

Eschar in Scrub Typhus: A Study from North East India

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Abstract

Introduction: Eschar is one of the most important clinical sign which helps in early diagnosis, and consequently initiation of specific treatment and prevention of complications in scrub typhus.

Aims: To study the prevalence and distribution of eschar in scrub typhus and comparison of clinical manifestations and complications among patients with or without eschar.

Methodology: A retrospective hospital based study in patients aged ≥ 18 years admitted to a tertiary care centre in north-eastern India. Scrub typhus was diagnosed based on clinical features supported by serological tests (Immunochromatographic card test, IgM ELISA and Weil Felix test). Chi square test was used for comparing variables. A 'p value' <0.05 was considered as statistically significant.

Results: A total of 129 patients of scrub typhus were included in the present study. Male to female ratio is 1.93:1 with the commonest age group being 18-30 years followed by 30-40 years. Eschar was found in 24.8% patients with 9.3% having multiple eschars and the rest had single eschar. Eschar was most commonly found in the inguinal region (28.57%) followed by trunk (25.75%) and lower limbs (22.85%). Presence of multi-organ dysfunction ($p=0.008$), hepatitis ($p=0.005$) and lymphadenopathy ($p<0.01$) were significantly higher in those patients who had eschar.

Conclusion: The common sites of distribution of eschar are the inguinal region, lower limbs and trunk and multiorgan dysfunction is more commonly associated with eschars.

Introduction

Scrub typhus also known as tsutsugamushi disease is a vector born disease transmitted by the bite of larval stage of trombiculid mite and caused by *Orientia tsutsugamusi*.¹ The disease has been reported with increasing frequency from various parts of India and also has seen resurgence in the north eastern part of the country.²⁻⁵ Scrub typhus usually present as an acute febrile illness associated with headache, malaise, suffused face and lymphadenopathy.⁶ An eschar, which is a necrotic skin lesion of 5-20 mm size found at the site of vector bite, is one of the pathognomonic signs of scrub typhus,⁷ which is present in 10-87% patients with scrub typhus.^{5,8,9} The identification of an eschar reduces the time spend in serological test and facilitate early institution of specific therapy thus reduces the complications associated with late initiation of specific treatment. However, the lesion has a

propensity of being frequently missed in initial physical exam as the vector bite and lesion is painless, free from pruritis and usually occurs in areas which are under cover of garments or occurs around the folds of body parts like inguinal or axillary region.¹⁰

In this context the current study was carried out in a tertiary care centre in north eastern India to study the distribution of eschars in patients with scrub typhus as well as to assess the possible association of eschar with clinical outcomes and complications.

Material and Methods

The present study was a hospital based retrospective study conducted in a tertiary care institute in north eastern India and includes patients who were admitted to the department of General Medicine from January 2013 to December 2015 in adult patient aged ≥ 18 years. Patient data was retrieved from the inpatient record file of the

scrub typhus patients. Patients with incomplete data were excluded from the study. The diagnosis of scrub typhus was made on the basis of clinical features supported by serological test for scrub typhus (Weils-Felix test, IgM immune-chromatographic card test or IgM ELISA). The following data were collected: age, gender, clinical presentation at the time of admission, details of eschar (number, location etc), complications and outcome. Complications including MODS, ARDS, DIC, AKI, shock were defined as per standard definitions and protocols.

Ethical clearance was taken from the Institutional Ethical Committee prior to the commencement of the study.

Statistical Analyses were done using Statistical Package for Social Survey (SPSS) for Windows version 17.0. Results are expressed as mean \pm standard deviation for continuous data and as percentage for categorical data. Chi square test was used for comparing variables. A 'p value' <0.05 was considered as statistically significant. The results were tabulated and graphically represented using Microsoft Office for Windows 2008.

Results and Observations

A total 129 number of patients were included in the present study. Age and sex distribution of patients is shown in Table 1. Total number of male and female patients were 85(65.89%) and 44(34.11%) respectively. Male to female ratio was 1.93:1. Commonest age group in both gender affected was 18-30 years followed by 31-40 years. Eschar was found in 32 (24.8%) patients out of which three patients had multiple eschars and rest had single eschar. Distribution of location of eschar in different part of the body showed

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that the maximum number of eschars were located in the inguinal region (28.57%) followed by the trunk (25.71%) and lower limbs (22.85%) (Table 2). On comparing patients with eschars and those without it was found that presence of multi-organ dysfunction ($p=0.008$), hepatitis ($p=0.005$) and lymphadenopathy ($p<0.01$) were significantly higher in those patients that had eschar (Table 3). Biopsy of eschar was done in few number of cases to study the pathological changes.

Discussion

Scrub typhus is considered to be a re-emerging topical disease in India. The reported outbreaks have shown a rising trend in recent times from various parts of India.^{9,11} The presentation of scrub typhus is non-specific with a predominance of constitutional symptoms like acute onset of fever with myalgia, headache, suffused face, and nausea and vomiting.^{2,6,12} Therefore, it becomes a clinical challenging to differentiate it from other co-endemic diseases like malaria, dengue, and leptospirosis. In this regard the combination of a high index of suspicion in an endemic geographical area combined with a detailed search for the pathognomonic eschar forms the essential crux in the early diagnosis of scrub typhus.

