

ORIGINAL RESEARCH

The Clinical Profile Of Scrub Typhus- A Study In A Tertiary Care Centre In Rural South India

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ABSTRACT

Introduction: Scrub typhus is an important differential diagnosis of fever of unknown origin and is often missed by a physician. Rural regions in South India have been witnessing a surge in the number of cases during the winters. The present study was conducted to study the clinical profile, laboratory manifestations and complications in patients diagnosed with scrub typhus at a tertiary care hospital in south India.

Materials and Methods: 44 cases of acute febrile illness with or without an eschar, diagnosed to have scrub typhus by IgM ELISA from January 2013 to December 2014 were included in our study.

Results: The majority of the patients in our study were agricultural workers (49%) and all of them suffered during the colder months of the year. The most common presenting symptom was fever (100%) followed by cough (36%) and headache (32%). The most common sign was eschar (77%) followed by hepatosplenomegaly (52%). Majority had an uneventful recovery with a mortality rate of 4.5%.

Conclusion: Scrub typhus should be considered as an important diagnosis in fever of unknown origin and a meticulous search for an eschar should be done. Early diagnosis of scrub typhus prevents its complications and mortality to a great extent.

Keywords: Fever, Hepatomegaly, ImmunoglobulinM, Splenomegaly

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INTRODUCTION

Scrub typhus is a significant and widespread disease in Asia. It is caused by the bacteria of the family Rickettsiaceae – ‘Orientia tsutsugamushi’, previously known as R.Orientalis/R.tsutsugamushi.¹ The name derives from the type of vegetation (i.e. terrain between woods and leaves) that harbours the vector. Scrub typhus is transmitted to humans by the bite of larva of trombiculid mites (“chiggers”), in which transovarial transmission maintains the infection in nature. The mite is very small (0.2 – 0.4mm) and can only be seen through a microscope or magnifying glass. The word ‘typhus’ is derived from the ancient Greek word ‘typhos’ meaning ‘fever with stupor or smoke’. The incubation period is about 5-10 days.

Scrub typhus is not as uncommon as thought in India. Epidemics of scrub typhus have been reported from Pondicherry, Vellore, Goa and Andhra Pradesh in the south,^{2,3} Uttarakhand and Rajasthan in north India^{4,5} and among the paediatric age group from eastern India and one in Meghalaya.^{6,7}

But it is highly underreported and undiagnosed due to the lack of clinical suspicion by the clinician and lack of access to a specific diagnostic facility.

Common complications associated with scrub typhus are acute kidney injury, hepatitis, ARDS, meningoencephalitis, myocarditis and septic shock. Some of these can prove to be fatal to the patients, inspite of effective treatment with doxycycline, due to the delay in diagnosis and late initiation of specific treatment.⁸

Keeping this clinical profile in view, a study was done in the department of General Medicine, Dr.PSIMS& RF – a tertiary care centre in rural south India, when there was clustering of cases in the winter.

MATERIALS AND METHODS

Our study was a retrospective observational study done in the department of General Medicine, Dr.PSIMS& RF – a tertiary care centre in rural south India, when there was clustering of cases in the winter

from January 2013 to December 2014. The study was approved by the Institutional Ethics Committee and Informed consent was taken from the patients. All the patients admitted with history of acute onset fever, headache, myalgia with multisystem involvement were evaluated for Scrub typhus after ruling out Dengue, Leptospirosis, Malaria and Enteric fever by serology, peripheral smear and blood culture as appropriate. The study included 44 cases of scrub typhus with/without an eschar and irrespective of age and sex.

Detailed history and clinical examination was followed by a basic laboratory evaluation which included complete blood picture, peripheral blood smear, blood glucose, liver function tests, renal function tests and chest x-ray. Diagnosis was confirmed with AccudiasTM rapid ELISA kit for scrub typhus at Rapid Diagnostics, Vijayawada and a cut off value of IgM was taken as three times of the Standard Deviation (SD) of normal human serum and/or human sera with unrelated infections. Special investigations like smear for malarial parasite, dengue serology, and Widal test and blood cultures were done to exclude alternative diagnosis and concurrent infections.

RESULTS

Among the 44 patients in our study, 45% were males and 55% were females. Six patients were in the paediatric age group and three patients were in the geriatric age group (>60years). All the cases in the study were reported only from the month of September to February with the maximum number of cases in November (n=17). All of the patients were from rural areas and majority of them were agriculture labourers (49%). The most common presenting symptoms were fever (100%), cough (36%), and headache (32%), and eschar (77%) was the most common sign followed by hepatosplenomegaly (Table I). Common laboratory findings (Table II) included hyperbilirubinemia (36%), elevated transaminases (32%) and leukocytosis (30%). Thrombocytopenia was present in 9 patients but none of them required platelet transfusions. Deranged renal functions were present in only 11% of the patients.

