



SCRUB TYPHUS: CLINICAL PROFILE AND LABORATORY INVESTIGATIONS

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ABSTRACT

Background: Scrub typhus is an acute febrile illness caused by *Orientia tsutsugamushi* and is transmitted to humans by the bite of larva of trombiculid mites. The Aim of the present work was to study the changes associated in clinical profile and laboratory manifestations of scrub typhus patients. **Methods:** We conducted Retrospective study in Department Of Microbiology, Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati over a period of Jan 2013 – Dec 2016. Detection IgM antibodies was done by ELISA using In Bios International TM IgM ELISA manufactured by (In BIOS International Inc.USA). Clinical features and laboratory findings of the patients were retrieved from hospital medical records. The Statistical software IBM SPSS for windows version 16.0 Armonk, NY IBM Corp. was used for data analysis. **Results:** In this study 857 patients were confirmed to have scrub typhus by serology. In Our study greatest number of scrub typhus were reported in the age group 18-49 (51.34%). Male and female ratio was 1.06:1. Fever was the most common symptom (100%). The most severe complication was Hepatic dysfunction (49.9%) followed by renal dysfunction paedal odema (14.5%), splenomegaly (5.3%), meingoencephalitis (4.2%), respiratoryfailure (4.08%), lymphadenopathy (2.33%), septic shock (1.8%) conjunctival congestion (1.4%),cerebral atrophy and pericardial effusion (1.28%) and jaundice (0.1%) in decreasing order. Laboratory findings noted were Erythrocyte Sedimentation Rate (67.6%) thrombocytopaenia (66.2%), Aspartate transaminase (61%), leucopaenia (52.5%), leucocytosis (32.5%), Alanine transaminase (28.2%) and thrombocytosis (1.1%). **Conclusion:** We conclude that prompt clinical findings and confirmed diagnosis will be helpful for clinicians to initiate appropriate treatment without delay leading to reduction of morbidity and mortality.

KEYWORDS: Fever, *Orientia tsutsugamushi*, Scrub typhus, Thrombocytopaenia, Tirupati.

INTRODUCTION

Scrub typhus is Rickettsial disease caused by *Orientia tsutsugamushi*, an obligate intracellular gram negative bacteria which was first isolated in Japan and is transmitted to humans by the bite of larva of trombiculid mites (chiggers),^[1] which are almost microscopic and frequently brilliant red in colour.^[2] Rickettsiosis, of which scrub typhus is commonest and evidently reported from several states in India.^[3] *O.tsutsugamushi* multiplies at the inoculation site and form a black eschar.^[4] Severe life threatening manifestations occurring in scrub typhus patients include interstitial pneumonia, meningoencephalitis, hepatosplenomegaly, acute renal failure, cardiac dysfunction and disseminated intra vascular coagulation.^[5] Diagnosis of rickettsial diseases by various serological methods are available but DNA PCR can be confirmatory and highly specific.^[2,6] The present work is carried out to study the clinical profile and laboratory findings in patients affected with scrub typhus, arouse clinical awareness and facilitate its proper diagnosis, treatment and prevention.

MATERIAL AND METHODS

This is a Retrospective study conducted in Department Of Microbiology, Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati over a period of 4 years from Jan 2013 – Dec 2016. The samples were processed for the detection of IgM antibodies for the diagnosis of scrub typhus by detection IgM antibodies by ELISA using In Bios International TM IgM ELISA kit manufactured by (In BIOS International Inc. USA). Clinical features and laboratory findings of the patients were retrieved from hospital medical records. Non-continuous variables were summarized as median [interquartile range (IQR)]. Categorical variables were summarized as percentages. Chi square test was performed for categorical data. Statistical significance was defined as “p” value less than 0.05. The Statistical software IBM SPSS for windows version 16.0 Armonk, NY IBM Corp. was used for data analysis.

RESULTS

Table 1: Age-wise distribution.

