

SHORT ARTICLE

A study of scrub typhus cases from a tertiary care hospital in DehradunMegha Luthra¹, Amit Varma², Sudhir Kumar Gupta³, Kamal Singh Negi⁴¹Professor, ³Professor & Head, ⁴Professor, Department of Community Medicine; ²Professor & Head, Department of Medicine, Sri Guru Ram Rai Institute of Medical and Health Sciences, Dehradun

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Citation

Luthra M, Varma A, Gupta SK, Negi KS. A study of scrub typhus cases from a tertiary care hospital in Dehradun. Indian J Comm Health. 2015; 27, 1: 150-154.

Source of Funding : Nil **Conflict of Interest:** None declared

Article Cycle

Submission: 25/01/2015; **Revision:** 31/01/2015; **Acceptance:** 22/03/2015; **Publication:** 31/03/2015

Abstract

Introduction: Scrub Typhus is a trombiculid mite-borne rickettsial zoonosis caused by *Orientia tsutsugamushi*, which is widely endemic in the Asia–Pacific region and threatens a population of millions. **Aim and Objectives:** To study epidemiology and clinical profile of Scrub Typhus Cases in a clinical setting and to clarify current diagnostic issues of scrub typhus. **Materials and methods:** Study period was August to December 2014. 197 clinical cases confirmed by positive result in immunoglobulin (IgG, IgM or IgA) using a rapid immuno-chromatographic assay (Bioline SD Tsutsugamushi One Step Scrub typhus Antibody test) were included. **Results:** 27.4% cases were in the age group of 20-30 years followed by cases in the age group of 10-20 as well as 40-50 years (15.7%). More than half of all the cases were female (58.4%). 29.9% were still studying and and 17.8% were illiterate/just literate. 29.4% cases were from district Dehradun followed by cases from district Saharanpur (25.4%). Most cases were not working, i.e. were housewives (42.6%) followed by students (29.9%). Most common presenting features were fever with gastro-intestinal symptoms (51.3%). All the cases were treated with appropriate antibiotics (Doxycycline, Azithromycin and a higher generation cephalosporin for secondary complications). 38.1% cases went on to develop a complication during their hospital stay. All were discharged in satisfactory condition except for two mortalities during the study period

Key Words

Scrub Typhus; immuno-chromatic assay

Introduction

Scrub typhus is an acute febrile illness varying from mild and self-limiting to fatal. Onset is by fever, headache, myalgia, cough and gastrointestinal symptoms. A typical eschar is found in more than 50% cases. There is regional lymphadenopathy and a maculopapular rash on 4th to 6th day of illness in some. Severe cases are characterized by encephalitis and interstitial pneumonia due to vascular injury with a CFR of 7% (1).

This trombiculid mite-borne rickettsial zoonosis caused by *Orientia tsutsugamushi*, is widely endemic in the Asia–Pacific region, and it threatens a population of millions of people (2). Although

effective drug therapy is widely available, scrub typhus remains a severe public health problem in China, with increasing reports of drug-resistant strains of *O. tsutsugamushi* and travel-acquired cases (3). Scrub typhus is common throughout in rural and in suburban areas in Korea, and is one of the most frequently reported infectious diseases during the months of October and November (4). The annual incidence of the disease has increased steadily and its reported incidence sharply rose to 6,480 cases in 2006 in Korea (5). Scrub Typhus is also endemic in Taiwan, Thailand, Vietnam and Japan (6-9).

In India, the disease is included in the list of infectious diseases under surveillance (IDSP), still there is underestimation of its prevalence and hazard (10). As an emerging infectious disease, scrub typhus has a trend of wide and fast spread in the past two decades. There is a study on a recent outbreak of scrub typhus recorded during the cooler months in patients admitted to a hospital in Southern India with acute febrile illness associated with diverse signs and symptoms (11). Seasonal outbreaks of febrile illness with eschar have been occurring in Bishnupur district of Manipur since 2001(12). To identify risk factors for scrub typhus in Darjeeling, a comparison study was carried out (13).

