

Research Article

A study on demographic, clinical profile and outcome of scrub typhus

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ABSTRACT

Background: The objective of the present investigation was to study epidemiological profile, clinical manifestation, laboratory features, complication and out-come of scrub typhus.

Methods: This is a retrospective study at a tertiary care hospital including patients diagnosed as scrub typhus by positive ELISA test.

Results: Of the 99 cases which were positive for scrub typhus, 48.5% belonged to age group 18 - 30 years and female populations were more commonly affected 51%. Fever was the common presentation of all the cases followed by GI symptoms 95%. ARDS 11% and MODS 7% were the common complications. Impaired liver function with three fold increase in SGOT/SGPT was found in 41% of cases. Most of the cases belonged to Vellore district 51%. Mortality was observed in 6% of cases.

Conclusions: The study shows wide variety of clinical manifestation and complications of scrub typhus, a well-known mite borne disease in South India especially in the North western districts of Tamil Nadu. The study highlights the clustering of cases during the months of September to January. Due to the varied presentation and high mortality due to complications, a high index of suspicion is required.

Keywords: Scrub typhus, Eschar, MODS, ARDS, Demographic profile

INTRODUCTION

Scrub typhus, caused by *Orientia* (formerly *Rickettsia*) tsutsugamushi, is an acute infectious disease of variable severity that is transmitted to humans by an arthropod vector of the Trombiculidae family.¹ It prevails in eastern and southern Asia, northern Australia, and on the islands of the western Pacific region, including Taiwan.² It affects people of all ages including children.

Humans are accidental hosts in this zoonotic disease. While scrub typhus is confined geographically to the Asia Pacific region, a billion people are at risk and nearly a million cases are reported every year.³ It was a dreaded disease in pre-antibiotic era and a militarily important

disease that affected thousands of soldiers in the far east during the second World War.² The overall mortality varied from 7% to 9%, second only to malaria among infectious diseases.⁴ Rickettsial disease in India has been documented from Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rajasthan, Assam, West Bengal, Maharashtra, Kerala and Tamil Nadu.⁵

The clinical spectrum of scrub typhus varies from mild to moderate severity. Acute fever is the most common manifestation later accompanied by headache, myalgia and cough. Incubation period varies from 7-21 days. Eschar is a characteristic skin lesion usually observed in most of the scrub typhus patients and the bite of this mite shows a characteristic black eschar that is useful to the doctor for making the diagnosis. Severe complications include prominent encephalitis, interstitial pneumonia

and ARDS, circulatory collapse with haemorrhagic features.^{6,7}

Need for the study

Scrub typhus may cause mild symptoms, serious complications, or even death. Mortality may be as high as 35–60% if diagnosis or appropriate therapy is delayed. The goal of this retrospective study was to provide a detailed panel of clinical aspects of this disease based on a large patient population, thus helping to create a better clinical and laboratory profile of this re-emerging disease for clinicians to work with.

METHODS

Study site

This study was conducted retrospectively in the patients presented with fever in the department of general medicine of Government Vellore Medical College and Hospital, Vellore.

Study design

Retrospective study

Study duration

Total duration was 12 months from January 2015 to January 2016

Study criteria

The study group consisted of scrub typhus patients admitted in various medicine units during January 2015 to January 2016.

Inclusion criteria

Patients admitted in the medicine units who were tested positive for IgM antibody against the 56 kDa protein of *O. tsutsugamushi* by ELISA during the study period of twelve months were included in the study.

Exclusion criteria

Patients diagnosed to have some other associated infection and other causes of acute febrile illness. Patient having co-morbid condition like chronic renal failure, chronic liver disease, patient with known neoplastic disease etc.

Data were collected regarding patient demographics, clinical features, vital parameters, laboratory data (complete blood counts, serum creatinine, and liver function tests), chest radiography findings, duration of hospital stay, duration of ventilation, need for dialysis,

complications, and outcome on a predesigned data abstraction form.

For the diagnosis of associated complication for the ease of comparison same standard definitions were used as of other study on scrub typhus.⁸

Multiple-organ dysfunction syndrome (MODS): Dysfunction of more than one organ, requiring intervention to maintain homeostasis.

Acute kidney injury: A rise in serum creatinine of more than 1.6 mg/dl or urine output less than 400 ml/24 hrs failing to improve after adequate rehydration.

Acute respiratory distress syndrome (ARDS): Bilateral alveolar or interstitial infiltrates on chest radiograph and PaO₂/FiO₂ less than or equal to 200mmHg.

Hepatitis: Rise in serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvic transaminase (SGPT) of more than three times the upper normal limit and/or elevation of serum bilirubin >3 times the upper limit of normal value.

Pancreatitis: Rise in threefold or more above the normal level of serum amylase and serum lipase level with typical pain upper abdomen of pancreatitis or radiological evidence of pancreatic involvement.

