



Clinical Manifestations and Complication Associated with Scrub Typhus with and without Eschar in a tertiary care Hospital, South India

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Abstract

Introduction: *Scrub typhus, also known as tsutsugamushi disease, is caused by the arthropod-borne gram-negative obligately intracellular bacillus Orientia tsutsugamushi. It is a re-emerging infectious disease in India and has gained clinical importance because of its effect on multiple organ systems and progression to various complications, when not detected early and managed appropriately. The present study was conducted in a Tertiary Care Hospital in South India with an objective to study the severity of scrub typhus to presence of Eschar.*

Methodology: *A Cross sectional study was conducted in a Tertiary Care Hospital in South India during August 2019 to January 2020 where 200 adult patients who presented with an acute undifferentiated febrile illness and confirmed to have Scrub Typhus were included in the study.*

Results: *The mean age of the study participants in Eschar group was 46.68 ± 14.69 and the mean age among the participants without Eschar was 48.86 ± 14.71 . Agricultural work was found to be predominant occupation in both the group 50% of the patients in Eschar group had Co-morbidities out of which 28% had Diabetes 14% had Hypertension, 8% had CAD where as in the Non-Eschar group, 41% were with Co-morbidities out of which, 19% were Diabetic, 15% were Hypertensive, 7% had a history of CAD. In our study among the Eschar group 5% Patients showed CNS manifestations and it was statistically significant when compared to non eschar group.*

Conclusion: *Eschar in patients with Scrub Typhus is significantly associated with a higher incidence of renal, respiratory system and CNS involvement. Hence early identification and early intervention play a key role in management of the patient.*

Introduction

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.¹ It threatens one billion people globally, and causes illness in one million people each year². Scrub typhus, also known as tsutsugamushi disease, is caused by the arthropod-borne gram-negative

obligately intracellular bacillus *Orientia tsutsugamushi*³. It is a re-emerging infectious disease in India and has gained clinical importance because of its effect on multiple organ systems and progression to various complications, when not detected early and managed appropriately.⁴

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 pain⁵.

An eschar at the site of chigger feeding is a classic clinical feature of scrub typhus. It begins as a papule at the site of chigger feeding and then ulcerates and forms a black crust like a skin burn from a cigarette. When present, it occurs prior to the onset of fever and other symptoms⁶

In male patients, eschars are primarily within 30 cm below the umbilicus. The other common locations are lower extremities and anterior chest. There is a different pattern in female patients, whose anterior chest, head and neck are the most prevalent areas⁷

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 Meningitis and/or encephalitis can develop in severe illness, causing patients to become agitated, delirious or even have seizures. Focal neurological signs are rare but have been known to occur. The case fatality can be up to 30–70% if no appropriate treatment is received while the median case fatality rate for untreated patients is 6% and for treated patient is 1.4% Therefore, development of effective measures to treat, control and prevent the disease is a critical public health issue.¹

The present study was conducted in a Tertiary Care Hospital in South India with an objective to study the severity of scrub typhus to presence of Eschar and also to find out the differences between Scrub Typhus patients with eschar and without eschar in relation to clinical features, degree of organ involvement.

Objectives of the study

1. To study the different clinical manifestation and complication associated

with scrub typhus with and without Eschar.

Materials and Methods

A Cross sectional study was conducted in a Tertiary Care Hospital in South India during August 2019 to January 2020 where 200 adult patients who presented with an acute undifferentiated febrile illness and confirmed to have Scrub Typhus were included in the study. Scrub Typhus was diagnosed in patients presenting with an acute febrile illness of <14 days duration and a positive Scrub IgM ELISA (In Bios International, Inc., Seattle, USA) with other aetiologies being negative. Other infectious aetiologies for acute febrile illness, like malaria, enteric fever, dengue fever and leptospirosis were ruled out by appropriate tests.

The patients with ST were divided into two groups i.e. 100 in each group based on the presence or absence of eschar. Clinical features, organ involvement and outcome in both groups were compared to observe for clinical and statistical significance.

