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"Scrub typhus": One of the leading cause of febrile illness: A report from a tertiary care centre

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Abstract
Introduction: Scrub typhus a neglected zoonoses and taken as differential diagnosis only after ruling out other causes of fever has now re-emerged and its prevalence also started to rise. This study is to show the prevalence of Scrub typhus in Northeast and its atypical presentation.
Materials and Methods: The study included all cases of fever which were undiagnosed in the district level and tertiary hospital like Gauhati Medical College and Hospital from whom serum sample was taken and detection of IgM for scrub typhus was done by using In Bios International TM IgM ELISA.
Results: Out of 148 cases, 33 were found to be positive, among the positive cases the number of males were more than females. The highest number of case was from Sonitpur district and patients mostly belong to age group 25-36 yrs.
Conclusion: Thus scrub typhus can no longer be neglected but it should be included in routine differential diagnosis of fever even when there is no typical history or clinical presentation.

Keywords: *Orientia tsutsugamushi*, tsutsugamushi triangle, meningoencephalitis, Asian-pacific, coagulopathy

Introduction

Scrub typhus is an infectious disease caused by *Orientia tsutsugamushi*, an obligate intracellular bacteria, transmitted by the bites of chigger mites. It is a leading cause of treatable non-malarial febrile illness in South-east Asia. It was originally associated with the Asian-Pacific "Tsutsugamushi triangle," until recent evidence from the Arabian Peninsula, Chile and possibly Kenya which suggests wider global distribution in tropical and subtropical regions [1]. Trombiculid mite species are known to be prevalent in Asia, Pacific Rim islands, some pockets in the north of Australia, and some areas of Chile [2]. Leptotrombidium deliense and Leptotrombidium akamushi are the two most important vectors in India and many other Asian countries [3].

Based on scant data there are one billion people at risk of scrub typhus; with one million clinical cases annually in Southeast Asia alone. Although the exact prevalence of scrub typhus is not available, several studies showed that the disease burden in rural Asia is high–causing in some areas over 20.0% of febrile illness admitted to hospital[2]. The World Health Organization has dubbed scrub typhus one of the world's most underdiagnosed /underreported diseases that often requires hospitalization [4].

In India, Scrub Typhus is considered as a re-emerging infectious disease and has been reported from Rajasthan, Jammu & Kashmir and Vellore. The first infection in the country was reported from the States of Assam and West Bengal during the Second World War (1942). Outbreaks have been reported in Himachal Pradesh, Sikkim, West Bengal, Puducherry, Uttarakhand and north-western part of the country. During 2010-2011, resurgence was reported in Assam after a gap of 65 years, since its maiden report. Thereafter, sporadic cases in the State of Assam as well as from its neighbouring States have been reported [5].

Disease presents as abrupt high fever, severe headache, lymphadenopathy, generalized myalgia, eschar, and rash. The eschar, a painless lesion at the site of the bite of an *Orientia tsutsugamushi*-infected Leptotrombidium chigger mite is considered pathognomonic which is seen a few days after the chigger bite, but before disease presentation, and therefore is an important early sign associated with scrub typhus. Though many professional phagocytic cells like dendritic cells, macrophages, neutrophils may be infected by *O. tsutsugamushi*, the ultimate target cells are the endothelial cells, so all tissues and organs of the body can be infected[6]. Progression of severe scrub typhus mostly manifest as acute respiratory distress, meningoencephalitis, gastrointestinal bleeding, acute renal failure, hypotensive shock, and coagulopathy [7].

The study was carried out to ascertain the prevalence of scrub typhus in febrile illness cases.

Materials and Methods

The study included a total of 148 febrile illness cases which were undiagnosed at the district level and tertiary hospital like Gauhati Medical College and Hospital. Blood samples were collected from the patients for detecting IgM for Scrub typus and detection of IgM for scrub typhus was done by using In Bios International IgM ELISA. The tests were done in the department of Microbiology, Gauhati Medical College and

Hospital. Blood samples were collected from the patients and after separation of serum it was tested for IgM antibody for scrub typhus. Samples from other district were collected in their respective places and were sent maintaining proper cold chain.