Meningitis: Altered sensorium with feature of meningeal irritation like neck rigidity, positive Kernig sign with elevated protein and/or polymorphic leucocytosis on CSF analysis.

All patients diagnosed to have scrub typhus or those with strong clinical suspicion of scrub typhus were treated with doxycycline in the dose of 100 mg twice daily PO for 10 days unless it is contraindicated like pregnancy. In cases where doxycycline was not used azithromycin in a dose of 500 mg once daily for 5 days given.

Data analysis

Data analysis and data entry were done using statistical package for social sciences (SPSS) software 16 version. The results were reported in percentages for descriptive data.

RESULTS

Total 101 cases were positive for scrub typhus by ELISA between January 2015 to January 2016. Among that two patients were excluded from the study because one patient was also positive for serology of leptospirosis and other patient was positive for Dengue IgM antibody. So totally 99 cases were included in the study.

Demographic data

Gender distribution of scrub cases

Figure 1 depicts among 99 cases diagnosed as scrub typhus, there was nearly equal distribution between male (48) and female (51).

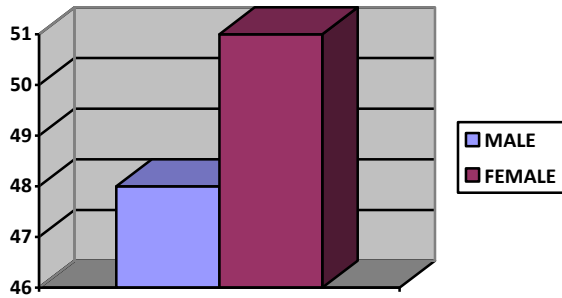


Figure 1: Gender distribution.

Age distribution

Figure 2 shows that majority of the patients belongs to the age group 18 to 30 years (48.5%) followed by 31 to 40 years (23%), 41 to 50 years (13%), 51 to 60 years (11%) and >60 years (4%).

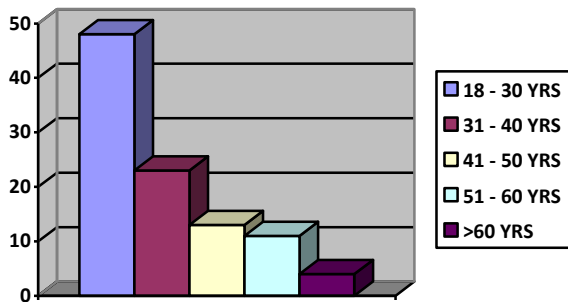


Figure 2: Age distribution.

Geographic distribution of scrub typhus

Majority of the patients admitted and diagnosed as scrub typhus belonged to Vellore district given in Table 1.

Table 1: Geographic distribution.

District	No of cases
Vellore	51
Thiruvannamalai	18
Polur	13
Arani	10
Gudiyatham	5
Sholingur	2

Seasonal variation

Figure 3 gives information about the prevalence of scrub typhus, more during rainy and winter season with maximum during month of January.

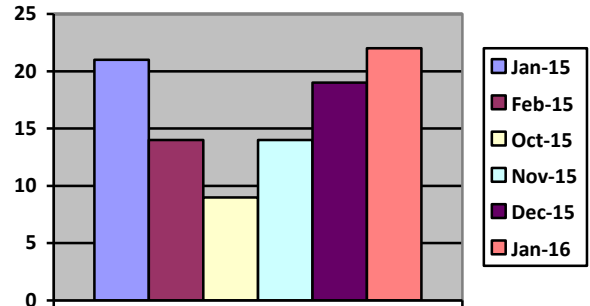


Figure 3: seasonal distribution.

As shown in the Table 2, all the patients had fever as the major symptom. Other important presentations were GI symptoms, dyspnoea and headache. The common signs were eschar seen in 45% of patient as shown in Figure 4. The rash present was mostly maculo-papular type, present in about 33% of cases. The lymphadenopathy were mostly painful with decreasing order of distribution inguinal (14), cervical (8), axillary (2). Eschar was most commonly found in the inguinal region.

Table 2: Signs and symptoms.

Symptoms	n (n%)
Fever	99 (100%)
Headache	88 (88%)
GI symptoms	95 (95%)
Dyspnoea	19 (19%)
Lymphadenopathy	24 (24%)
Cervical	8
Inguinal	14
Axillary	2
Eschar	46 (45%)
Inguinal	18
Trunk	11
Axillary	7
Penile	1
Inframammary	9
Rash	33 (33%)
Jaundice	12 (12%)
Hepatomegaly	24 (24%)
Splenomegaly	18 (18%)
Oliguria	8 (8%)
Altered sensorium	1 (1%)

Table 3 shows the laboratory profile of scrub typhus patients in which most of the patients have thrombocytopenia (56%) among which 11 patients suffer from severe thrombocytopenia. Liver enzymes SGOT &

SGPT showed threefold increase in titre among 41% of the patients. Impaired renal function in the form of elevated serum creatinine was noted in 22 patients.



