

Original Research Article

Incidence of scrub typhus in a tertiary care hospital in Kolkata, India

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ABSTRACT

Background: Authors aimed to identify incidence of scrub typhus among patients of fever. Scrub typhus is an endemic disease in India caused by *Orientia tsutsugamushi*, transmitted by trombiculid mites. It is an important cause of acute febrile illness in India. Signs and symptoms include fever, headache, myalgia and GI symptoms and is generally associated with morbilliform rash (<40%), eschar (<50%) which is due to bite of the mite. Abnormal LFTs and lymphocytosis are commonly seen in early phase of illness. It's often labelled as PUO. Early diagnosis and prompt administration of therapy mostly leads to complete recovery

Methods: Authors screened 100 patients presenting with fever, malaise, headache, with or without rash for more than a week from the month of May to December 2019. Routine blood investigations with fever profile (Dengue NS1 antigen, MP, MPDA, TyphidotM) and cultures were done. Patients in whom no cause of fever could be established, having lymphocytosis, hyponatremia and transaminitis, they were tested for Scrub typhus by using Indirect immunofluorescence & detection of IgM antibody.

Results: Total 22 patients were found positive for scrub typhus by using the aforementioned method (22%). Male: Female ratio was 3:4 (9 vs 12). Patients were in the age group of 16-76 years. Lymphocytosis, hyponatremia and transaminitis were cardinal features seen in almost all patients diagnosed with Scrub Typhus.

Conclusions: This study will help clinicians to have a stronger suspicion of scrub typhus in undiagnosed febrile patients.

Keywords: Eschar, Hyponatremia, Meningitis, *Orientia tsutsugamushi*, *Rickettsia*

INTRODUCTION

Scrub Typhus, a Rickettsial disease caused by *Orientia tsutsugamushi*, generally seen in hilly and forest areas, is now being commonly encountered among patients in cities presenting with febrile illness in monsoon and post monsoon season.¹ It has a varied presentation and is an important cause of morbidity and mortality nowadays. Hence all febrile illness should be thoroughly investigated and high suspicion of scrub typhus should be there.

Scrub typhus prevails in eastern and southern Asia, western Pacific Islands, and northern Australia. The

enclosed area is often called the "tsutsugamushi triangle," with approximately one billion residents.² Scrub typhus has been listed as a category 4 notifiable disease in Taiwan since 1955.

O. tsutsugamushi is maintained by transovarial transmission in trombiculid mites. After hatching, infected larval mites (chiggers, the only stage that feeds on a host) inoculate organisms into the skin. Infected chiggers are likely to be found in areas of heavy scrub vegetation during the wet season, when mites lay eggs.

Epidemiologic clues to the transmission of a particular pathogen include environmental exposure to mites during

the season of activity or travel to or residence in an endemic geographic region during the incubation period which ranges from 6-21 days.³

We screened 100 febrile patients from the month of May to December 2019 presenting to our institution.

Common symptoms included fever, headache, weakness, myalgia with or without nausea, vomiting, cough, and gastrointestinal symptoms. Clinical diagnosis is often made by the presence of an eschar and clinical improvement following doxycycline.⁴ Identification of eschars in Indian population is difficult due to dark skin with incidence ranging from 4%-46%.⁵

A severe case of scrub typhus was defined as having septic or hypovolemic shock, acute respiratory failure (requiring intubation), acute kidney injury (serum creatinine doubled from baseline), rhabdomyolysis, and acute gastrointestinal bleeding without prior peptic ulcer history, meningoenzephalitis, myocarditis, or death.⁶ A good treatment response was defined as recovery of scrub typhus without complications.

Severe cases typically manifest with encephalitis and interstitial pneumonia due to vascular injury.³ Scrub typhus invades the central nervous system as part of systemic infection and is found in endothelial cells of blood vessels and in circulating phagocytes.⁷ Neurological manifestations with meningitis or meningoenzephalitis are the most common manifestation reported in 15%-50% patients with scrub typhus in different studies.⁸ Cranial nerve deficit is also present.⁹ The case-fatality rate for untreated classic cases is 7% but would probably be lower if all mild cases were diagnosed.³

Immunity wanes over 1-3 years, and the organism exhibits remarkable antigenic diversity.

