsia orientalis* (*Orientia tsutsugamushi*). There are at least eight serotypes of *Rickettsia orientalis* known and infection with one strain does not provide immunity against other (5). Though, reports of scrub typhus exist from Jammu region in past but no report of scrub typhus exist among children from this region. Thus, this is first retrospective study done to see the clinical profile of children suffering from Scrub typhus from Jammu region.

### Material & Methods

This retrospective study was carried out in the Department of Pediatrics, SMGS Hospital, Government

Medical College Jammu during the period between October 2008 to September 2009. All hospitalized children with clinical features suggestive of Rickettsial disease (fever, generalized rash) who tested ELISA positive for IgM against Scrub Typhus were included in the present study.

### Results

#### Epidemiology

All the children hospitalized with fever and generalized rash and ELISA positive for IgM against Scrub typhus during the time period between 1st October 2008 and 30th September 2009 were included in this study. Total number of such children were 21. The ages of the children ranged from 5 years to 18 years. Out of these 21 children, 11 were males and 10 females. 52.4% (11) children belonged to Sunderbani-Naushera - Rajouri belt while 23.8% (5) cases belonged to other hilly areas such as Jindrah and Chenani. Majority of the cases were admitted during the months of September and October. (Table-1)

#### Clinical Features

All children presented with fever and maculopapular rash. The fever was high grade and continuous in type with a median duration of 8 days. The rash was generalized, predominantly on the peripheries involving palm and soles in all the patients. 61.9% (13) had lymphadenopathy and

From the PG Department of Pediatrics Government Medical College, Jammu.

Correspondence to : Dr. Sanjeev Digra, Consultant, PG Department of Pediatrics, GMC, Jammu J&K-India

**Table 1. Sex, Area and Seasonal Distribution of Cases**

<b>Total Positive Cases</b>	n=21
<b>Time</b>	Oct 2008- Sept 2009
<b>Sex distribution</b>	Male 11 (52.3%) Female 10 (47.6%)
<b>Area distribution</b>	
Sunderbani-Naushera-Rajouri belt	11(52.3%)
Jindrah	3(14.2%)
Kathua-Hiranagar	2(9.5%)
Jammu City	2(9.5%)
R.S. Pura	1(4.7%)
Chenani	1(4.7%)
Banihal	1(4.7%)
<b>Seasonal Distribution</b>	
August	2(9.5%), September 10(47.6%)
October	7(33.3%), November 2(9.5%)
<b>Mortality</b>	Nil

57.14% (12) had edema out of which 6 had facial puffiness and 3 each had pedal edema and anasarca. 47.6% patients had conjunctival congestion. 76.19%, 23.8%, 19.04%, 9.5% had hepatosplenomegaly, pain abdomen, altered sensorium and gastrointestinal bleed respectively. 19.04% children developed meningoencephalitis and 14.2% each developed myocarditis and hepatic dysfunction during the course of illness. Two children had consolidation while one developed azotemia (Table 2 & 3).

**Table 2. Clinical Features**

Clinical Features n=21	n (%)
Fever	21(100%)
Rash	21(100%)
Hepatosplenomegaly	16(76.19%)
Lymphadenopathy	13(61.9%)
Edema	12(57.14%)
Conjunctival congestion	10(47.6%)
Pain abdomen	5(23.8%)
Altered Sensorium	4(19.04%)
Gastrointestinal Bleed	2(9.5%)

**Table 3. Complications**

Complications n=21	n (%)
Meningoencephalitis	4(19.04%)
Myocarditis	3(14.2%)
Hepatic dysfunction	3(14.2%)
Consolidation	2(9.5%)
Azotemia	1(4.7%)
Required ICU care	0(0%)
Multiorgan Involvement	0(0%)

**Investigations**

On routine investigations all the children were found to be anemic (Median Hb: 8 gm%). 28.57% (6) children had leucocytosis and 38.09% (8) had thrombocytopenia. C-Reactive Protein (CRP) and Serum Amyloid (SAA) were not done in any of the case. Urine routine examination,

blood and urine cultures, widal test, CSF examination, renal and liver function tests, X ray chest, ECG, etc. were done as and when required. CSF examination revealed meningitis in 4 patients, and liver function and renal function tests were deranged in 3 and 1 patients respectively. ECG was suggestive of myocarditis in 3 children which was confirmed by echocardiography.