Figure 4: Eschar in right axilla.

Table 3: Laboratory profile.

Investigations	n (n%)
Hb<11g%	44 (44%)
Leucocytosis	23 (23%)
Leucopenia	7(7%)
Platelet <1.5 lakh/cu.mm	56 (56%)
Platelets <50,000/cu.mm	11 (11%)
Sr.Bilirubin >2g%	18 (18%)
SGOT >150IU/L	41 (41%)
SGPT >150IU/L	36 (36%)
Sr Creatinine >1.6mg/dl	22 (22%)

Table 4: Complications and out-come.

Complication	n (n%)
ARDS	11 (11%)
Pneumonia	4 (4%)
MODS	7 (7%)
Bleeding	5 (5%)
Encephalitis	1(1%)
Mortality	6(6%)

Among the complications ARDS was most common 11%. Patients who developed MODS had poor outcome and mortality was noted among 6% of patients in this study as shown in Table 4.

DISCUSSION

Scrub typhus is a well-known mite born disease in southern India.⁹ Most of the cases were found mostly during the months of September to January though scattered prevalence was noted through-out the year.¹⁰ Similar type of clustering of cases is seen in our study. This is because during these months farmers are involved in the harvesting activity in the fields, where they are

exposed to the bites of larval mites. Further, in the immediate post monsoon period (October to early months of the next year), there is growth of secondary scrub vegetation, which is the habitat for trombiculid mites.

In our study there was nearly equal incidence of scrub typhus among female and male population with slight preponderance to females 51%, similar to the study by Saleem.⁹ The most common age group affected belonged to third decade, but study by Shirish Inamdar showed greater incidence among fourth decade.¹¹ Among the cases diagnosed, majority 51% belonged to Vellore district.

Patients usually present with fever, headache, malaise, suffused face, lymphadenopathy and eschar. It is so characteristic for scrub typhus that in the present study doxycycline was started empirically. Fever was most common clinical feature seen in our study (100%) as observed by a study of Gopal followed by gastro intestinal symptoms like abdominal pain, dyspepsia, diarrhoea etc.¹²

A necrotic eschar which is considered as most useful diagnostic clue for scrub typhus was present in 46(45%) cases of our study population similar to a study done in Taiwan though it was reported as high as 86.3% in some study and also as low as 5%.¹³⁻¹⁵ In our present study the commonest site of eschar was inguinal region 18%, followed by trunk and axilla, similar to the study by Jamil.¹⁶ Few patients had eschar in the inframammary region and one had penile eschar. Lymphadenopathy is common in scrub typhus that was seen in our study also.¹⁷ Inguinal lymphadenopathy was the commonest followed by cervical and axillary. Hepatomegaly 24% and splenomegaly 18% were also noticed among the cases.

Thrombocytopenia was observed in many patients. The observed thrombocytopenia does tend to be mild in this disease similar to the study conducted in CMC Vellore, about 56% of our patients had platelet counts <1.5 lakh/cu.mm and only 11% had severe thrombocytopenia <50,000/cu.mm. Leukocytosis (>11,000/cu mm), a common sign of bacterial etiology, was found in less than 50 (23%) of our patients.¹⁸

As with other studies, three fold elevation of SGOT (41%) and SGPT (36%) was present in many cases. Raised bilirubin more than 2 mg/dl present in 18% and raised serum creatinine of more than 1.6 mg/dl present in 22% of patients.

MODS and ARDS are the common complications associated with scrub typhus with high mortality rate. MODS were reported as high as 50% of patients without meningoencephalitis and 76.5% with meningoencephalitis.¹⁹ In our study MODS was present in 7%, meningoencephalitis in 1% and ARDS in 11% patients though other study reported meningoencephalitis as a more common complication (26%) and ARDS incidence

same as present study (11.1%).²⁰ The case fatality rate was 6% of which the most common cause was MODS, followed by ARDS.

Majority of the patients treated with doxycycline 100mg two times in a day, whereas pregnant women are treated with azithromycin 500mg once or twice in a day because doxycycline is contraindicated in pregnancy. I.V azithromycin was administered to patients who developed complications.

CONCLUSION

The study shows the wide variety of clinical manifestation and complications of scrub typhus, a well-known mite borne disease in South India. Scrub typhus is present in regions that are co-endemic for diseases that may present with similar clinical syndromes, such as malaria, dengue, typhoid, and leptospirosis. The study highlights the clustering of cases during the months of September to January. When a patient presents with fever and elevated liver enzymes with or without the presence of eschar, scrub typhus considered as differential diagnosis and an empirical therapy with doxycycline should be started if there is high index of suspicion. Due to the varied presentation and high mortality due to complications, a high index of suspicion is required.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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