Statistical Analysis

Data tabulation using Microsoft Excel 2013 and statistically analysis was done SPSS version 16. Descriptive statistics include Mean, standard deviation, frequencies, and percentages were calculated. Unpaired T test was used to compare the parametric data among the 2 groups. Chi-square test was used for non-parametric data. At 95% confidence interval, P value of <0.05 was statistically significant.

Results

In the present study, the mean age of the study participants in Eschar group was 46.68 ± 14.69 and the mean age among the participants without Eschar was 48.86 ± 14.71 . There was no statistically significant difference observed between the two groups as the p value calculated to be >0.05.

Among the Eschar group, majority i.e. 51% were female and in the Non-Eschar group, majority were Male i.e. 62%.

Agricultural work was found to be predominant occupation in both the group as 65% of the patients were into Agricultural work and 35% were House wife in the Eschar group whereas in the Non Eschar group, 53.5% were into Agricultural work, 33% were House wife.

50% of the patients in Eschar group had Co-morbidities out of which 28% had Diabetes 14% had Hypertension, 8% had CAD where as in the Non-Eschar group, 41% were with Co-morbidities out of which, 19% were Diabetic, 15% were Hypertensive, 7% had a history of CAD.

In the present study, fever with chills, abdominal pain, Breathlessness, seizure and overt bleeding showed a statistically significant difference as the p value calculated to be <0.05.(Table 1)

Table 1: Clinical Presentation

Variable	Group	With Eschar		Without Eschar		Chi-square value	P value
		N	%	n	%		
Fever with Chills	Yes	83	83	66	66	7.61	<0.05*
	No	17	17	34	34		
Myalgia	Yes	57	57	45	45	2.88	>0.05
	No	43	43	55	55		
Headache	Yes	52	52	40	40	2.90	>0.05
	No	48	48	60	60		
Vomiting	Yes	50	50	39	39	2.45	>0.05
	No	50	50	61	61		
Abdominal Pain	Yes	50	50	31	31	7.49	<0.05*
	No	50	50	69	69		
Breathlessness	Yes	41	41	2	2	45.1	<0.05*
	No	59	59	98	98		
Cough	Yes	32	32	30	30	0.93	>0.05
	No	68	68	70	70		
Altered Sensorium	Yes	15	15	9	9	1.70	>0.05
	No	85	85	91	91		
Seizure	Yes	5	5	0	0	5.13	<0.05*
	No	95	95	100	100		
Overt bleeding	Yes	5	5	0	0	5.13	<0.05*
	No	95	95	100	100		

A significant difference was observed between the two groups (p<0.05) with Laboratory parameters include Hb gm%, WBC count, Neutrophils,

Platelet count, Serum Creatinine, Urea, CPK, Albumin, SGOT, SGPT, ALP.(Table 2)

Table 2: Biochemical Parameters

Variable	With Eschar		Without Eschar		T value	P Value
	Mean	SD	Mean	SD		
Hb	12.13	2.94	10.98	2.99	2.74	<0.05*
WBC count	10457.00	1118.33	8119.40	2140.09	9.68	<0.05*
Neutrophils	69.12	9.31	64.17	9.09	3.80	<0.05*
Platelet count	93295.00	15281.13	103410.00	24909.23	3.46	<0.05*
creatinine	1.27	0.36	1.14	0.32	2.69	<0.05*
urea	39.79	12.25	28.60	6.87	7.96	<0.05*
CPK	131.12	73.20	207.70	102.56	6.07	<0.05*
Bicarbonate	18.72	4.03	18.88	4.49	0.26	>0.05
Total Bilirubin	1.35	0.77	1.55	0.83	1.76	>0.05
Total protein	6.82	0.79	6.94	0.90	1.01	>0.05
Albumin	3.55	0.81	3.07	0.55	4.90	<0.05*
SGOT	429.66	229.65	160.47	80.31	11.06	<0.05*
SGPT	55.71	26.36	93.57	44.98	7.26	<0.05*
ALP	128.64	78.28	146.24	42.24	1.97	<0.05*

