

Research Article

A study of complications of scrub typhus in a tertiary health care institute of Uttarakhand, India

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ABSTRACT

Background: Scrub typhus or tsutsugamushi disease is a febrile illness caused by *Orientia tsutsugamushi*. Uttarakhand State in the northern region of India has been witnessing increased incidence of this fever. There is paucity of data on this topic from this region. The present study was conducted to find out the clinical features, complications, response to treatment and outcome of patients suffering from scrub typhus in a tertiary health care institute of Uttarakhand, India.

Methods: The study was performed at SGRR Institute of Medical & Health Sciences, Dehradun, which is a tertiary health care institute Uttarakhand. The study period was of 1 year from December 2012 to November 2013. Patients of 12 years of age or above who were IgM antibody positive by ELISA technique were included in the study. All such patients underwent detailed clinical examination and investigation.

Results: 47 patients were found to be suffering from scrub typhus. The common symptoms noted fever, myalgias, headache, vomiting, diarrhoea, breathlessness, petechiae and jaundice. Common complications noticed were hepatitis (78.7%) acute respiratory distress syndrome (19.2%), thrombocytopenia (46.8%) and acute renal failure (31.9%), Mortality was seen in 3 (6.4%) patients.

Conclusions: Scrub typhus is an important cause of mortality and morbidity in Uttarakhand. High index of suspicion, early diagnosis, monitoring of the clinical and laboratory parameters and prompt intervention may help in reducing the mortality.

Keywords: Scrub typhus, Complications, *Orientia tsutsugamushi*, Uttarakhand

INTRODUCTION

Scrub typhus, a potentially fatal rickettsial infection, has recently become a major public health problem causing significant morbidity, mortality and economic loss. It is confined geographically to the Asia Pacific region. Around one billion people are at risk of getting scrub typhus and nearly one million cases are reported every year.¹ In India, scrub typhus epidemic appeared in Assam and West Bengal during the Second World War. Later on its presence was reported throughout India in humans,

trombiculid mites and rodents.² The clinical spectrum of scrub typhus is broad, with most infections being of mild-to-moderate severity. The diagnosis is confirmed by serological testing.^{3,4} Mortality rates in untreated patients range from 0% to 30% and tend to vary with different geographical regions.⁵

METHODS

This prospective study was performed at SGRR Institute of Medical & Health Sciences, Dehradun, which is a tertiary

care hospital of Uttarakhand. The centre receives patients from Uttarakhand and adjacent parts of Uttar Pradesh and Himachal Pradesh, India. The study period was of 1 year from December 2012 to November 2013. Patients of 12 years of age or above it who were IgM antibody positive by ELISA technique were included in the study. These patients underwent detailed clinical examination and investigation. All patients received doxycycline as treatment. 3 patients, detected to have coinfection with dengue fever, were excluded from the study.

RESULTS

A total of 47 patients were found to be suffering from scrub typhus. 20 (42.6%) patients were referred from the neighbouring states of Uttar Pradesh and Himachal Pradesh while the remaining 27 (57.4%) patients were the native residents of Uttarakhand state. 21 (44.7%) were females and 26 (55.3%) were male (Table 1). The youngest patient was 12 year old while the oldest was aged 61 year. Maximum number of cases was seen in the months between Septembers to November. Fever was the commonest symptom seen in all 47 (100%). Duration of fever ranged from 2 to 8 days. Generalized muscle pain was observed in 38 (80.9%) cases. Headache was present in 35 (74.5%). Diarrhoea was complained by 12 (25.5%) and vomiting by 13 (27.7%). Petechiae were noted in 9 (19.2%). Abdominal pain was complained by 14 (29.8%). Splenomegaly was noted in 12 (25.5%), hepatomegaly in 13 (27.7%), hepatosplenomegaly in 14 (29.8%) and ascites in 16 (34.0%). These findings were detected by ultrasonography. Jaundice was noted in 20 (42.6%). Respiratory failure was the result of ARDS, noted in 9 (19.2%). Shock appeared in 6 (4.2%) and CNS manifestations in the form of meningoencephalitis in 8 (17.0%). 22 (46.8%) patients were reported to have thrombocytopenia. 24 (51.0%) patients had leucocytosis and 8 (17.0%) had leucopenia. Serum bilirubin was raised (>2.0 mg/dl) in 21 (44.7%), SGOT in 38 (78.7%) and SGPT in 30 (63.8%). Hypoalbuminemia was seen in 24 (51.1%) and acute renal failure (Serum creatinine >1.5 mg/dl) was noted in 15 (31.9%) patients. 3 (6.4%) patients died.

