

February, 2023; 3(02), 216-219

Popular Article

Scrub Typhus - An Emerging Threat!

Subhash Chand Meena, Surendra Singh Shekhawat, Monika Soni and Neharika Saxena

Department of Veterinary Public Health & Epidemiology

Post Graduate Institute of Veterinary Education & Research, Jaipur, Rajasthan-302021

<https://doi.org/10.5281/zenodo.7678747>

Abstract

Scrub typhus is a serious public health issue in Asia-Pacific. It threatens one billion people worldwide and causes one million illness per year. Scrub typhus, caused by *Orientia tsutsugamushi*, is an important and neglected vector-borne zoonotic disease with an expanding known distribution. Scrub typhus, which is caused by *Orientia tsutsugamushi*, can result in severe multiorgan failure and has a case fatality rate of up to 70%. Research on the burden of the disease in India, which is a member of the "tsutsugamushi triangle," indicates that scrub typhus accounts for at least 25.3% of cases of acute undifferentiated febrile sickness. Fever, headache, myalgia, coughing, and digestive symptoms mark the development of the disease after an incubation period of 5–21 days. There could be an initial papular lesion that eventually forms a flat, black eschar. Our goal is to give a thorough review of the epidemiology, prevention, and management of scrub typhus at this time.

Keywords: Scrub typhus, *Orientia tsutsugamushi*, zoonotic disease, "tsutsugamushi triangle,"

Introduction

Scrub typhus is primarily blamed for acute, non-differentiated fever diseases in India. The little Rickettsia bacterium causes the contagious illness. Scrub typhus is a very hazardous acute fever infection that is brought on by the bacteria *Orientia tsutsugamushi*. The term "scrub" refers to the class of plants which harbours the vector. The Greek term "typhus," which means "fever with stupor"

or "smoke," was the one that gave rise to the English term "typhus." The phrase for a mite / insect is the brief, perilous "Tsutsuga" "Mushi." It is also known as bush typhus and tsutsugamushi sickness. Unintentionally, this zoonotic illness affects humans.

Scrub typhus was discovered in Japan in 1899. Scrub typhus is endemic in many Indian states and union territories, according to studies done in the 1960s and 1970s; the state of Himachal Pradesh was the first to record cases. A "tsutsugamushi triangle" is indeed a territory with an endemic illness that runs from far Russia and northern Japan in the north to the Solomon Sea region, including northern Australia there in the south, and primarily to Pakistan and Afghanistan in the west. Scrub typhus was the ailment that scared Far Eastern soldiers most during the Second World War. Scrub typhus epidemics began in India and, during the Second World War, expanded into West Assam and Bengal.

Etiology

Orientia tsutsugamushi causes scrub typhus, sometimes known as "Bush typhus." These gram-negative bacteria are responsible for the serious intracellular infection known as rickettsiae. They can appear as a single little rod, a brief chain, a filament, or even a cocci. Scrub typhus is spread by a number of vectors, including *L. deliense* and *L. akamushi*.

Epidemiology

Scrub typhus is likely one of the most underdiagnosed and underreported febrile illnesses, according to WHO in 1999. Scrub typhus affects one million people annually, has a 10% fatality rate when untreated, and can be more deadly than dengue. The tsutsugamushi triangle, which spans a 13 million km² area and is bordered by Japan in the east, China, the Philippines, tropical Australia, and the western countries of India, Pakistan, possibly Tibet, Afghanistan, and southern parts of the USSR, appears to be where scrub typhus is most commonly found. India, Pakistan, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and other islands in the region are among the countries in southeast and eastern Asia where the disease is most common. It can be found in the Eastern and Western Ghats, the Vindhya and Satpura ranges in the country's central region, and the entire Shivalik mountain range in India, which stretches from Kashmir to Assam. In Himachal Pradesh, Sikkim, and Darjeeling (West Bengal), outbreaks of scrub typhus were reported in 2003–2004 and 2007.



