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Scrub Typhus In Rural Teaching Hospital- Our Experience

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Abstract

Background- Scrub typhus infection is an important aetiology of acute undifferentiated fever in south-east Asia and India. The World Health Organization has dubbed scrub typhus one of the world's most underdiagnosed/underreported diseases that often require hospitalization.

Methodology- A prospective study was done from June 2018 to September 2018. A total of 29 scrub positive cases admitted in wards and MICU were studied. Thorough clinical examination, routine investigations and IgM antibody for Scrub typhus by ELISA were done.

Results – A total of 29 patients were studied out of which 23 were females and 06 were males. Most common symptom was fever followed by fever associated with myalgia. Eschar was seen in 31.03% of patients. Hepatitis was seen in 3 patients. ARDS in 3 patients and MODS in 1 patient. One patient expired out of 29 patients.

Conclusion- Though unusual, we encountered 29 cases of Scrub typhus in a span of 4 months.

Keywords: Scrub Typhus, Eschar, ARDS, MODS

Introduction

Scrub typhus, also known as bush typhus, is a zoonotic rickettsial disease caused by a arthropod-borne gram-negative obligately intracellular bacillus called *Orientia tsutsugamushi*(1). Scrub typhus is a serious public health problem in the Asia-Pacific area including, but not limited to, Korea, Japan, China, Taiwan, India, Indonesia, Thailand, Sri Lanka, and the Philippines. It threatens one billion people globally, and causes illness in one million people each year(2).

The traditional endemic area of scrub typhus is known as the "tsutsugamushi triangle". It is a region covering more than 8 million km^2, from the Russian Far East in the north, to Pakistan in the west, Australia in the south, and the Japan in the east(3).It is prevalent in many parts of India and has been reported in the east, south and the Himalayas.(4)

The widespread use of insecticides and empiric treatment of febrile illness as well as changes in lifestyle all contributed to the subsequent decrease in incidence(5). However, scrub typhus is still an under-diagnosed disease in India(6). Field epidemiology studies indicate that the disease occurs all over India, from South India to Northeast India and Northwest India. There were cases reported from Maharashtra, Tamil Nadu, Karnataka, Kerala, Himachal Pradesh, Jammu and Kashmir, Uttaranchal, Rajasthan, West Bengal, Bihar, Meghalaya, and Nagaland(7)(8) The peak of the disease is between August and October. Socioeconomic status and occupation are important risk factors for scrub typhus. Most scrub typhus patients in India are uneducated and live in rural areas.(9)

The reservoirs for the infection are the chiggers (larva of trombiculid mite) and rats and humans are accidentally infected. The ricketssia is transmitted from rodents to humans by the bite of a larval stage (chigger) trombiculid mite. Approximately 5 to 14 days after being bitten by an infected vector, a Leptotrombidium mite, patients begin to exhibit

manifestations of infection such as non-specific flu-like symptoms, fever, rash, eschar at the bite site, headache, myalgia, cough, generalized lymphadenopathy, nausea, vomiting, and abdominal pain(10). Fever and headache are the most common features among scrub typhus patients. Between 95% and 100% of confirmed cases were noted to have fever in several studies(11).In some patients, an eschar may develop at the site of chigger feeding, usually at sites where the skin surfaces meet, such as axilla and inguinal area(12). The incubation period for symptoms is between six and twenty-one days from exposure.

Severe complications such as multiorgan failure occur in some cases. The severe multiorgan manifestations include jaundice, acute renal failure, pneumonitis, acute respiratory distress syndrome (ARDS), myocarditis, septic shock, meningoencephalitis, pericarditis, and disseminated intravascular coagulation (DIC)(13)(14). The pathophysiological hallmark of scrub typhus is disseminated vasculitis with subsequent vascular injury that involves organs such as skin, liver, brain, kidney, meninges and the lung.(15)

The aim of the present study is to evaluate the clinical manifestation, laboratory findings and treatment outcomes of scrub typhus in a rural teaching hospital.

Methodology

This study describes the demographic and clinical profile of 29 scrub typhus positive patients who were admitted in a rural teaching hospital at Yavatmal, Maharashtra. A total of 150 patients were studied during a span of 4 months i.e from June 2018 to September 2018. All the patients with high index of suspicion of Scrub typhus were subjected to thorough clinical examination and routine laboratory investigations like complete blood count, liver function tests and renal function tests. In all cases diagnosis was based on detection of IgM antibody against Orientia tsutsugamushi using ELISA. Patients whose IgM antibody for scrub typhus was positive were included in study and were followed up till their stay in hospital. All patients were started on i.v Cephalosporin and oral Doxycycline. Baseline investigations were done on day of admission and on day 3.

Results

A total of 29 scrub typhus positive patients were included in the study.