Table 1: Age and sex wise distribution of scrub typhus cases.

Age group	Male	Female	Total
12-20	5 (10.6%)	4 (8.5%)	9 (19.2%)
21-30	7 (14.9%)	5 (10.6%)	12 (25.5%)
31-40	6 (12.8%)	5 (10.6%)	11 (23.4%)
41-50	5 (10.6%)	4 (8.5%)	9 (19.2%)
51-60	3 (6.4%)	2 (4.3%)	5 (10.6%)
61-70	0 (0.0%)	1 (2.1%)	1 (2.1%)
Total	26 (55.3%)	21 (44.7%)	47 (100%)

Table 2: Clinical manifestations in scrub typhus cases.

Criteria	No. of cases (n =47)
Fever	47 (100%)
Myalgia	38 (80.9%)
Headache	35 (74.5%)
Diarrhoea	12 (25.5%)
Vomiting	13 (27.7%)
Petechiae	9 (19.2%)
Abdominal pain	14 (29.8%)
Splenomegaly	12 (25.5%)
Hepatomegaly	13 (27.7%)
Hepatosplenomegaly	14 (29.8%)
Ascites	16 (34.0%)
Jaundice	20 (42.6%)
ARDS	9 (19.2%)
Meningoencephalitis	8 (17.0%)
Shock	6 (4.2%)

Table 3: Hematological and biochemical findings in scrub typhus cases.

Criteria	No. of cases (%)
Thrombocytopenia <1.5 Lakh / cu. mm.	22 (46.8%)
Thrombocytopenia <1.0 Lakh / cu. mm.	10 (21.3%)
Thrombocytopenia <50,000 / cu. mm	5 (10.6%)
Leucocytosis	24 (51.0%)
Leucopenia (TLC <4000 / cu. Mm.)	8 (17.0%)
Serum bilirubin > 2.0 mg/dl	21 (44.7%)
SGOT	38 (78.7%)
SGPT	30 (63.8%)
Serum albumin < 3 g/dl	24 (51.1%)
Acute renal failure (Serum creatinine > 1.5 mg/dl)	15 (31.9%)

Table 4: Outcomes in scrub typhus cases.

Age group	Total	Improved	Mortality
12-20	9 (19.2%)	8 (17.0%)	1 (2.1%)
21-30	12 (25.5%)	12 (25.5%)	0 (0.0%)
31-40	11 (23.4%)	10 (21.3%)	1 (2.1%)
41-50	9 (19.2%)	9 (19.2%)	0 (0.0%)
51-60	5 (10.6%)	4 (8.5%)	1 (2.1%)
61-70	1 (2.1%)	1 (2.1%)	0 (0.0%)
Total	47 (100%)	44 (93.6%)	3 (6.4%)

DISCUSSION

Most of the cases were seen during the monsoon and post monsoon season. Similar finding has been reported in earlier studies.⁶⁻¹⁰ Scrub typhus presents as an acute febrile illness with non-specific signs and symptoms.¹¹ In our study also fever was the commonest symptom reported by all patients. Another study from the same region has reported fever as commonest symptom¹² while in some studies myalgia and headache has been reported as commonest symptom.⁷ The common symptoms were fever, myalgia, headache, vomiting, abdominal pain, loose motions, and jaundice. Similar to other Indian studies^{13,14} rash was not very common in this study. Rare but serious complications of scrub typhus include myocarditis, meningitis, acute renal failure and interstitial pneumonia.¹⁵⁻¹⁷ Since clinical presentation of fever with rash and myalgia occurs in other febrile illnesses like dengue fever, malaria and typhoid; they should be considered in differential diagnosis. An eschar at the bite site of the mite is pathognomonic of Scrub typhus¹¹ however, it is rarely seen in south East Asia and Indian subcontinent.^{6,8,10,18} In our study, eschar was not seen in any patient. Though lymphadenopathy is common in Scrub typhus^{19,20} it was rare in our study, a finding similar to another Indian study.⁹