**Treatment**

All the children were treated with chloramphenicol and supportive management. Median duration of antibiotic administration was 10 days. Eight of these children required more than one antibiotics due to associated complications. Outcome. All the children recovered and became afebrile by 5th day of starting treatment with a median duration of hospital stay of 10 days.

**Discussion**

Scrub typhus is caused by *Orientia tsutsugamushi* and is spread by bite of larval trombiculid mites. The infection presents as a nonspecific febrile illness which may be associated with gastrointestinal, respiratory or central nervous symptoms (2). Though it is reported from Jammu and Kashmir in past but the present study describes the clinical profile of this disease in the pediatric age group. The age group in the present study ranged from 5 years to 18 years with Male to Female ratio of 1.1 : 1. All the patients had high grade continuous fever and generalised maculopapular rash which is similar to the findings of Patil *et al* (6). Similar to the observations of Patil *et al* (6) who reported hepatosplenomegaly in 85% cases, 75% cases had hepatosplenomegaly in our study while Mahajan *et al* (2) reported the same in 43% cases. We observed lymphadenopathy, pain abdomen and altered sensorium in 61.9%, 23.8% and 19.04% respectively which is comparable to the findings made by Mahajan *et al* (2) 19.04% and 14.2% children in present study developed meningoencephalitis and myocarditis as complications during the course of illness. Another 14.2% had deranged liver function tests. Patil *et al* (6) reported myocarditis in 4% cases. Complete blood counts, urine routine examination, blood and urine cultures, widal test done as and when required were all unable to detect the cause of fever. All the children received chloramphenicol for a median duration of 10 days and all of them recovered and were discharged after a median hospital stay of 10 days.

A retrospective study from Taiwan reported fever, anorexia, eschar and lymphadenopathy in 100%, 72%, 69% and 64%, respectively as the most common clinical features and hepatic dysfunction (77%) and pneumonitis (54%) as most common complications of pediatric scrub typhus (7).

Another study from Taiwan reported fever, cough, rash, lymphadenopathy and hepatomegaly in 100%, 50%, 35.7%, 42.9% and 35.7% respectively. They observed meningoencephalitis in 6 (21.4%) out of a total of 28

**Table 4. Clinical Profile of Pediatric Scrub Typhus**

Authors	Place	Number	Clinical Feature
Current Study	Jammu	21	Fever (100%) & maculopapular rash (100%), lymphadenopathy (61.9%), edema (51.12%) and conjunctival congestion (46%). 76.13%, 23.8%, 19.04%, 9.2% had hepatosplenomegaly, pain abdomen, altered sensorium and gastrointestinal bleed respectively.
Patil <i>et al</i> (6)	Karnataka	48	Fever and rash (100%), oedema (77%), altered sensorium (52%), convulsions (4%) and joint pains (27%). Rash was seen in all children of which characteristic non-confluent maculopapular rash involving palms and soles was seen in 42 cases (87%) and purpuric rash was seen in 6 cases (13%), hepatosplenomegaly (85%), upper GI bleeds (13%), peripheral gangrene (6%), myocarditis (4%) and pneumonia (4%).
Huang <i>et al</i> (8)	Taiwan	28	Fever (100%), cough (50%), eschar (50%), rash (35.7%), poor appetite (42.9%), lymphadenopathy (42.9%), headache (39.3%), and hepatomegaly (35.7%). Elevated CRP in 100%, AST in 100%, ALT in 91.3%, hypalbuminemia found in 88.9% & proteinuria in 50%.
Jim <i>et al</i> (7)	Eastern Taiwan	145	Fever (100%), cough (72%), anorexia (72%), eschar (69%), chill (67%) and lymphadenopathy (64%). Hepatic dysfunction (77%) and pneumonitis (54%).
Liu <i>et al</i> (11)	China	70	Fever & headache (100%), skin rash (91%), eschar (84%), lymphadenopathy (61%), and gastrointestinal signs (56%).