Results

Total number of samples tested were 148, out of which 33 samples were found to be positive for IgM ELISA for scrub typhus. Prevalence rate is found to be 22.2%. Among the positive cases, the number of males were 23 and females were 10 with a male female ratio of 2.3:1 (Table 1).

Highest percentage of positive cases was found in the age group 25-36years (24.2%) followed by age group 37-48 years,13-24 years (21.2%) and 0-12 years, 49-60 years (15.1%) (Table2).

The highest number of case was detected from Sonitpur district followed by Barpeta, Nagaon etc. Single case was referred from neighbouring state ie Arunachal Pradesh (Table3).

The most common symptom among patients was fever followed by altered sense of consciouness, headache, loose stools, jaundice, conjunctival congestion, hepatitis, epistaxis, and Myalgia and skin rash (Figure 1).

Table 1: Gender wise distribution of Scrub typhus cases

Gender	Total	Positive cases
Male	95	23 (69.6%)
Female	53	10 (30.3%)
Total	148	33 (22. 2%)

Table 2: Age wise distribution of Scrub typhus cases

Age group (years)	Total case	Positive cases
0-12	34	7 (21.2%)
13-24	38	5(15.1%)
25-36	31	8 (24.2%)
37-48	24	7 (21.2%)
49-60	12	5 (15.1%)
>60	8	1 (3%)
Total	147*	33

*Unknown 1

Table 3: Distribution of scrub typhus cases in different district

District	Total number	Positive cases
Sonitpur	89	10
Barpeta	5	4
Nagaon	4	3
Dima Hasao	7	3
Nalbari	4	2
Kamrup rural	7	0
Kamrup metro	9	2
Baksa	3	0
Lakhimpur	2	2
Golaghat	2	0
Dhubri	4	2
Dhemaji	1	0
Darrang	5	1
Goalpara	1	1
Udalguri	1	1
Morigaon	1	1
Karbi Anlong	2	0
Huri (Arunachal Pradesh)	1	1

