

Health Protection Agency

Scrub Typhus

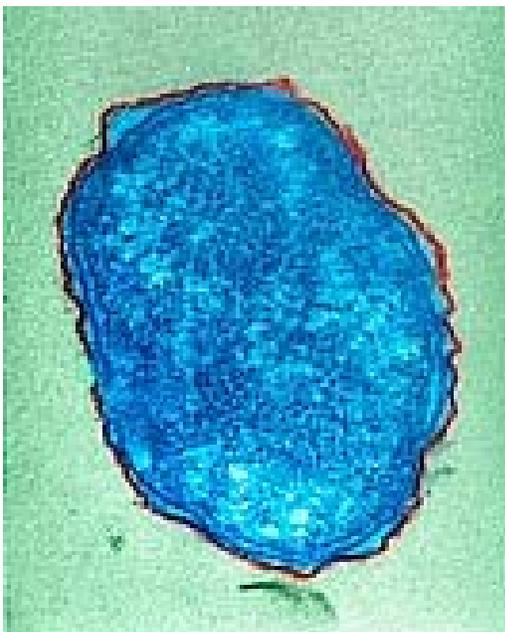
Information Sheet for Doctors



The chigger - the larval stage of trombiculid mites *Leptotrombidium* are infected by *O. tsutsugamushi*



Wild rats serve as the natural reservoir for chiggers.



The causative organism: *Orientia tsutsugamushi*



The eschar on the bite site

Scrub Typhus – Clinical Management Guide

Introduction

This is a seasonal infection seen in people who visit or live in islands with scrub vegetation. In Maldives, scrub typhus incidence peaks in the months of January-February and July-August. This follows seasonal rains, and also is after the school holidays when people commonly visit such islands on picnics.

Distribution: Scrub has been documented in several atolls, more commonly in Gdh, Ga, Aa, Hdh, R, N, S and Gn. Atolls. [1,2].

Pathophysiology: Scrub typhus is caused by *Orientia* (formerly *Rickettsia*) *tsutsugamushi*, a gram negative bacterium, that is carried by mites called chiggers that infest rats living in the vegetation. Humans going into vegetation/agriculture where rats live are exposed to chiggers. The organism enters the body via a chigger bite, which often leaves a typical eschar (30-50% of patients). The incubation period is 5-20 days. Although severe complications may develop later in the disease, it is most often due to an unfortunate missed diagnosis.

The key to successful management of scrub typhus is early diagnosis and treatment with appropriate antibiotics.

Clinical Features

The commonest presentation to suspect scrub typhus is fever lasting more than 5 days, or fever preceded by an eschar. Remember to ask for a history of exposure.

Symptoms:

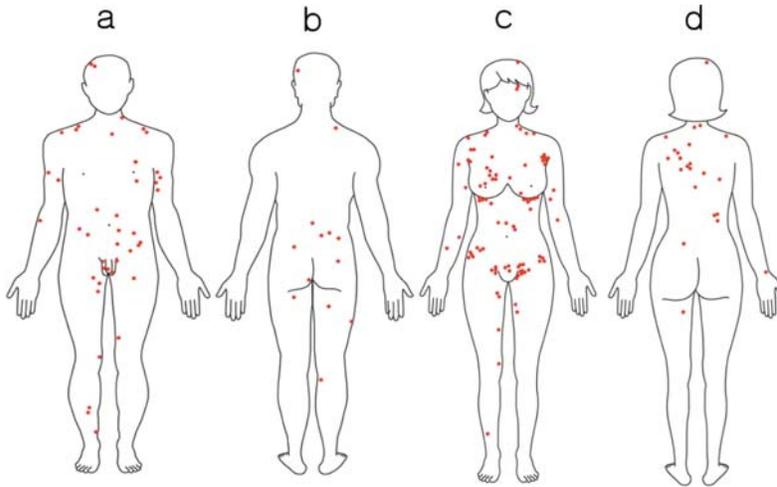
- Fever – abrupt onset, high grade, usually persisting if untreated
- Headache, malaise, myalgia,
- Less commonly, ocular pain, injected conjunctiva,
- Wet cough
- History of visiting island with vegetation for picnic, farming, etc.

Signs:

- Fever (104-105F),
- Eschar (Seen in 30-50%. Precedes onset of fever if present): Common areas - genitalia and perineum, inguinal area neck, umbilicus, and axilla.
- Lymphadenopathy (generalized or regional)
- Tonsillitis (with cervical lymphadenopathy)
- Hepatomegaly
- Macular rash on the trunk (in ~35%) - by end of first week, transient, often missed
- Less frequently – injected conjunctiva



Figure 1. Common sites of eschars



Sites that manifest an eschar in scrub typhus patients: (a) male front, (b) male back, (c) female front, (d) female back. From Dong-min Kim et al. Distribution of eschars on the body of scrub typhus patients: a prospective study. *Am. J. Trop. Med. Hygiene*, 76(5), 2007, pp. 806–809.