Transmission

The infection is spread to people and rodents by specific infectious trombiculid mite species, including *L. deliense* and other chiggers, which feed on tissue fluid and lymph rather than blood. Through the course of their entire lives, they are infected after ingesting the bodily fluid of small mammals like rats in the wild. Transovarial transmission is the technique by which they spread the illness to their eggs as adults. Transstadial transmission is another method by which the illness is transferred from the egg to the larva or adult. The larvae use their salivary glands to deliver a sizable amount of *O. tsutsugamushi* into their host during feeding. When people stumble over an infectious larval mite while standing, sitting, or laying on an infested surface, they become infected. The lifecycle of adult mites consists of four stages: egg, larva, nymph, and adult. The only stage (chigger) that can spread the illness to people and other vertebrates is the larva.

Clinical Features

The incubation period is 5 to 21 days after the initial bite. An illness typically starts out with symptoms including fever, headache, myalgia, coughing, and gastrointestinal distress. Scrub typhus patients initially experience a vesicular lesion at the mite feeding site, which later turns into an eschar or an ulcer with localized lymphadenopathy. An eschar with a black necrotic center and an erythematous rim is frequently visible at the bite site. Additionally, it is frequently seen in the neck, groyne, axilla, and genitalia. A maculopapular rash that starts on the trunk and spreads to the limbs emerges around the end of the first week. By the end of the second week, systemic symptoms start to appear, primarily affecting the respiratory, gastrointestinal, renal, cardiovascular, and neurological systems. It's possible to experience severe complications like myocarditis, pneumonia, meningoencephalitis, acute renal failure, and gastrointestinal bleeding. Case fatality rate in untreated patients may be as high as 30%, although deaths in children are infrequent

Diagnosis

Weil-Felix agglutination test, Enzyme-linked immunosorbent assay, Rapid lateral flow-assay, Western blot, Immunochromatographic test, The indirect fluorescent assay, Indirect immunoperoxidase and PCR amplification of *Orientia* gene.



Prevention

The infection of scrub typhus in the human population is being managed through case detection, public education, rodent control, and habitat alteration. Avoiding the mite-infected regions will help to prevent the sickness. When entering an exposed location, people should wear mite-repellent clothing, mite-resistant shoes such boots with socks, and mite-impregnated clothing. Both connected and unattached chiggers can be removed by lathering with soap in a hot bath or shower. Chiggers and humans transmitting to other chiggers in a cycle that can be broken by clearing plants and chemically treating soil. Following personal prophylaxis against the mite vector by impregnating clothes with miticidal chemicals (permethrin and benzyl benzoate) and the application of mite repellants (diethyltoluamide) to exposed skin surfaces.

Controlling the marsupial and rodent reservoirs may also help to keep chiggers out of populated areas where people live or work. It is crucial to involve community-based organizations in the prevention and management of scrub typhus.

In India, scrub typhus is a significant contributor to acute febrile sickness. Due to its ambiguous clinical presentation, low index of clinical suspicion, limited knowledge, and lack of diagnostic resources, it is underdiagnosed. It should always be taken into account as a possible cause of febrile illness in patients who have a history of exposure to the area and/or season. Early detection and intervention can lower mortality and disease-related complications.

Reference

- Cowan GO. Rickettsial infections In Manson, s Tropical Diseases. Gordon C[Edi] 21st Edi. London Saunders Elsevier Science, *Health Sciences division* 2003;50: 891-906.
- Hornick RB. Rickettsial Diseases. [Chapter 371] In; Bennet JC, Plum F, editors. Goldman: Cecil Textbook of Medicine. 21st ed. Philadelphia ,USA:WB Saunders company;2000;p.1911-2
- Lee N, Ip M,Wong B, Lui G,Tsang OT etal. Risk factors associated with life threatening rickettsial infections.*Am J Trop Med Hyg* 2008; 78:973-978.
- Sundhindra BK, Vijaykumar S, Kutti AK, Tholpadi SR, Rajan AS, Mathai E, et al. Rickettsial spotted fever in Kerala. *Natl Med J India* 2004;17:51-2.
- Watt G, Parola P. Scrub Typhus and tropical rickettsiosis. *Curr Opin Infect Dis*,2003; 16:429-436.