Table 1: Distribution of study subjects based on demographic factors

Demographic factors	Frequency	Percentage
Age (in completed years)		
0 to 10	0	0
11 to 20	6	20.7
21 to 30	4	13.8
31 to 40	7	24.2
41 to 50	6	20.7
51 to 60	3	10.3
61 to 70	3	10.3
Gender		
Female	23	79.3
Male	6	20.7

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Occupation		
Farm labourers	17	58.6
Student	7	24.2
others	5	17.2
Residence		
Yavatmal District	27	93.1
Outside Yavatmal	2	6.9

Among the 29 patients, there were 7 patients in the age group of 31 to 40 years followed by 6 patients in the age group of 11 to 20 years and 41 to 50 years each, 4 patients in the age group of 21 to 30 years, and 3 patients each in the age group of 51 to 60 years and 61 to 70 years. The youngest patient was 15 year old while the oldest was aged 69 years. The mean age of patients was 37.93 ± 16.69 years. There were 6 males and 23 females. Majority of the patients i.e. 58.6% were Farm labourers followed by students 7%. Most of the patients i.e. 93.1% were from Yavatmal district.

Table 2: Clinical features of patients diagnosed with scrub typhus

Clinical features	**Frequency**	**Percentage**
Fever with myalgia	18	62.06
Fever with chills	4	13.8
Fever with cough	4	13.8
Fever with headache	2	7.0
Fever with rash	1	3.4
Duration of fever in days		
1-5	11	37.9
6-10	13	44.8
11-15	5	17.3
Presence of Eschar		
Yes	09	31.03
No	20	68.96

Fever was the chief presenting symptom in all the 29 cases. While 58.6% patients presented with fever with myalgia, other patients had co-existing generalised weakness (3.4%), chills (13.8%), cough (13.8%), headache (7%) and rash (3.4%). The duration of fever before hospitalization ranged from 2 to 15 days with a mean of 7.58 ± 3.78 days. Mean length of stay in the hospital was 10.03 ± 3.81 days with range of 4 to 18 days. The pathognomonic feature such as eschar was seen in 09 patients.. Axilla, groin and nape of neck were the observed sites of eschar.

Table 3: Mean biochemical parameters of patients diagnosed with scrub typhus

Parameter	**Mean**

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Haemoglobin	10.53 gm/dl
TLC	8801.37/ micro-litre
Platelets	1.95 lacs/micro-litre
Urea	30.82 mg/dl
Creatinine	1.19 mg/dl
Total Bilirubin	1.02mg/dl
Sr.Potassium	3.71 mmol/Litre
Sr. Sodium	134.79 mmol/Litre
RBS	104.86 mg/dl
SGOT	68.41 IU/l
SGPT	82.06 IU/l

Fig 1. Eschar

Laboratory investigations revealed anemia in 14 of the 29 cases; thrombocytopenia in 12 patients and peripheral blood smear was normal in all patients. Total bilirubin was deranged in 3 patients. Alanine transaminase and aspartate transaminase were elevated (>40 U/L) in four patients. Serum creatinine was elevated in three patients. Of 29 patients, three developed Hepatitis, 3 landed up in ARDS and 1 patient in MODS. All critical patients were shifted to ICU. Sequential APACHE II scoring was done for all ICU patients. 3 patients having ARDS were managed successfully with higher antibiotics and mechanical ventilation. Out of 29 patients, one Patient Died Due To MODS.

Discussion

Scrub typhus is widely endemic in Asia and especially in various regions of India. Disease occurrence is more in rainy season and occurs in persons who engage in occupational or recreational behaviour that brings them into contact with mite-infested habitats.

The present study was conducted in rural teaching hospital in Yavatmal district. No cases have been reported here till now. All the cases occurred during

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rainy season. We encountered 29 cases of scrub typhus out of which 7 were critically ill and 1 patient expired.

In our study, the commonest presentation seen was that of fever with associated symptoms like myalgia, chills, cough, headache etc. Eschar was seen in 09 patients. Though lymphadenopathy is common in scrub typhus, it was rare in present study.

12 patients had thrombocytopenia. 3 patients had deranged renal function test. 4 patients had deranged liver function test.

Of 29 patients, three developed Hepatitis, 3 landed up in ARDS and 1 patient in MODS. All critical patients were shifted to ICU. Sequential APACHE II scoring was done for all ICU patients. 3 patients having ARDS were managed successfully with higher antibiotics and mechanical ventilation. Out of 29 patients, one patient died due to MODS

Indirect immunofluorescence assay (IFA) is highly sensitive and considered 'gold standard' but its use is limited by the cost and availability. Microimmuno-fluorescence, immunoperoxidase assay, latex agglutination, indirect hemagglutination, enzyme linked immunosorbent assay, dot blot immunoassay (including dipstick test) are various other serological tests available.(16) Polymerase chain reaction can detect acute infection with Orientia tsutsugamushi(17). A rapid immunochromatographic assay which uses recombinant major outer membrane protein Antigen of Orientia tsutsugamushi to detect IgM, IgG and IgA antibodies has been shown to be reliable and suitable for use in developing countries but is expensive(10).

Doxycycline remains the antibiotic of choice for treatment of scrub typhus(10). Azithromycin and rifampicin are other antibiotics useful for the treatment of this infection. In our series all the patients were treated with i.v cephalosporins and oral doxycycline for which they responded well.

Conclusion

In conclusion scrub typhus is endemic in many parts of India and all clinicians should be well aware of the disease. When a patient presents with fever and elevated liver enzymes with or without the presence of eschar, a diagnosis of scrub typhus should be considered and an empirical therapy with doxycycline should be started if there is high index of suspicion. Though eschar is pathognomonic of the disease, it may not be commonly seen, and its absence does not rule out scrub typhus. An early diagnosis & timely antibiotic therapy may prevent further complications.

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