The major complication (Fig II) in our study group was hepatitis accounting for 30% (n=13). Acute renal failure and pulmonary involvement was seen in 5 and 7 patients each (11% and 16%). Multi organ dysfunction occurred in 4 patients (9%), while one patient each suffered from shock and meningoencephalitis.

FIGURE 1: Sites of Eschar

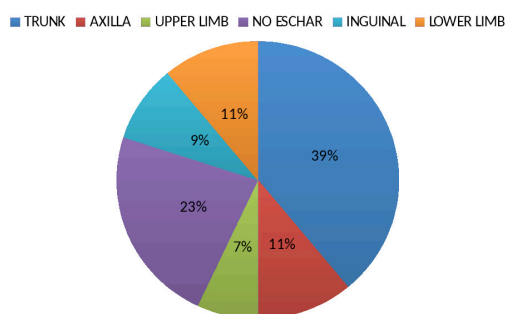


Figure II: Complications in Scrub typhus (n=44)

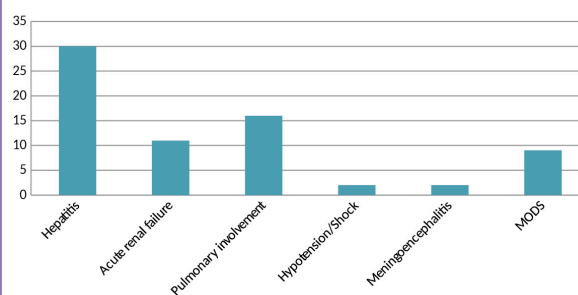


Figure III: Eschar in Scrub typhus



TABLE I - CLINICAL PROFILE OF PATIENTS IN OUR STUDY GROUP (n=44)

SYMPTOMS		SIGNS	
• Fever	100% (n=44)	• Eschar	77% (n=34)
• Headache	32% (n=14)	• Icterus	23% (n=10)
• Myalgias	23% (n=10)	• Lymph nodes	11% (n=5)
• Cough	36% (n=16)	• Hepatomegaly	52% (n=23)
• Vomiting	20% (n=9)	• Splenomegaly	50% (n=22)
• Jaundice	14% (n=6)	• Lung crackles	16% (n=7)
• Rash	2% (n=1)		
• Oliguria	11% (n=5)		
• Abdominal discomfort	23% (n=10)		

TABLE II - LABORATORY FINDINGS IN OUR STUDY

➤ Leucocytosis (>11000/cu mm)	30% (n=13)
➤ Leucopenia (<4000/cu mm)	5% (n=2)
➤ Thrombocytopenia (<1lakh/cu mm)	23% (n=10)
➤ Raised bilirubin (>1.2gm/dl)	36% (n=16)
➤ SGOT (>100 IU/L)	32% (n=14)
➤ SGPT (>100 IU/L)	32% (n=14)
➤ ALP (>150 IU/L)	27% (n=12)
➤ Serum creatinine (>1.6gm/dl)	11% (n=5)

DISCUSSION

Among the 44 patients in our study, 45% were males and 55% were females. Nine patients were from the paediatric age group (<18 years) while 4 were from the geriatric age group (>60 years). The mean age of the patients was 37.1 years. All the cases in the study were reported only from the month of September to February with the maximum number of cases in November (n=17) probably due to vegetation in the post monsoon cooler months of the year. All of the patients were from rural areas due to their close proximity to the bushes and majority of them were agriculture labourers (49%).

It is important to investigate the cause of fever in regions which are endemic for infections like malaria, dengue, leptospirosis etc. Scrub typhus also mimics several other diseases like hepatitis, pneumonia, meningoencephalitis etc. The non-specific presentation and lack of the characteristic eschar in 40% patients makes the misdiagnosis more often. Finding out the exact etiology is necessary for prompt treatment and avoidance of unnecessary antibiotics.

There are very few studies on scrub typhus from the state of Andhra Pradesh.^{9,10} The soil moisture, amount of rainfall and the vegetation are the important factors responsible for the disease transmission.¹¹ As all the patients in our study came from rural areas and majority were agricultural labourers, they have close proximity to bushes, woodpiles and secondary scrub vegetation making them more prone to the bite of the mites which live on them. Age & sex can occasionally influence the incidence of scrub typhus mainly due to their exposure to outdoor activities.

The classic case description of scrub typhus includes an eschar, regional lymphadenopathy and a maculopapular rash.¹² Our study highlights the importance of meticulous search for an eschar in suspected cases of scrub typhus as 77% of the cases in our study had an eschar while it was only 40-46% of cases in other Indian studies.^{2,13} An eschar (Fig III) is a black adherent scab with a red margin and is painless. It occurs at the site of chigger feeding and is most commonly found in the covered parts of the body (Figure-I). The eschar may develop before the onset of systemic symptoms, and can occur in multiple locations. Eschar, a useful sign of variable occurrence, has to be differentiated from anthrax. Though lymphadenopathy is common in scrub typhus, it was rare in our study similar to Kedarshwar et al study.³ Other typical finding like maculopapular rash was rare (2%) in our study while it was 14% in a study done by Vivekanandan et al.² The reason for the absence of rash may be due to the dark skin complexion among the south Indians, which often

conceals the finding.