Serum transaminases were raised in large number of patients. This finding was similar to other studies.^{6,8,18,21} Leukocytosis, thrombocytopenia, and low serum albumin were other laboratory findings. A study from Jammu²² has reported thrombocytopenia of 38.1% which is lower than what was found in our study (46.8%). Low serum albumin and leucocytosis are thought to be associated with severe scrub typhus.^{23,24} Complications in scrub typhus develop after first week of illness and are directly related to the blood load of *O. sutsugamushi*.^{11,25,26}

Serious complications of scrub typhus include myocarditis, meningitis, acute renal failure and interstitial pneumonia.^{15-17,27-29} Renal failure has been well described in scrub typhus^{30,31} which was seen in 31.9% patients of this study. Meningoencephalitis was similar to what was observed in the study by Mahajan et al.³² In our study the most common organ dysfunction was hepatitis followed by ARDS, shock and circulatory collapse and acute renal failure. Mortality rate in scrub typhus varies from 0 to 33.5%.^{6,8,18,24} In this study 3 (6.4%) patients died. All patients who died had multiorgan failure, and treatment was started late in them because of their late presentation (second week of illness).

CONCLUSION

Scrub typhus is an important cause of mortality and morbidity in Uttarakhand. A high index of suspicion is needed in patients presenting with fever especially during monsoon and post monsoon season. Fever, rash, myalgias, gastrointestinal symptoms, hepatitis, renal failure and ARDS are usual features. Though eschar is

pathognomonic of the disease, it may not be commonly seen, and its absence does not rule out scrub typhus. Delay in treatment may lead to complications and higher mortality. As patients respond to doxycycline or macrolides, empirical treatment with these antibiotics may be given in cases where there is a strong suspicion of scrub typhus.

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REFERENCES

1. Watt G, Parola P. Scrub typhus and tropical rickettsioses. *Curr Opin Infect Dis.* 2003;16(5):429-36.
2. Park K. Epidemiology of Communicable Diseases. In: Park K, eds. *Park's Textbook of Preventive and Social Medicine.* 20th ed. Jabalpur: Banarsidas Bhanot; 2009: 262.
3. Willet HP. Sterilization and Disinfection. In: Joklik WK, Willet HP, Amos DB, Wilfert CM, eds. *Zinsser microbiology.* 20th ed. Orwalk, Conn: Appleton & Lange; 1992:700-718.
4. Chogle AR. Diagnosis and treatment of scrub typhus - the Indian scenario. *J Assoc Physicians India* 2010;58:11-2.
5. Watt G. Scrub typhus. In: Warrell DA, Cox TM, Firth JD, eds. *Oxford, Textbook of Medicine.* 5th ed. USA: Oxford University Press; 2010: 919-924.
6. Varghese GM, Abraham OC, Mathai D, Thomas K, Aaron R, Kavita ML et al. Scrub typhus among hospitalized patients with febrile illness in South India: magnitude and clinical predictors. *J Infect* 2006;52:56-60.
7. Kamarasu K, Malathi M, Rajagopal V, Subramani K, Jagadeeshramasamy D, Mathai E. Serological evidence for wide wide distribution of spotted fevers and typhus fever in Tamil Nadu. *Indian J Med Res* 2007;126:128-30.
8. Vivekanandan M, Mani A, Priya YS, Singh AP, Jayakumar S, Purty S. Outbreak of scrub typhus in Pondicherry. *J Assoc Physicians India* 2010;58:24-8.
9. Somashekar HR, Prabhakar DM, Sreeja P, Elizabeth M, Didier R, Jean MR. Magnitude and features of scrub typhus and spotted fever in children in India. *J Trop Pediatr* 2006;52:22.
10. Sharma A, Mahajan S, Gupta ML, Kanga A, Sharma V. Investigation of an outbreak of scrub typhus in the himalayan region of India. *Jpn J Infect Dis* 2005;58:208-10.
11. Mahajan SK. Scrub typhus. *J Assoc Physicians India* 2005;53:954-8.
12. Jain N, Jain V. Study on Clinico - Laboratory Profile of Children with Scrub Typhus. *J Nepal Paediatr Soc* 2012;32(2):187-92.
13. Rapmund G. Rickettsial diseases of the Far East: a new perspective. *J Infect Dis* 1984;149:330-8.