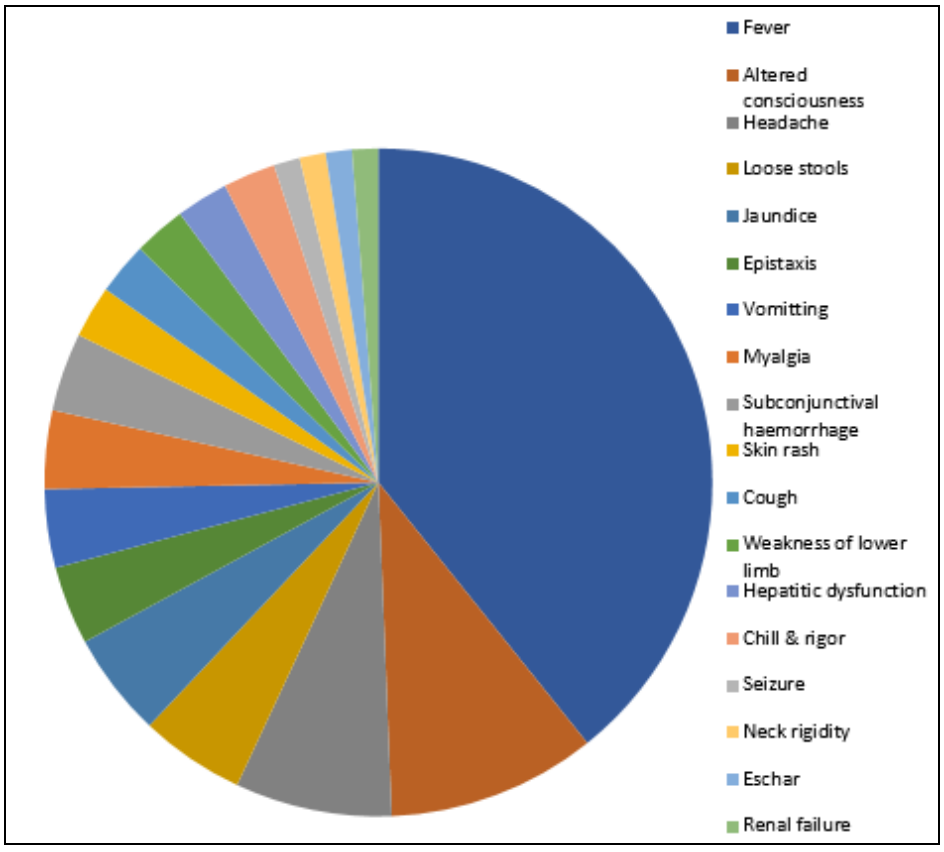

Fig 1: Showing clinical presentation of positive cases

Discussion

In this study, the prevalence rate of Scrub typhus is found to be 22.2% among the undiagnosed cases of fever. Prevalence rate however varies in different studies conducted in different places. In another study conducted in Northeast by Khan SA *et al.* [5] the prevalence was found to be 45.1%. Whereas in studies conducted in different parts of the country by Rizvi M *et al.* [8] incidence of scrub typhus was reported as 25.5%, in Andhra Pradesh by Ramashryee A *et al.* [9] prevalence is 39% and in a study conducted by Vinod Kumar CS *et al.* the prevalence rate is 16.57%.

Out of 31 positive cases, 23 were male and the rest were female showing male predominance. The study conducted by Ramashryee A *et al.* [9] also showed male predominance among positive cases, whereas study conducted by Rizvi M *et al.* [8], Vinod Kumar CS *et al.* [10] and Luthra M *et al.* [11] showed female predominance among positive cases.

In our study, patients mostly belong to 25-36years of age group, followed by age group 37-48 years, 13-24 years and 0-12 years, 49-60 years. The prevalence of Scrub typhus among different age group is different in different studies. The study conducted by Luthra M *et al.* [11] showed more prevalence in age group 20- 30 yrs and in a study by Ramashryee A *et al.* [9]. In another study by Vinod Kumar CS *et al.* [10] pedominant age group was 31-40 yrs. In our study a majority of cases (21.2.%) also found in the age group 0-12 years whereas study by Vinod Kumar CS *et al.* [10] and Luthra M *et al.* [11] found 10 % and 5.6% only in the age group <10 years of age. However another study by J. Balaji *et al.* [12] reported 39.6% positivity of scrub typhus in the age group 0-12 years.

The positive cases belong to different districts of Assam except for one case that belong to a place named Huri in Arunachal Pradesh and maximum cases belong to Sonitpur district followed by Barpeta district of Assam.

In our study, fever was seen as the most common clinical presentation among the patients followed by other symptoms and signs. This is similar to other study conducted by Ramasyree A *et al.* [9] and Luthra M *et al.* [11] where fever is seen as the most common presentation among patients. However the typical eschar formation followed by fever and jaundice was noted in only one patient from Arunachal Pradesh. Other studies conducted by Vinod Kumar CS, *et al.* [10] and Luthra M *et al.* [11] also reported 8 out of 61 and 16 out of 197 cases of eschar formation in patients. There were also no reports of eschar formation in patients in studies conducted by Rizvi M *et al.* [8] and Ramasyree A *et al.* [9].

Conclusion

Scrub typhus has been reported from different parts of India both northern and southern states and also from different states of Northeast showing its prevalence in undiagnosed case of fever. It is high time now to include it in differential diagnosis of fever as it has become one of the re-emerging disease which can no longer be neglected with its rising prevalence and its severe form which can lead to increase mortality rate. And only 3 doses of Doxycycline can reduce this mortality rate. Thus our study shows it prevalence from this part of the country and it should not be missed clinically as many a times there may not be typical presentation as seen in our study.

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