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## Spot The Dot: Solve The Mystery: Tsutsugamushi Disease.

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### ABSTRACT

Scrub typhus (Tsutsugamushi disease) is an acute febrile infectious disease endemic in eastern Asia is caused by *Orientia tsutsugamushi*, transmitted by bite of a *Leptotrombidium* mite (chigger). 45 year old lady presented with progressive worsening of fever (102F), myalgias, headache and tachycardia (120 /min). Leucopenia with thrombocytopenia was noted with elevated liver enzymes. Provisional diagnosis of malaria and dengue was suspected and serological tests were carried out. Paracetamol, IV fluids was given and patient was monitored for hypotension and bleeding manifestations. Serology for malaria and dengue were negative. Despite management fever continued to spike. Black eschar was noted on the left shoulder tip and scrub typhus was suspected because of characteristic eschar. Doxycycline was started and serology was positive for *Orientia tsutsugamushi* antibodies. Patient recovered with fever and platelet counts normalizing. Recovery was uneventful. The spotting of the "black dot" i.e. eschar, helped us in clinching the diagnosis that ultimately led to the successful and uneventful recovery of this patient. A high index of clinical suspicion, prompt diagnosis and early institution of appropriate antimicrobials can decrease the morbidity and mortality.

**Keywords:** Tsutsugamushi, Scrub typhus, infection

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## INTRODUCTION

Scrub typhus , also called Tsutsugamushi disease , is an acute febrile infectious disease of zoonotic origin. Scrub typhus is endemic in regions of eastern Asia and the south- western Pacific. It is estimated that there are about one million cases of this disease each year [7] caused by *Orientia tsutsugamushi*, an obligate intracellular Gram negative bacterium, first isolated in 1930. The causative organism is transmitted by the bite of a larval *Leptotrombidium* mite (chigger). In India, scrub typhus has been reported from Rajasthan, Jammu & Kashmir and Vellore, Sikkim, Darjeeling, Nagaland & Manipur . In a study conducted from July through October 2004 in Himalayas, among cases of acute febrile illness of unknown origin, *O. tsutsugamushi* was identified as causative agent [8]. In an entomologic study in Himachal Pradesh, vector species *Leptotrombidium deliense* and *Gahrialpia (schoengastilla) spp.* were recorded [9]. Cases also been reported from Kerala and Tamilnadu.

### Case History

A 45 year old lady presented to us with progressively worsening high grade fever associated with diffuse myalgias, severe back ache and headache of 7 days duration. Examination revealed a middle aged female, moderately built and nourished with high spiking temperature of 102 F. Vital signs revealed febrile tachycardia of 120/min with normal blood pressure. General examination and systemic examination were unremarkable. Salient investigations revealed haemoglobin of 12g/dl, total leucocyte count of 3,000/mm<sup>3</sup> and platelet count of 30,000/mm<sup>3</sup> (Table 1).

Liver enzymes were mildly elevated with AST-140 IU/L, ALT-150IU/L and ALP-200IU/L (Table 2). Malarial parasite was negative by smear and QBC method. With the ongoing epidemic of Dengue fever, a provisional diagnosis of severe dengue fever was made and serological tests for dengue sent. She was managed in high dependence unit with maintenance intravenous fluids, paracetamol and watched for hypotension and bleeding manifestations. However, within the next 24 hours, the fever continued to spike despite periodic administration of paracetamol. The platelet counts dropped to 10,000 and 4 units of platelet rich concentrates were administered. A perplexing observation of a "black skin lesion" on the left shoulder tip (Figure 1) under the ICU gown was got to our attention by the nurses while giving bed care. Examination revealed an eschar on the left shoulder tip that was hidden beneath the ICU gown. After sending for serological tests for scrub typhus, doxycycline was initiated leading to remarkable improvement in symptoms and rising platelets. Antibodies to *Orientia tsutsugamushi* were positive confirming the diagnosis of scrub typhus. The patient had an uneventful recovery

**Table 1: Blood Parameters**

Haemoglobin	12g/dl
Platelets	30,000/mm <sup>3</sup>
WBC Counts	3,000/mm <sup>3</sup>