children in their study. C-reactive protein and aspartate aminotransferase was raised in all the cases and the mean duration of antibiotics and the mean duration of fever resolution after starting treatment was 11 days and 2.8 days respectively (8). Another study from Israel studied the levels in scrub typhus fever of C-reactive protein (CRP) and serum amyloid -a (SAA) and observed that both CRP and SAA were elevated during acute phase of illness and decreased during convalescent phase except for one case where SAA continued to be elevated even during convalescence (9). The study of Huang *et al* (8), Liu *et al* (11) and Jim *et al* (7) from, Taiwan, China & Eastern Taiwan recorded high (50, 84 & 69%) respectively. However in Indian study by Patil *et al* (6) and the current Maculopapular rash remained main presentation as 100% in each study. The Literature reviewed and compared with current study in *table-4*. (6-8, 11)

No rapid laboratory tests are available to diagnose rickettsial infection early in the course of the disease. Microimmunofluorescence, immunoperoxidase assay, latex agglutination, indirect hemagglutination, enzyme linked immunosorbent assay, dot blot immunoassay (including dipstick test) and Weil-Felix test are the various serological methods available for diagnosis of rickettsial diseases. IFA (Indirect immunofluorescence assay) is a reference serological method for diagnosis of rickettsial diseases and is considered 'gold standard' but it is not available in India.

of these, only Weil-Felix and ELISA are easily available in India. Weil-Felix test is not entirely obsolete but should be read in correct clinical perspectives. It is not a very sensitive test (10). Though most of the Indian studies used Weil-Felix to diagnose Rickettsia we included only those cases who had ELISA positive for IgM against Scrub typhus. However, C-reactive protein (CRP) and serum amyloid a (SAA) were not done in any of these cases which is the limitation of this study but the same can be planned for the prospective studies in future.

### Conclusion

Present study reveals that Rickettsial infection is quite common in Jammu region particularly Sunderbani-Naushera-Rajouri belt during the period between July and October every year. A high degree of suspicion and knowledge of geographical distribution and clinical features of Rickettsial disease is crucial for its early diagnosis, treatment and favourable outcome.

### References

1. Batra HV. Spotted fevers and typhus fever in Tamil Nadu - commentary. *Indian J Med Res* 2007; 126:101-03.
2. Mahajan SK, Kashyap R, Kanga A, Sharma V, Prasher BS, Pal LS. Relevance of Weil-Felix test in diagnosis of scrub typhus in India. *J Assoc Phys India* 2006; 54: 619-21.
3. Mathai E, Lloyd G, Cherian T, Abraham OC, Cherian AM. Serological evidence of continued presence of human rickettsiosis in southern India. *Ann Trop Med Parasitol* 2001; 95: 395-398.
4. Sundhinda BK, Vijaykumar S, Kutti AK. Rickettsial spotted fevers in Kerala. *Natl Med J India* 2004; 17: 51-52.
5. Singh P. Scrub Typhus, a Case Report: Military and Regional Significance. *MJAFI* 2004; 60:89-90.
6. Patil D, Bidari LH, Tikare N, Revankar VA. Profile of Rickettsial fever in children. Karnataka Pedicon 2006 - Conference Abstracts. *Pediatric Oncall* [serial online] 2006 [cited 15 November 2006 (Supplement 11)]; 3. Available from: [http://www.pediatriconcall.com/fordocor/conference\\_abstracts/KARNATAKA\\_PEDICON/profile\\_rickettsial\\_fever\\_in\\_children.asp](http://www.pediatriconcall.com/fordocor/conference_abstracts/KARNATAKA_PEDICON/profile_rickettsial_fever_in_children.asp)
7. Jim WT, Chiu NC, Chan WT, *et al*. Clinical manifestations, laboratory findings and complications of pediatric scrub typhus in eastern Taiwan. *Pediatr Neonatol* 2009; 50(3):96-101.
8. Huang CT, Chi H, Lee HC, Chiu NC, Huang FY. Scrub typhus in children in a teaching hospital in eastern Taiwan, 2000-2005. *Southeast Asian J Trop Med Public Health* 2009; 40(4):789-94.
9. Yagupsky P, Gross EM, Alkam M, Shainken-Kestenbaum R, Kuperman O, Sarov I. C-reactive protein and serum amyloid a levels in rickettsial spotted fever. *European J Clin Microbiology Infectious Diseases* 1985; 4(6): 597-98.
10. Rathi N, Rathi A. Rickettsial Infections: *Indian Pediatr* 2010; 47:157-64.
11. Liu YX, Jia N, Suo JJ, Xing YB. Characteristics of pediatric scrub typhus in a new endemic region of northern China. *Pediatr Infect Dis J* 2009 ; 28(12):1111-14.