Age	Number of cases	Percentage	IQR
Group 1 (1 to 17)	55	6.42	13(6-15)
Group 2 18 to 49	440	51.34	34(26-42)
Group 3 50 and above	362	42.24	62(56-70)

The present study showed that the total of 857 patients were test positive by IgM ELISA against scrub typhus. Most of them were affected in the age group 2 (18-49), followed by group 3 (50 & above) and group 1(17-49) respectively. Group 2 (51.34%), group3 (42.24) and group1 (6.42) followed respectively. (Table -1).

Table 2: General clinical symptoms.

Symptoms	No. of positives	Percentage
Fever	857	100
Rash	225	26.2
Body ache	206	24.3
Eschar	32	3.73
Headache	193	22.5
Vomiting	126	14.7
Altered sensorium	107	12.4
Neck swelling	78	9.1
Chest pain	95	11.08
Facial puffiness	44	5.1
Cough	101	11.7
Urinary tract infections	137	15.9
Loose stools	53	6.18

Common presenting symptoms were fever (100%), Rash (26.2%), Body ache (24.3%), Headache (22.5%), Urinary tract infections (15.9%), Vomiting (14.7%), Altered sensorium (12.4%), Chest pain (11.08%), Cough (11.7%), Neck swelling (9.1%), loose stools (6.18%), facial puffiness (5.1%) and Eschar (3.73). Present study showed that fever is the most common symptom in all the patients were (100%) and least common one in patients were eschar (3.73%) (Table-2).

Table 3: Severe complications.

Complication	No. of patients	Percentage
Hepatic dysfunction	428	49.9
Renal dysfunction	167	19.4
Meningo encephalitis	36	4.2
Myocarditis	8	0.93
Pleural effusion	6	0.69
Respiratory failure	35	4.08
Splenomegaly	46	5.36
Paedal odema	125	14.5
Generalised lymphadenopathy	20	2.33
Conjunctival congestion	12	1.4
Jaundice	01	0.1
Cerebral atrophy	11	1.28
Prostatomegaly	09	1.05
Endocarditis	36	4.2
Septic shock	16	1.86
Pericardial effusion	11	1.28
Severe anemia	375	43.7

Most of the patients presented with severe complications like hepatic dysfunction (49.9%), severe anemia (43.7%), Renal dysfunction (19.4%), Paedal odema (14.5%), splenomegaly (5.36%), Meningo encephalitis & endocarditis (4.2%), Respiratory failure (4.08%), Generalised lymphadenopathy (2.33%), Septic shock (1.86), Conjunctival congestion (1.4%), Cerebral atrophy & Pericardial effusion (1.28%), Prostatomegaly (1.05%), Myocarditis (0.93%), Pleural effusion (0.69%) and jaundice (0.1%). Present study showed that highest severe complication were hepatic dysfunction (49.9%) and least severe complication were jaundice (0.1%). (Table - 3).

Table 4: Laboratory findings of scrub typhus.

Test	Ni/Nt	Percentage
A) Haemoglobin	375/857	43.7
B) RBC count	435/857	50.9
C) WBC count		
Leucocytosis	279/857	32.5
Leucopaenia	450/857	52.5
D) Platelet count	578/857	67.4
Thrombocytopaenia	568	66.2
Thrombocytosis	10	1.1
E) Erythrocyte sedimentation Rate (ESR) (mm/hr)	64/857	67.6
F) Aspartate Amino Transferase (AST) (iu/l)		
Elevated AST	523/857	61.0
G) Alanine AminoTransferase ALT (iu/l)		
Elevated ALT	242/857	28.2

Laboratory findings of patients presenting abnormal test results were elevated erythrocyte sedimentation rate

(67.6%), thrombocytopaenia (66.2%), Aspartate Amino Transferase (61%) leucopaenia (52.5%), abnormal RBC count (50.9%), Haemoglobin (43.7%), leucocytosis (32.5%), Alanine Amino Transferase (28.2%), thrombocytosis (1.1%). The present study showed that highest abnormal levels of ESR in patients were (67.6%) and least were thrombocytosis (1.1%). (Table-4).