**Table 2: Liver Enzymes**

ALP	200IU/L
AST	140IU/L
ALT	150IU/L

**Figure 1: Black Eschar – Tip of Left Shoulder**



## DISCUSSION

Scrub typhus, also called Tsutsugamushi disease, is a mite-borne acute febrile infectious disease of zoonotic origin first isolated and reported in Japan in 1899. It is caused by *Orientia tsutsugamushi*, an obligate intracellular Gram-negative bacterium. It grows freely in the cytoplasm of infected cells as it is devoid of a vacuolar membrane. There is a high degree of antigenic heterogeneity among the different strains. Several serotypes coexist in an endemic area, among which one predominates. Strains vary in their virulence. The vector/reservoir complex consists of trombiculid mites and the small mammals, especially rodents. The agent along with the vector/reservoir complex forms "typhus islands" [1]. Five major serotypes: Boryon, Gilliam, Karp, Kato, and Kawazaki. Serotype differentiation gains importance in laboratory diagnosis [2]. The causative organism is transmitted by the bite of a larval *Leptotrombidium* mite (chigger). The adult mites have a four-stage lifecycle: egg, larva, nymph, and adult. The larva is the only stage (chigger) that can transmit the disease to humans and other vertebrates. The clinical symptoms vary depending on the duration of illness, strain of *O. tsutsugamushi*, immune status, and the other host factors of the patient. In the early stage of the disease, the clinical symptoms are fever, rash, eschar, myalgia, and lymphadenopathy with characteristic eschar [3]. The maculopapular rash appears on the trunk 3-4 days after the onset of fever and spreads to the arms and legs. Regional lymphadenopathy is usually present when the eschar appears. Generalized lymphadenopathy develops 2-3 days later. Bacteremia is detectable 1-3 days before the onset of fever [4]. Respiratory symptoms are frequent. Interstitial pneumonia, pulmonary edema, pleural effusion, cardiomegaly, and focal atelectasis are observed by chest radiography in patients [5]. Gastrointestinal symptoms including nausea, vomiting, abdominal pain, diarrhea, hematemesis, and melena also occur. Myocarditis, pericarditis, and relative bradycardia may develop. The diagnosis is based on the exposure history, the clinical features, and an increase in antibody titer, antigen detection in blood, and polymerase chain reaction [6]. The disease is usually self-limiting and responds well to antibiotics with spontaneous recovery. Weil-Felix was the first test for detection of scrub typhus cases. ELISA has good specificity (87%) but is relatively costly, time-consuming, and cannot be performed on a single serum. ICT has almost equal sensitivity and specificity, is easy to perform, and single sera can be tested.

In this case, a 45-year-old lady presents with high-grade fever with progressive worsening and diffuse myalgias, headache, and tachycardia. Laboratory parameters revealed leucopenia with thrombocytopenia and elevated liver enzymes. Provisional diagnosis of malaria and dengue was suspected, and serology typing was done. IV fluids and paracetamol were given and she was monitored for bleeding manifestations and hypotension. Malaria and dengue serology were negative. Despite periodic administration of paracetamol and IV fluid treatment, fever continued to spike. Platelet counts came down to 10,000 and 4 packets of platelets were transfused. Later, a BLACK SKIN LESION was noted on the tip of the left shoulder and it was confirmed to be an ESCHAR suggestive of scrub typhus. Patient was started on doxycycline, and serological tests for scrub typhus were carried out. Patient showed improvement in platelet counts and recovery from fever. Antibodies to *Orientia tsutsugamushi* were positive, confirming the diagnosis of scrub typhus. The patient had an uneventful recovery.

## CONCLUSION

Scrub typhus can present with a myriad of manifestations. It is crucial to meticulously look for eschar in patients who present with febrile illnesses without localizing signs. The eschar that is produced due to the bite of the mites can go unnoticed as it is painless and occurs in clothed areas like the axilla or genital regions that are usually ignored during clinical examination. The spotting of the "black dot" i.e. eschar, helped us in clinching the diagnosis that ultimately led to the successful and uneventful recovery of this patient. A high index of clinical suspicion, prompt diagnosis, and early institution of appropriate antimicrobials can decrease the morbidity and mortality. Proper case identification, public education, rodent control, and habitat modification is warranted to control the impact of scrub typhus on public health. Vaccines are under trial; sooner we will be able to control this scourge of mankind.

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