Deaths caused by delay in diagnosis and treatment can occur in scrub typhus patients. To prompt early diagnosis, guide subsequent therapy, and minimize the mortality of scrub typhus, current diagnostic issues are required to be identified, and effective strategies should be established.

Aims & Objectives

1. To Study epidemiology and clinical profile of Scrub Typhus Cases in a clinical setting.
2. Clarify current diagnostic issues of scrub typhus

Material and Methods

Medical records of confirmed Scrub Typhus patients (by immuno-chromatic assay) admitted to SMIH, Dehradun (Uttarakhand) from August to December 2014 were analyzed. Those cases were excluded from the study whose records were incomplete.

Clinical Case: Coexistence of more than or equal to three of the following items can be used to diagnose a clinical case of scrub typhus:

1. Field exposure history 1–3 weeks before onset;
2. Clinical features including high fever, lymphadenopathy, skin rash, splenomegaly, hepatomegaly, or multiorgan dysfunction etc;
3. Typical cutaneous lesions (eschars or rash);
4. Rapid defervescence with appropriate antibiotics (2).

Confirmed Case: Clinical case with a positive result in immunoglobulin (IgG, IgM or IgA) using a rapid immuno-chromatographic assay (Bioline SD Tsutsugamushi One Step Scrub typhus Antibody test). Based on the above, a total number of 197 confirmed cases were included in the study.

Results

Maximum cases (27.4%) were in the age group of 20-30 years followed by cases in the age group of 10-20 as well as 40-50 years (15.7%).

More than half of all the cases were female (58.4%). A study by education revealed that maximum cases (29.9%) were students and 17.8% were illiterate/just literate.

Maximum cases were from district Dehradun (29.4%) followed by cases from district Saharanpur (25.4%). Cases from various districts of Uttarakhand, Uttar Pradesh and from a few districts of Himachal Pradesh were also found

A study by occupation revealed that most cases were not working, i.e. were housewives (42.6%) followed by students (29.9%).

As is well documented, the most common clinical features were fever with gastro-intestinal symptoms (51.3%) followed by fever with respiratory symptoms (23.9%). However, presentation with multiple clinical features was also common (81.7%).

All the cases were treated with appropriate antibiotics (68.0% received Doxycycline, 75.6% received Azithromycin and 59.9% also received a higher generation cephalosporin). 75 (38.1%) cases went on to develop a complication during their hospital stay. All were discharged in satisfactory condition except for two mortalities during the study period. In this study all the cases included were confirmed by rapid immune-chromatographic assay

Discussion

A total number of 197 cases confirmed by immune-chromatographic assay were included in the study. Maximum cases seen in this hospital (27.4%) were in the age group of 20-30 years followed by cases in the age group of 10-20 as well as 40-50 years (15.7%). More than half of all the cases were female (58.4%). A study by education and occupation revealed that maximum cases (29.9%) were still studying, i.e. did not conform to any one of the standard educational groups and some were small children. ICMR states that cases are more likely to have exposure to rodents at home or at work, and activities which expose them to the risk of encountering chiggers (larvae of trombiculid mites: the vector of this zoonotic disease) while sitting in grass blades, bushes, shrubs (14). Maximum cases were from district Dehradun (29.4%) followed by cases from district Saharanpur (25.4%). Cases from various districts of Uttarakhand, Uttar Pradesh and from a few districts of Himachal Pradesh were also found.

This finding can be explained on the basis of catchment area of SMIH.

A study by occupation revealed that most cases were not working, i.e. were housewives (42.6%) followed by students (29.9%). Farmers constituted only 3% of the cases. It is a known fact that scrub typhus occurs in areas where scrub vegetation (low lying trees and bushes) is encountered, and also in habitats as diverse as banks of rivers, rice fields, poorly maintained kitchen gardens (15), grassy lawns which can all be inhabited by chiggers (16). It is also known that the disease was more common among individuals who defecated or urinated in the jungle or bushy areas from a squatting position (12). Students are at risk of encountering chiggers while sitting in grass blades, bushes, shrubs (14).

