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Eschar in scrub typhus: A valuable clue to the diagnosis

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ABSTRACT

Background: Scrub typhus is an acute febrile illness widely prevalent in the 'tsutsugamushi triangle' region of the world. Clinical features include fever, myalgia, headache, rash, and a pathognomonic eschar. An eschar is formed by the bite of chigger mite that inoculates the causative agent of Scrub typhus *Orientia tsutsugamushi*. The aim of this study is to determine the most common sites of eschars over the bodies of patients with Scrub typhus. **Materials and Methods:** In a retrospective analysis, we examined a total of 418 patients who presented to Christian Medical College, Vellore between 2009 and 2012 with an acute febrile illness and an eschar on clinical examination and confirmed to have scrub typhus with a positive Scrub typhus IgM ELISA test. We studied the distribution of eschars over the bodies of 418 patients with Scrub typhus. **Results:** There was a significant difference in the distribution of eschars between males and females with a preponderance of the chest and abdomen (42.3%) among females and the axilla, groin and genitalia (55.8%) in males. Some unusual sites of an eschar were the cheek, ear lobe and dorsum of the feet. **Conclusion:** The eschar is the most useful diagnostic clue in patients with acute febrile illness in areas endemic for Scrub typhus and therefore should be thoroughly examined for its presence especially over the covered areas such as the groin, genitalia, infra-mammary area and axilla.

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Introduction

An eschar in a patient with acute febrile illness is of very high diagnostic value for Scrub typhus infection, a re-emerging infection in India. Scrub typhus has increasingly been reported from various regions of India especially the hilly regions of the Himalayas, Assam, West Bengal and Tamil Nadu. The causative organism, *Orientia tsutsugamushi*, a Gram-negative bacterium, is transmitted to humans by the bite of the larval stage of the trombiculid mites. The patients may present with fever, headache, breathlessness and an eschar in variable proportion of patients and can be complicated by hepatitis, pulmonary and cardiac involvement and meningo-encephalitis. The eschar is a 5 mm - 20-mm-sized necrotic lesion on the skin at the site of the vector bite. Various studies have shown an eschar prevalence of 20-87% among Scrub typhus patients.^[1] However, it is quite

frequently missed on a routine physical examination as the vector bite is painless and the patient most often does not notice the lesion. Hence, we studied a large cohort of patients with eschar to describe its distribution over the body of Scrub typhus patients.

Materials and Methods

In a retrospective analysis done in Christian Medical College, Vellore which is a 2700 bed medical college hospital, we examined a total of 418 patients who presented between 2009 and 2012 with an acute febrile illness and an eschar on clinical examination and confirmed to have scrub typhus with a positive Scrub typhus IgM ELISA test (InBios International, Seattle, USA). Polymerase Chain Reaction (PCR) for 56-kDa antigen gene of *Orientia tsutsugamushi* on 25 eschar samples was performed for confirmation. Bacterial DNA, extracted using a QIA amp DNA mini kit (Qiagen, Hilden, Germany) according to the manufacturer's instructions, was used as the template for the PCR. A standard PCR targeting the 56-kDa protein was carried out as reported previously.^[2] The data was analysed using Microsoft Excel 2010. This study was approved by the Institutional Research Board of Christian Medical College, Vellore and patient confidentiality was maintained using unique identifiers.

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Results

Among 418 patients, multiple eschars were present in 8; double eschars in 7 and one patient had 3 eschars. The mean (standard deviation) age of the patients was 45 ± 14 years and there was a female predominance (53.3%). The mean duration of fever prior to presentation was 8 ± 4 days. 379 eschars (88.9%) were on the front of the body. The distribution of eschars over the body overall is shown in Table 1 and the different patterns in males and females is shown in Figure 1. There was a significant difference in the distribution of eschars between males and females with a preponderance of the chest and abdomen (42.3%) among females and the axilla, groin and genitalia (55.8%) in males. Overall, the most common area of the presence of an eschar was the groin region (17.8%) followed by the abdomen (17.3%). Some unusual sites for an eschar were the cheek, ear lobe (two patients), cubital fossa (two patients), dorsum of the foot and tip of the penis. Of the 25 eschar samples on which PCR was performed, 22 were positive for the 56-kDa antigen gene of *Orientia tsutsugamushi* and three were negative.

Discussion

An eschar is formed when an infected chigger, the larval stage of trombiculid mites (*Leptotrombidium deliense* and others) bites while feeding on human skin, usually in warm, damp areas where pressure from clothing occurs but can sometimes occur in unusual sites such as the ear lobes, wrist and forearm.^[3] The mite is very small (0.2-0.4 mm) and can only be seen through a microscope or magnifying glass. The mites proceed through egg, larval, nymphal, and adult stages. Adults and nymphs live in the soil and feed on plants, other mites and small insects, and insect eggs. Larvae may bite animals or humans, and are referred to as chiggers in the vernacular. *Orientia tsutsugamushi* parasitize these mites and are transmitted to humans during the bite. The bacteria multiply at the inoculation site with the formation of a papule that ulcerates and becomes necrotic; evolving into an eschar, with or without regional lymphadenopathy. The border of the eschar may be surrounded by a reddish erythema. The eschar resolves in 3-4 weeks with no sequelae, but may occasionally cause scarring or hyperpigmentation. As the bite is painless, patients are unaware of the presence of an eschar though it can sometimes be pruritic.^[4] The different pattern of distribution between males and females was noted previously.^[5] The eschar is the most useful diagnostic clue in patients with acute febrile illness and therefore should be thoroughly examined for its presence especially over the covered areas such as the groin, genitalia, infra-mammary area, and axilla.

Acknowledgment

We thank Dr. Mohan for the illustration of the distribution of eschars. We also thank the Institutional Research Board of Christian Medical College, Vellore, for granting us permission to conduct this study.

Table 1: Distribution of eschars

Site	Number (percentage) total: 426 (%)
Head	7 (1.6)
Neck	11 (2.5)
Axilla	58 (13.6)
Chest	65 (15.2)
Abdomen	74 (17.3)
Back	18 (4.2)
Arms	18 (4.2)
Groin	76 (17.8)
Genitalia	44 (10.3)
Buttocks	10 (2.3)
Thighs	35 (8.2)
Legs	2 (0.4)

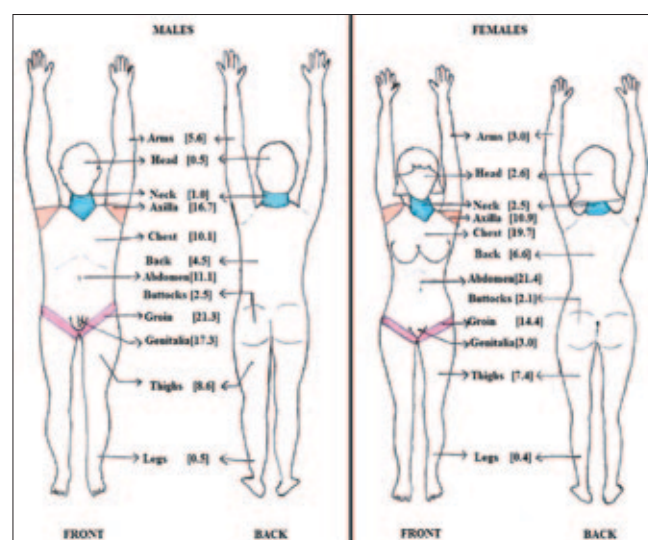


Figure 1: Distribution of eschars in males and females (percentage)

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