An eschar is usually of 5-20 mm in size, in early stage they have a necrotic black central ulcer with

Table 1: Age and sex distribution of the patients with scrub typhus

Age groups (in years)	Male		Female		Total	
	n	%	n	%	n	%
18-30	39	30.23	21	16.28	60	46.51
31-40	23	17.83	9	6.97	32	24.80
41-50	13	10.07	8	6.20	21	16.27
51-60	4	3.10	5	3.87	9	6.97
Above 60	6	4.65	1	0.70	7	5.42
Total	85	65.89	44	34.11	129	100



Fig. 1: A typical eschar with central black ulcer with surrounding erythema in suprapubic region

erythematous margin Figure 1. The typical eschars are painless and non pruritic, but are associated with regional lymphadenopathy. Biopsy of eschar in few cases were done in the present study population and its histopathological findings are shown in Figure 2 (A-D). In the present study eschar was found 24.8% of the patients but studies from other part of India and other Asian countries show different results that vary from less than 10% to 90%.^{10,13} In our study the most common sites of distribution of eschar were the inguinal region followed by the trunk and lower extremities. In a previous study the common eschar sites were localised on the abdomen and around the chest and groin.⁷ In another study the commonest sites for an eschar in male patients were

Table 2: Distribution of the location of eschar in patients with scrub typhus

Region of body	No. of eschar	%
Inguinal region including pubic and perineal region	10	28.57
Axillary	3	8.57
Upper limb	2	5.71
Lower limb	8	22.85
Head and neck	3	8.57
Trunk	9	25.71

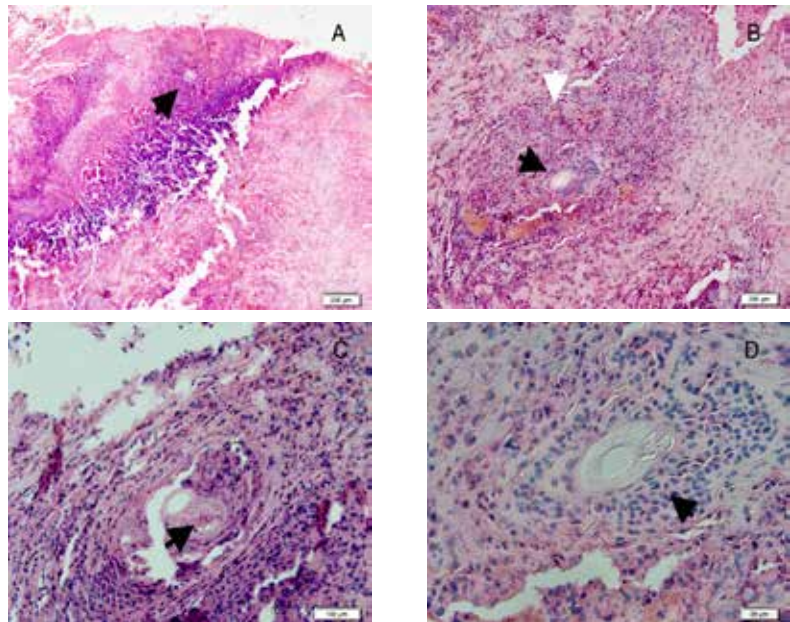


Fig. 2: (A-D) Cutaneous histopathology of maculopapular skin rash (Eschar). (A) Completely ulcerated skin tissue showing thrombi and lymphocytic infiltrate, arrow indicates infiltration of lymphocytes in perivascular spaces original magnification x40. (B) Black arrow indicates swelling of endothelial cells and white arrow indicates fibrinoid necrosis original magnification x40. (C) Black arrow indicates fibrin thrombi original magnification x100. (D) Black arrow indicates focal sweeping of endothelium original magnification x400

the perineum, inguinal, and buttock area.¹⁴ The probable reason leading to such a pattern of distribution may be due to the dressing pattern in the study population and the propensity of the eschars to occur in areas which are warm and damp due to pressure from clothing.¹⁰ In our study we found that three patients had multiple eschars while the rest had a solitary eschar. The unusual presentation of multiple eschars in scrub typhus has been infrequently reported in literature and need to be astutely looked for by the clinicians.^{10,15}

On comparison of the differences in

Table 3: Comparison of complications in scrub typhus with/without eschar

Complications	Patients without eschar (97)		Patients with eschar (32)		p value
	n	%	n	%	
Lymphadenopathy	32	32.9	29	90.6	<0.01
Acute kidney injury	29	29.9	10	31.2	0.88
Hepatitis	39	40.2	22	68.7	0.005
Thrombocytopenia less than 50,000/cumm	6	6.1	4	12.5	0.24
Meningo-encephalitis	11	11.3	4	12.5	0.85
Multi organ dysfunction	11	11.3	10	31.2	0.008

clinical presentation and complications in patients with and without eschar we found that presence of multi-organ dysfunction, hepatitis and lymphadenopathy were significantly higher in those patients that had eschar.

While previous studies¹⁴ have elaborated on independent predictors for fatal outcome in scrub typhus like were ages over 65 years, acute kidney injury and hyperbilirubinaemia, the role of an eschar in predicting clinical outcome has not been substantially evaluated. A study from South Korea shows opposite finding when compared to present study, they reported age \geq 60 years, the absence of eschar, WBC counts $> 10,000/\text{mm}^3$, and albumin ≤ 3.0 g/dL were found to be independently predictive variables for the occurrence of severe scrub typhus.¹⁶ However, literature in this regard from the adult population is lacking and further such evidence may help in the utilization of the presence of eschar as an early indicator for prediction of multi-organ dysfunction and consequent early prognostication.

Conclusion

Presence of eschar was found to be relatively common in scrub typhus. The common areas of distribution are the inguinal region, lower limbs and trunk. Lymphadenopathy and multiorgan dysfunction were more common in patients having eschars.

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