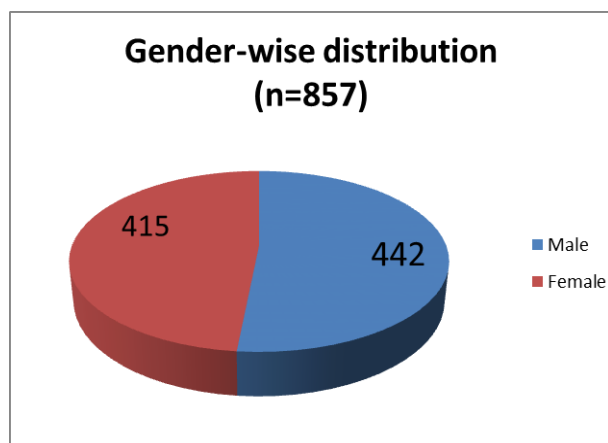


Figure 1: The male predominance 442 (51.5%) than female 415 (48.4%).

DISCUSSION

Scrub typhus affects almost a million of people every year and mainly occurs in populations that encounter scrub vegetation as part of their occupation or daily life.^[7] In this study 857 patients were confirmed to have scrub typhus by serology. Scrub typhus is widely endemic in many countries of Asia. In India scrub typhus cases have been documented from Jammu and Kashmir, uttaranchal, Rajasthan, West Bengal, Tamilnadu, Kerala, Bihar, Karnataka and Meghalaya.^[8,9,10] The greatest number of scrub typhus in Korea was in the age group 50 – 69 years.^[11] In our study highest number of scrub typhus patients were in the age group of 18-49 (51.34%). Number of cases in group 1 were significantly lesser as compared to age group 2 ($p > 0.001$) and age group 3 ($p > 0.001$). Nowneet Kumar Bhat al reported the ratio of affected male and female as 1.44:1 whereas in our study the ratio was 1.06:1.^[12]

Fever, rash, lymphadenopathy and eschar are the most common symptoms of scrub typhus and are important in the clinical diagnosis of this disease. In the present study fever was present in 100% of the patients and findings are comparable to the previous studies like Chang-Ting Huang et al and Sanjeev Kumar Digra et al.^[13,14] A necrotic eschar appeared at the inoculating site of the mite.^[15,16] Mahajan et al found incidence of eschar in northern India was 9.5% and another study George et al reported eschar 43.5%.^[17,18] In our study less number of patients presented eschar (3.73%). Most severe complications in scrub typhus develop after first week of illness and are directly related to the blood load of *O.tsutsugamushi*.^[19] In the present study, the most common organ dysfunction was hepatic dysfunction (49.9%) followed by renal dysfunction (19.4%), pedal

edema (14.5%), splenomegaly (5.3%), meingoencephalitis (4.2%), respiratory failure (4.08%), lymphadenopathy (2.33%), septic shock (1.8%), conjunctival congestion (1.4%), cerebral atrophy and pericardial effusion (1.28%) and various complications correlate with other study by Mahajan et al.^[17] Most of the patients had elevation of serum transaminases, even without any other evidence of multi organ dysfunction.^[19] In the present study abnormal Aspartate transaminase AST was observed in 61% and abnormal Alanine transaminase ALT in 28.2% patients. Other laboratory findings noted were thrombocytopaenia (66.2%), thrombocytosis (1.1%), elevated Erythrocyte sedimentation rate (67.6%), leucocytosis (32.5%), leucopaenia (52.5%) while low platelet count and leukocytosis are thought to be associated with severe scrub typhus.^[5,20,21] Various laboratory tests are available for diagnosis of rickettsial diseases but gold standard test is Indirect Immunofluorescence Assay.^[2,22] Weil- felix test and ELISA are the most economic tests available in India. Weil – felix test is highly specific, but poor in sensitivity.^[15] In the present study we used ELISA testing for IgM antibodies against *O.tsutsugamushi* for diagnosis. The test has shown good sensitivity and has been adequately validated.^[23]

CONCLUSION

Scrub typhus is a serious form of disease and is difficult to differentiate from other infectious diseases due to non - specific symptoms, limited awareness, low index of suspicion and lack of diagnostic facilities in under developed countries. We conclude that prompt clinical findings and confirmed diagnosis will be helpful for clinicians to initiate appropriate treatment without delay, leading to reduction of morbidity and mortality.

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