14. Mehta SR, Dham SK, Jetley V, Sahane AG. Scrub typhus - a report of six cases. *MJAFI* 1993;49:279-81.
15. Fang CT, Ferng WF, Hwang JJ, Yu CJ, Chen YC, Wang MH, Chang SC, Hsieh WC. Life-threatening scrub typhus with meningoencephalitis and acute respiratory distress syndrome. *J Formos Med Assoc* 1997;96:213-16.
16. Lee WS, Wang FD, Wang LS, Wong WW, Young D, Fung CP, Liu Y. Scrub typhus complicating acute respiratory distress syndrome: A report of two cases. *Chin Med J (Taipei)* 1995;56:205-10.
17. Chi WC, Huang JJ, Sung JM, Lan RR, Ko WC, Chen FF. Scrub typhus associated with multi-organ failure: a case report. *Scand J Infect Dis* 1997;29:634-5.
18. Narvencar KPS, Rodrigues S, Nevrekar RP, Dias L, Dias A, Vaz M, Gomez E. Scrub typhus in patients reporting with acute febrile illness at a tertiary health care institution in Goa. *Indian J Med Res* 2012;136:1020-4.
19. Mahajan SK, Rolain JM, Sankhyan N, Kaushal RK, Raoult D. Pediatric scrub typhus in Indian Himalayas. *Indian J Pediatr* 2008;75:947-9.
20. 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 Physicians India* 2006;54:619-21.
21. Aung-thu, Supanaranond W, Phumiratanaprapin W, Phonrat B, Chinprasatsak S, Ratanajaratroj N. Gastrointestinal manifestations of septic patients with scrub typhus in Maharat Nakhon Ratchasima Hospital. *Southeast Asian J Trop Med Public Health* 2004;35:845-51.
22. Sanjeev Kumar Digra, Ghan Shyam Saini, Virender Singh, Sunil Dutt Sharma, Rajesh Kaul, Scrub Typhus in Children: Jammu Experience; *JK Science* 2012;12(2):95.
23. Kim DM, Kim SW, Choi SH, Yun NR. Clinical and laboratory findings associated with severe Scrub typhus. *BMC Infect Dis* 2010;10:108.
24. Lee CS, Hwang JH, Lee HB, Kwon KS. Risk factors leading to fatal outcome in Scrub typhus patients. *Am J Trop Med Hyg* 2009;81:484-8.
25. Kim DM, Kang DW, Kim JO, Chung JH, Kim HL, Park CY et al. Acute renal failure due to acute tubular necrosis caused by direct invasion of *Orientia tsutsugamushi*. *J Clin Microbiol* 2008;46:1548-50.
26. Sonthayanon P, Chierakul W, Wuthiekanun V, Phimda K, Pukrittayakamee S, Day NP et al. Association of high *Orientia tsutsugamushi* DNA loads with disease of greater severity in adults with scrub typhus. *J Clin Microbiol* 2009;47:430-4.
27. Saah AJ. *Orientia Tsutsugamushi* (Scrub typhus). In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and practice of infectious disease*. 5th ed. Philadelphia, Pa: Churchill Livingstone; 2000: 2056-2057.
28. Levine HD. Pathologic study of thirty-one cases of Scrub typhus fever with especial reference to the cardiovascular system. *Am Heart J* 1946;31:314-28.
29. Seong S, Choi M, Kim I. *Orientia tsutsugamushi* infection: overview and immune responses. *Microbes & Infection* 2001;3(1):11-21.
30. Yen TH, Chang CT, Lin JL, Jiang JR, Lee KF. Scrub typhus: a frequently overlooked cause of acute renal failure. *Ren Failure* 2003;25:397-410.
31. Sanjay K Mahajan, Sharath Babu NM, et al. Scrub typhus presenting as acute abdomen. *Trop D.* 2011 Oct;41(3):185-6.
32. Mahajan SK, Rolain J-M, Kanga A, Raoult D. Scrub typhus involving central nervous system, India, 2004-2006. *Emerg Infect Dis* 2010 October;16(10):1641-3.

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