Data with respect to systemic involvement between Eschar group vs Non Eschar group, Hematologic involvement (13% vs 10%, $p>0.05$), Renal involvement (25% vs 17%, $p>0.05$), CVS involvement (14% vs 10%, $p>0.05$), CNS

involvement (5% vs 0%, $p<0.05$), Hepatic involvement (6% vs 4%, $p >0.05$), GI involvement (2% vs 17%, $p<0.05$), Respiratory system involvement (32% vs 18%, $p<0.05$) (Table 3)

Table 3: Systemic Involvement

Variable	Group	With Eschar		Without Eschar		P value
		n	%	N	%	
Hematologic involvement	Yes	13	13	10	10	>0.05
	No	87	87	90	90	
Renal Involvement	Yes	25	25	17	17	>0.05
	No	75	75	83	83	
CVS involvement	Yes	14	14	10	10	>0.05
	No	86	86	90	90	
CNS involvement	Yes	5	5	0	0	<0.05*
	No	95	95	100	100	
Hepatic involvement	Yes	6	6	4	4	>0.05
	No	94	94	96	96	
GI involvement	Yes	2	2	17	17	<0.05*
	No	98	98	83	83	
RS involvement	Yes	32	32	18	18	<0.05*
	No	68	68	82	82	

Discussion

In the present study, the mean age of the Eschar group was 46.68 ± 14.69 and non Eschar group was 48.86 ± 14.71 . Study by Premraj et al⁴, the mean age of the patients was 39.6 ± 20.5 yr (mean \pm SD). Nadjm et al⁸ in their study reported that Peak incidence of scrub typhus was reported to be in the fifth decade of life. Varghese et al⁹ study reported that the mean age of patients was 45 ± 15 years.

Nadjm et al⁸ in their study reported that occupation of majority of the patients with scrub typhus was farming (140/251; 55.7%) which is similar to the present study. Agricultural laborers were predominant occupation in study by Varghese et al⁹ which is similar to present study.

In the present study, Fever with chills, Headache were the most common presenting complaints by the majority of the patients which is similar to study conducted by Jamil et al¹⁰ where the commonest presentation was an acute febrile illness with severe headache (94.91%), which is global and throbbing in nature.

Park et al¹¹ reported that The independent risk factors were old age and underlying chronic

diseases like DM and other less frequent diseases.

This corroborates our clinical impression that elderly patients from rural areas with underlying chronic diseases had more severe clinical presentations and prolonged morbidity.

In our study Regarding the clinical severity of scrub typhus, Eschar group vs Non Eschar group, Hematologic involvement (13% vs 10%, $p>0.05$), CNS involvement (5% vs 0%, $p<0.05$), Hepatic involvement (6% vs 4%, $p >0.05$), GI involvement (2% vs 17%, $p<0.05$), Respiratory system involvement (32% vs 18%, $p<0.05$). study by Park et al¹¹ showed similar results where there were 16 cases of severe complications (10.5%). Respiratory complications (7.8%), CNS complications (5.9%), cardiac complications (2%), and septic shock (1.3%) were observed.

In a study by Shaikh et al¹² Acute renal failure was significantly more among patients with an eschar (18.1%) as against 5.7% in those without an eschar. Other studies from India reported a 12-33% incidence of renal failure¹³. Previous studies from India show an incidence of acute respiratory distress syndrome of 8-25% with majority of them requiring invasive ventilation.¹⁴ Tsay and Chang

reported no association between the presence of an eschar and pulmonary involvement.¹⁵

In a study by Pai et al¹⁶ CNS manifestations of Scrub Typhus infection occurs in 12.5-26% of affected patients. In our study among the Eschar group 5 Patients showed CNS manifestations and it was statistically significant when compared to non eschar group.

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