Clinical laboratory findings such as thrombocytopenia, normal or low WBC counts with predominant lymphocytosis, mild to moderate serum elevations of hepatic aminotransferases, and hyponatremia were frequently seen and suggested some common pathophysiologic mechanisms.¹⁰ Hyponatremia (reflecting increased vascularity) is an important laboratory finding and an early finding to differentiate it from other infections.¹¹

Establishing the etiologic diagnosis of rickettsioses is very difficult during the acute stage of illness, and definitive diagnosis usually requires the examination of serum samples during the acute and convalescent phases of illness.

METHODS

This is a Cross sectional study, conducted in KPC Medical College and Hospital, Jadavpur, Kolkata.

Admitted patients in the Department of General Medicine, Intensive care unit in KPC Medical College and Hospital. Period of study was for 8 months (May to December 2019). Study population includes patients presenting with fever for more than a week.

Out of all the patients being admitted in KPCMCH with fever, during the study period, first 100 consecutive patients fulfilling the study criteria was selected for the study.

Inclusion criteria

- Patients admitted with fever but tested negative for commonly sent infective profile according to local guidelines for infectious disease (Eg: Dengue NS1 antigen, MP, MPDA, TyphidotM, viral serology).
- Patients with Pyrexia of Unknown Origin.
- Patients giving consent for the study.

Exclusion criteria

- Already diagnosed cases of fever on admission.
- Immunocompromised patients.
- Patients not giving consent for the study.

Serologic assays, Scrub typhus IgM (Indirect Immunofluorescence Assay method) were the tests performed for all the suspected patients.

Statistical analysis

Descriptive values were expressed as mean±standard deviation and percentage accordingly. The p values were two-tailed and those <0.05 were considered statistically significant.

RESULTS

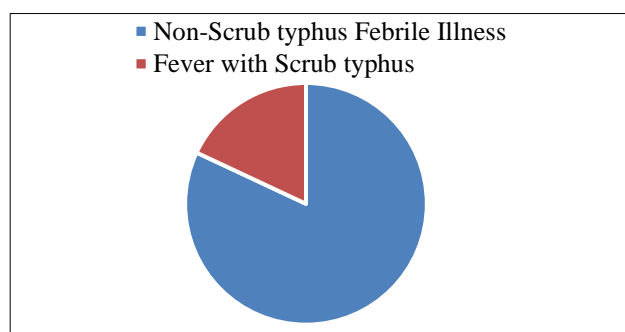
Out of the 100 febrile patients screened 22 patients were found to be scrub typhus positive. 5 out of the 22 scrub typhus patients had severe complication in the form of scrub typhus meningitis with cerebral venous sinus thrombosis. 1 patient had multiple cranial nerve palsy. There was 1 death.

Patients with non-scrub typhus febrile illnesses included Dengue fever, Malaria, Enteric fever, viral fever and other cases like acute gastroenteritis, lower respiratory tract infections, viral hepatitis, bacterial meningitis, metabolic conditions like DKA, etc. and few cases of pyrexia of unknown origin.

Patients with Scrub typhus were treated with oral Doxycycline (100 mg twice daily for 7-15 days). Although Azithromycin (500 mg once daily for 3 days), or Chloramphenicol (500 mg four times daily for 7-15 days) are alternative.

Table 1: Demographic findings of patients diagnosed with Scrub typhus.

