

Scrub Typhus

Nitin Shinde¹

ABSTRACT

Scrub typhus is a tickborne acute febrile infectious illness caused by *Orientia tsutsugamushi*. It is prevalent in many parts of India. The incidence has increased since 1990. Scrub transmission is common in April through October, with peak during rainy season. Exposure of human to areas of scrub vegetation—low lying trees, bushes, rice fields & grassy lawns have helped the disease to spread further. Common complications include interstitial pneumonia / respiratory failure, renal dysfunction, encephalitis and multiorgan failure. Antimicrobial resistance is rare. Quantitative - ELISA - for detection of immunoglobulin M (IgM) antibodies comes positive at the end of 1 week with a sensitivity of 90% and specificity of 80%. High index of suspicion during the peak transmission months is justified. Aggressive treatment even in sickest patient can turn around the situation and is highly rewarding.

Scrub typhus is an acute febrile infectious illness caused by *Orientia tsutsugamushi*, (tsutsuga means dangerous, mushi means insect or mite). Scrub typhus is a tickborne disease and have a long history after first reported in 1899 in Japan. Scrub typhus is endemic to a part of the world known as the tsutsugamushi triangle. This extends from northern Japan and far-eastern Russia in the north, to the territories around the Solomon Sea into northern Australia in the south, and to Pakistan and Afghanistan in the west. Historically Severe epidemics of the disease occurred among troops in Burma, Ceylon and Japan during World War II.

It is prevalent in many parts of India however exact epidemiological data is lacking. In India, cases are reported from Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Bihar, West Bengal, Meghalaya, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu & Kerala. Rickettsiaceae *tsutsugamushi* is a gram negative obligate intracellular organism. It stains very poorly with routine stains.

The incidence is apparently increased since 1990. The discovery of cephalosporins in 90s have reduced empirical usage of tetracyclines in general practice.

Hence the disease has gradually become more overt in last 2 decades. Scrub is classically seen in rural areas where population of mite is abundant. Epidemic is influenced by the activities of the infected mite. Scrub transmission is common in April through October, peak is during rainy season.

Exposure of human to areas of scrub vegetation—low lying trees, bushes, rice fields & grassy lawns have helped the disease to spread further. The farming activity is most common occupation associated with exposure to the vector in our area. Most of the patient in our practice are from rural background. If they are from urban background, they always have history of a pet (dog) or other animal like cow at home / farmhouse. The ticks thrive on the body of these organisms. There is also history of travel to rural areas to meet extended family or travel to jungles / forests for weekend holiday. There are many instances where the disease is associated with occupational exposure. Electrician, masons, labourers get exposed to ticks in crowded areas, slums in cities at the time of peak transmission.

The organism is transmitted to human by an arthropod vector - larva of trombiculid mite 'Chiggers'. Human is the accidental dead end host for scrub typhus. Bacterias are maintained in mites from one generation to another via trans ovarian and transtadial transmission. The larva of mites (chiggers), accidentally climb on human body unnoticed and then after traveling some distance they

¹Consultant Infectious Diseases and Internal Medicine
Alexis Multispeciality Hospital, Nagpur

Address for Correspondence -

Dr. Nitin Shinde

E-mail : dr.nitinshinde@gmail.com

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get stuck at clothes or at body folds. They then try to obtain their meals on the skin surface. The saliva of chiggers dissolves the keratin layers of the skin and produce eschar, while doing so it inoculate salivary bacterias in the skin. After feeding on skin for some time, they get dislodged after few hours / days. They need prolonged exposure to feed and inoculate bacterias on skin. (It is very important to educate farmers in endemic areas to take a bath and change their clothes every day once they return from work)

The incubation period can be very long ranging from 6-20 days (sometimes upto 30 days). Average incubation period in our areas 10-15 days. The clinical presentation is very varied. Most prominent complaints is high grade fever with myalgia and headache. The onset is more insidious than abrupt in many cases. There are many atypical presentations which include abdominal pain, jaundice, depression, anxiety, excessive fatigue, isolated thrombocytopenia, elevated leukocytosis and fever can be secondary complaint. The variable presentation can be attributed to antigenic heterogenicity of the bacteria. Many of the milder infections are self limiting and some do respond to short course of macrolides or fluoroquinolones given as an empirical treatment for fever.

Of the all abnormalities, headache, deranged liver functions and mild leukocytosis are very consistant feature of scrub typhus. Generalized rash is rare in our patient and when seen can also be attributed to other secondary factors e.g. drug rash. Eschar is seen in only 50% of patient. A careful full body examination with special emphasis on body folds is required to demonstrate eschar. It is not yet clear why all the patients do not manifest eschar. The exact pathogenesis of scrub is also unresolved issue. It is hypothesized that the organism infect vascular endothelium and cause leakage which eventually leads to multiorgan failure. If untreated, scrub typhus can reach mortality to the tune of 30%.

The most common complication in our practice is interstitial pneumonia / respiratory failure. Second common complication is renal dysfunction and third complication is encephalitis. Scrub myocarditis is less frequent but still observed in many patient

which tends to improve without residual morbidity. Majority of patients with scrub pneumonia require ventilator support. And in these patient intubation, venti support and timely tracheostomy should be quickly though of without hesitation. Those who develop CSF proven encephalitis have poor prognosis. Similarly patient with multiorgan failure with DIC also have poorer prognosis in scrub typhus.

In an unpublished data studied by Dr. Sandhya Saoji, Senior microbiologist, Nagpur, observed that 56% patient came from Madhya Pradesh and rest from Vidarbha region. All the patients had fever on presentations. The most common clinical finding was hepatosplenomegaly (67%), eschar was present in only 14% of patients. She had noted around 14% of mortality in her series.

Diagnostic dilemma with scrub typhus :

Traditional test for scrub typhus is Weil Felix . The sensitivity is around 50% at the end of 2 weeks. So large no of infections can be missed out if test ordered early. The specificity of this test is 90 % in our region. The cut off defined is 1: 80.

Due to this disadvantage, It is recommended to do Quantitative (ELISA)- for detection of immunoglobulin M (IgM) antibodies. This test comes positive at the end of 1 week. The sensitivity is 90% and specificity is 80%. The cut off described in our area is 0.385. The cut off prescribed by ICMR is 0.500. The two troublesome issues of this test is one, borderline false positive values (values between 0.5 -1.0) and cross reactivity to dengue, malaria and other antigens equally prevalent causing confusion. One should specifically keep this problems in mind while labelling patient as scrub typhus and stopping other evaluation. A very commonly used rapid card test for diagnosis of scrub typhus also have limitations due to high percentage of false positivity. Therefore all positive rapid tests should be confirmed with ELISA.

Treatment :

Standard duration of therapy is 7-14 days of doxycyclin or azithromycin. Patient who had longer incubation period and longer period of illness

require prolonged treatment to prevent relapse. Antimicrobial resistance is rare and addition of rifampicin should be avoided and instead initiate search for other factors responsible for delayed/no response.

In conclusion, scrub is the disease which is difficult to diagnose and difficult to rule out from other similar tropical syndromes. However one needs to think about this disease all the time during the peak transmission months. Aggressive treatment even in sickest patient can turnaround the situation. A successful treatment of complications in scrub is exceptionally rewarding scenario in clinical practice.

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