As well documented elsewhere (1), the most common clinical features in this study were fever with gastro-intestinal symptoms (51.3%) followed by fever with respiratory symptoms (23.9%). However, presentation with multiple clinical features was also common (81.7%). All the cases were treated with appropriate antibiotics (68.0% received Doxycycline, 75.6% received Azithromycin and 59.9% also received a higher generation cephalosporin). 75 (38.1%) cases went on to develop a complication during their hospital stay. All were discharged in satisfactory condition except for two mortalities during the study period.

In this study all the cases included were confirmed by rapid immune-chromatographic assay. As per WHO, cheapest and most easily available serological test is the Weil-Felix test which is unreliable and is now being replaced by a complement-fixation test. The gold standard is indirect immune-fluorescence antibody (IFA). Indirect immune-peroxidase (IIP) is a modification of the standard IFA method that can be used with a light microscope, and the results of these tests are comparable to those from IFA. Commercial rapid diagnostic kits provide well-accepted preliminary results within one hour but other serological tests must be used in order to obtain confirmation (14). ELISA can be considered for use in conjunction with rapid diagnostics.

Conclusion

From the present work it can be concluded that most cases of scrub typhus occur in the ages between 10-50 years and in females. The disease tends to afflict people who are poorly educated and are not of working class (students and housewives) with

predominant presenting features of fever and gastro-intestinal disturbances followed by fever and respiratory complaints. Combination of Doxycycline and Azithromycin and higher generation cephalosporins for secondary infections were found to be effective antibiotics for management.

It can be suggested that in the absence of large scale availability of gold standard tests (IFA and IIP), emphasis should be shifted to early diagnosis with one or more rapid tests (Immuno-chromatographic assay, ELISA) and start of early treatment with appropriate antibiotics in all cases of fever of more than 5 days duration. Generating awareness among the masses about transmission of disease, stoppage of open defecation and personal prophylaxis to prevent chigger bite will go a long way in preventing this potentially hazardous disease.

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Tables

TABLE 1 AGE-WISE DISTRIBUTION OF SCRUB TYPHUS CASES

Age Group	Number	Percentage
<10 years	11	5.6
10-20 years	31	15.7
20-30 years	54	27.4
30-40 years	47	23.9
40-50 years	31	15.7
50-60 years	15	7.6
>=60 years	08	4.1
Total	197	100.0

TABLE 2 EDUCATIONAL STATUS OF SCRUB TYPHUS CASES

Educational Status	Number	Percentage
Illiterate/Just Literate*	35	17.8
Primary School	04	2.0
Middle School	34	17.3
High School	11	5.6
Intermediate	15	7.6
Graduate	18	9.4
Post Graduate/Others	21	10.7
Students	59	29.9
Total	197	100.0

* Includes children below 5 years of age

TABLE 3 DISTRICT-WISE DISTRIBUTION OF SCRUB TYPHUS CASES

District	Number	Percentage
Bijnor	06	3.0
Chamoli	08	4.1
Dehradun	58	29.4
Haridwar	11	5.6
Kailath	01	0.5
Muzafarnagar	03	1.5
Paonta Sahib	07	3.6
Pauri	06	3.0
Rampur	01	0.5
Roorkee	06	3.0
Rudraprayag	01	0.5
Saharanpur	50	25.4
Shimor	03	1.5
Shrinagar	01	0.5

Tehri	17	8.6
Uttarkashi	18	9.1
Total	197	100.0

TABLE 4 OCCUPATIONAL STATUS OF SCRUB TYPHUS CASES

Occupation	Number	Percentage
Student	59	29.9
Unemployed	04	2.0
Labourer	05	2.5
Farmer	06	3.0
Businessman / Shopkeeper	12	6.1
Private Job	24	12.2
Government Job	03	1.5
Housewife	84	42.6
Total	197	100.0

TABLE 5 CLINICAL FEATURES OF SCRUB TYPHUS CASES

Clinical Feature	Number	Percentage
Fever	189	95.9
Eschar	16	8.1
CVS Symptoms	01	0.05
CNS Symptoms	46	23.3
GIT Symptoms	101	51.3
Respiratory Symptoms	47	23.9
Other complaints	59	29.9
Multiple Responses	161	81.7