Characteristics	Values	Normal value
Age (years)	16-76	
Gender= M: F	9:12	
Fever duration (days)	7-12	
Initial symptoms and signs		
Fever	100% (22/22)	
Skin rash	23% (5/22)	
Eschar	18% (4/22)	
Headache	86% (19/22)	
Malaise	100% (22/22)	
Cough and breathlessness	9% (2/22)	
Neck rigidity	23% (5/22)	
GI symptoms	14% (3/22)	
Initial lab tests		
WBC	8000±3500	4000-10,000/cu.mm
Lymphocytosis	>40±10	20-40%
Platelets	1.2±0.5	1.5-4lakhs/cu.mm
SGOT	100±30	0-31 U/L
SGPT	90±30	0-34 U/L
Creatinine	1.0±0.4	0.6-1.1 mg/dl
Sodium	122±5	135-145 mEq/L
Potassium	3.3±0.5	3.5-5.5 mEq/L
CRP	12-24	<6 mg/dl
Hospitalisation(days)	7±3 days	
Severe cases	8	
Response to Doxycycline	95% (21/22)	
Deaths	1	

**Figure 1: Incidence of scrub typhus among patients presenting with febrile illness.**

The pie chart shown above depicts the incidence of scrub typhus (shown in orange) among all the patients presenting with febrile illness. Rest other cases (shown in blue) included Dengue fever, Malaria, Enteric fever, viral fever and other cases like acute gastroenteritis, lower

respiratory tract infections, viral hepatitis, bacterial meningitis, metabolic conditions like DKA, etc. and few cases of pyrexia of unknown origin.

DISCUSSION

After its re-emergence, scrub typhus has become an important cause of morbidity and mortality in patients presenting with febrile illness during monsoon and post-monsoon season.¹ According to WHO, Scrub typhus is probably one of the most underdiagnosed and under-reported febrile illnesses requiring hospitalization.² It is transmitted by bite of trombiculid mites during the season of activity or travel to or residence in an endemic geographic region during the incubation period (6-21 days).³ A clinician must possess high degree of suspicion for scrub typhus if a patient of febrile illness tests negative for all the common infective profile as per the local infection control guidelines. Though Scrub typhus is commonly encountered in patients either residing in hilly or forest areas or having a travel history to endemic areas, due to urbanisation and afforestation it is frequently found in urban areas nowadays.

We conducted a study in our institute which is a tertiary care centre in Kolkata, on 100 febrile patients and performed Scrub typhus IgM on suspected cases. 22 patients were found to be positive for scrub typhus. Common signs and symptoms in such patients were fever for more than a week, malaise, headache, nausea with or without vomiting, cough, gastrointestinal symptoms. Few had maculopapular rash and majority did not. Eschar was even rare to be found only in 4 patients.

Common laboratory findings were normal or low WBC counts with predominant lymphocytosis, mild to moderate serum elevations of hepatic enzymes, and hyponatremia. Hyponatremia is an important finding and was almost invariably found in all patients with Scrub typhus.¹¹

Majority of sequelae due to scrub typhus are the outcome of "Rickettsial vasculitis".¹ Complications appear from second week onwards in form of multiorgan dysfunction. Neurological complication of Scrub typhus in the form of meningitis or meningoencephalitis is commonly mentioned in literature and was found in 5 patients.⁸ They presented with fever, headache, neck rigidity with signs of meningeal irritation, nausea and vomiting and altered sensorium. With meningitis these patients were also found to have cerebral venous sinus thrombosis. Respiratory complication in the form of pneumonia was also encountered. There was 1 reported death.

Early diagnosis and prompt initiation of treatment was the key to management. All the patients were responsive to Doxycycline and symptoms improved quite dramatically and changes were apparent after few doses of the drug. Scrub typhus is an important cause of febrile illness in India and accounts for up to 23% of all febrile

episodes occurring annually, in endemic areas.¹² Morbidity and mortality associated with the disease can be reduced to a great extent if it gets detected early and specific treatment is started without any delay.

CONCLUSION

The disease manifestation is comparable between summer and autumn. Older age, longer duration of fever, thrombocytopenia, abnormal liver and renal function, hyponatremia, and elevated CRP levels are associated with severe complications and prolonged treatment duration. Clinically, younger patient population, rapid diagnosis, and prompt treatment may be associated with a shortened disease course and a better outcome.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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