Complications (if untreated by 2nd – 3rd week):

- Pneumonitis, ARDS
- Meningitis, meningo-encephalitis
- Myocarditis
- Acute Renal Failure
- CNS involvement: meningitis/meningo-encephalitis
- Tremors, nervousness, slurred speech, nuchal rigidity, or deafness (~1/3)
- Rare: seizure, coma

Investigation Work-up

- CBC: Total Leucocyte Count in lower limits, early lymphopenia, late lymphocytosis, thrombocytopenia
- LFT:
 - o Elevated liver transaminases (ALT or SGPT and AST or SGOT) (in 75-95% of cases)
 - o Hypoalbuminemia (seen in~50% of cases)
 - o Hyperbilirubinemia (rare)
- G6PD (for deciding on treatment – chloramphenicol)

Confirmatory tests:

- Scrub typhus IgM and IgG – qualitative test is available in IGMH sometimes.
Limitations are:

- o IgM becomes positive after about 7 days of fever
- o takes several days to get report

Differential Diagnosis (considering clinical features and basic investigations)

- Dengue – The high fever, similar differential blood counts and elevated liver transaminases, and a positive dengue rapid test may mimic dengue, but platelets do not decrease as low as in DHF. The clinical course differs. Dengue fever would recover (fever settles) or show features of DHF (i.e. fluid leak or haemorrhage) by 5-7 days on onset of fever. However, scrub typhus fever will continue unless treated.
- Typhoid – clinical features and CBC may be similar in the early phase. Scrub typhus can be characterized by lymphadenopathy, eschar and the exposure history of venturing into vegetation.
- Leptospirosis – clinical features like injected conjunctiva, and complications of liver dysfunction, renal failure and meningitis are common to both. However, clinical jaundice and elevated bilirubin are more common in leptospirosis than scrub typhus. This will be at a later stage, where confirmatory antibody tests could differentiate.

Investigations for late presentations (>1 week of fever):

- For Pneumonitis: CXR
- For Myocarditis: ECG, Troponin-T, CK-MB, Echo
- For Meningitis: Brain imaging, CSF (may be either normal, or indicate a low number of monocytes)
- Other tests: Renal functions, coagulation profile, FDP

Treatment: Antibiotic therapy and supportive therapy.

Antibiotics should be started on suspicion without waiting for serology report. Choice of antibiotics:

- chloramphenicol for children (if G6PD normal)
- doxycycline* for adults
- Newer macrolides – azithromycin, roxithromycin (for children with G6PD deficiency)
- Antibiotic duration: 7-14 days

* Doxycycline should not be given to children below 8 years, and caution between ages 8-12 years, due to deposition in growing teeth. Refer to formulary for details.

Scrub typhus shows a rapid therapeutic response to antibiotics. Fever lyses within 12-48 hours. The response may be seen before the serology results arrive. Thus, therapeutic

response should guide the continuation of antibiotics for the above duration. Stable patients may be treated on an outpatient basis and followed up in 3 days, or earlier if fever persists, keeping in mind the DD of dengue.

Referral to Higher Centers

Diagnosis of scrub typhus can be made clinically. Oral antibiotics may be used effectively, as long as the patient is not vomiting, and can take orally. There is no need to refer patients purely for confirmatory tests. Thus scrub typhus can be treated even in islands as outpatient basis if detected early, while the patient is clinically stable.

Transfer may be required if complications are setting in. As the patient would be very ill by this time, please ensure that you communicate with the specialist in the hospital you plan to transfer the patient to, even it is on patient's or relatives' request.

Prevention

To prevent scrub typhus, people should be advised to:

- wear clothing that covers the body, including arms and legs, as a physical barrier against the disease bearing mites. Clothes should be tight around the ankles and wrists, e.g. long trousers tucked into boots or tightly woven socks and long-sleeved shirts.
- use insect repellent on exposed skin and clothing.
- not to sit or lie on bare ground or on grass or other vegetation - use a ground sheet or ground covering.

Surveillance

Scrub typhus should be reported on a case-to-case basis by completing the Communicable Disease Notification form. Any death from scrub typhus should be informed within 24 hours by telephone to the hotline given on the notification form.

References

1. Annual Communicable Diseases Report 2011. CCHDC, Ministry of Health, Maldives. 2011, 13.
2. Scrub typhus reemergence in the Maldives. Emerging Infectious Diseases. 2003;9(12):1638-41. Available from: www.cdc.gov/eid, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3034347/pdf/03-0212.pdf>
3. Medscape.com - Pediatric Scrub Typhus by David J Cennimo, MD, FAAP, AAHIVS; Chief Editor: Russell W Steele, MD. From: <http://emedicine.medscape.com/article/971797-overview>
4. Some case studies from Thailand.