Scrub typhus involves multiple organs including the lung, heart, CNS, and is characterised by focal vasculitis or perivasculitis leading to organ dysfunction.¹⁴ Such microangiopathies may also involve the kidney (acute renal failure), gastrointestinal tract (GI bleed), liver (hepatic dysfunction and hepatomegaly), spleen (splenomegaly), and lymph node (lymphadenopathy).¹⁵ The majority of the patients (32%) presented with hepatosplenomegaly and hepatic dysfunction similar to the other large studies done in Andhra Pradesh¹⁶ and Rajasthan.⁵

Respiratory tract involvement is a common manifestation of scrub typhus and needs to be differentiated from community acquired pneumonia. Cough and breathlessness were present in 36% and 28% of cases respectively in contrast to 53% and 47% in another study.¹⁶ 16% of the cases had signs of consolidation on clinical examination and on the chest X-ray but none had respiratory failure. Gastrointestinal symptoms in the form of vomiting and diarrhoea are common presenting features of scrub typhus and reported in many studies.^{2,13} Abdominal discomfort was found in 23% of the patients, vomiting in 20% and none had diarrhoea. The most consistent laboratory finding was hyperbilirubinemia (36%) followed by elevated transaminases (32%). This was in contrast to another study done in the same region where the raise in liver enzymes was about 80%.¹⁶ Thrombocytopenia was present in 9 patients but none of them required platelet transfusions. The major complication (Fig II) in our study was hepatitis accounting for 30% (n=13). Acute renal failure and pulmonary involvement was seen in 5 and 7 patients each (11% and 16%). Multi organ dysfunction occurred in 4 patients (9%), while one patient each suffered from shock and meningoencephalitis (2%). Elevation of serum creatinine >1.6 mg/dl was seen in 11% of the cases unlike the other study done in Andhra Pradesh where about 28% of the patients presented with renal failure.¹⁶ Out of the 5 cases, only one required dialysis.

Scrub typhus, as the name suggests is characterised by fever with altered sensorium. CNS involvement ranges from aseptic meningitis to frank meningoencephalitis.¹⁷ We had only one case of meningoencephalitis and he succumbed to death. Severity of illness is due to multiple factors like virulence of the infecting strain, host factors and nutritional status.¹⁸

The oldest test used to diagnose scrub typhus is Weil-Felix test which is most economical but lacks sensitivity and specificity.¹⁹ The current choice for the serologic diagnosis is IgM ELISA testing or indirect immunofluorescence assay (IFA), which is considered the gold standard, but its availability is limited.

Serological methods are most reliable when a four-fold rise in antibody titre is present between two sera. Commercial rapid diagnostic kits provide reliable and well-accepted preliminary results within one hour, but the availability of these tests is limited by their cost.²⁰ Antibiotics of the tetracycline class (doxycycline) have a high degree of efficacy and low toxicity in treating rickettsial infections. The treatment of choice for scrub typhus infection is doxycycline 100 mg twice daily (orally or intravenously) for adults.²¹ This treatment should be started empirically as soon as diagnosis is suspected. Majority of the patients were treated with Doxycycline 100mg twice daily for 7-15 days and 40 patients had an eventless recovery. Azithromycin was preferred in children and pregnant women. Rifampicin or azithromycin is effective in doxycycline resistant strains of scrub typhus.²¹ There were no reported cases of resistance to Doxycycline in our study. There were 5 patients under the age of 8 years and none of the patients were pregnant. Four cases in our study required ICU admission due to multi organ dysfunction out of which two recovered. Mortality occurred in two cases (4.5%), one with meningoencephalitis and the other with hypotension and shock. The mortality rate was similar to the previous Indian studies where it varied from 4-8%.^{2-6,8} Average duration of stay in the hospital was about 8 days with the maximum stay being 14 days. The limitation of the study was small sample size.

CONCLUSION

Scrub typhus is often under-reported in our country due to lack of clinical suspicion. Scrub typhus should be suspected in all cases of acute onset fever with multisystem involvement with rural background involved in agricultural activities. It should be considered in the differential diagnosis of acute febrile illness associated with gastrointestinal symptoms, respiratory symptoms, rash and myalgias. The presence of eschar in addition is diagnostic of scrub typhus. Empirical treatment with doxycycline or azithromycin may be given in cases where there is strong suspicion of scrub typhus as delay in treatment may lead to complications and higher mortality.

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