SCRUB TYPHUS

CME

Introduction • Epidemiology • Pathogenesis • Clinical features • Investigations • Treatment

Learning objectives

- Introduction
- Causative organism and vector.
- Epidemiology and basic pathogenesis.
- Clinical presentation and important complications.
- Laboratory investigations.
- First-line treatment and prevention.

1. Introduction

- acute febrile illness caused by **Orientia tsutsugamushi.**
- zoonotic infection transmitted to humans by the bite of infected mites (chiggers).
- Classically associated with scrub vegetation, but transmission can occur in many rural and peri-rural environments.
- Clinical severity ranges from an uncomplicated febrile illness to multiorgan failure.



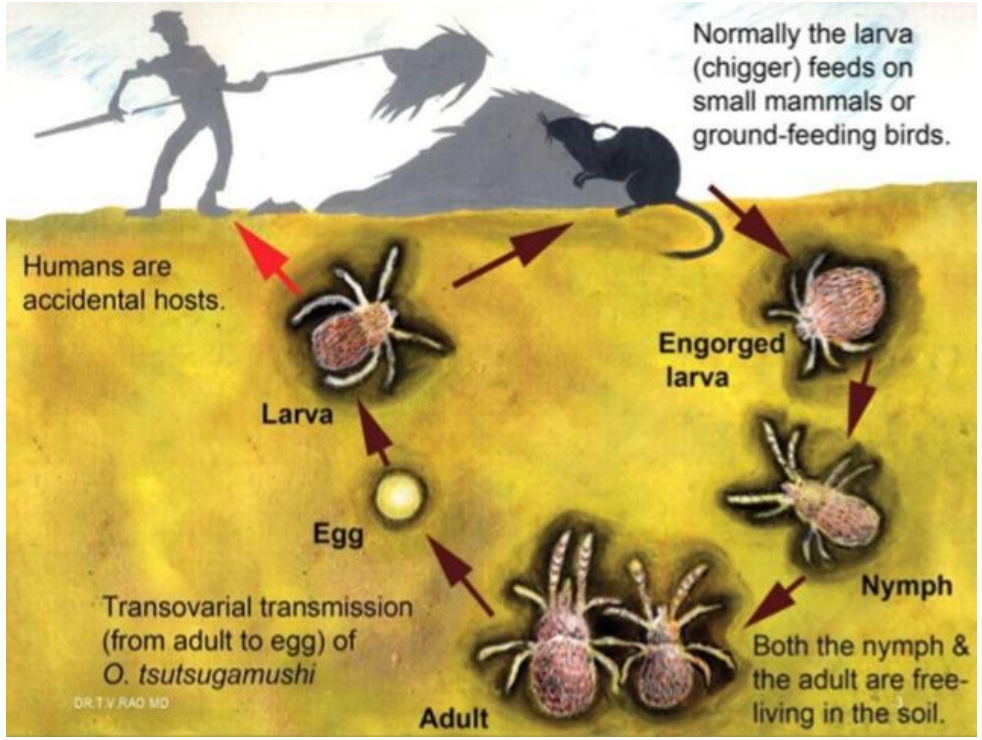
plant community dominated by low-to-medium woody shrubs (typically under 8 meters tall), mixed with grasses, herbs, and geophytes.

2. Epidemiology / prevalence

- Occurs mainly across the Asia–Pacific region; endemic areas extend from South Asia through Southeast Asia and parts of East Asia.
- Transmission is focal and often seasonal, depending on mite ecology, rainfall, vegetation, and human exposure.
- Cases are increasingly recognized in South Asia, including Nepal and northern India.
- Risk is higher with agricultural work, outdoor activity, and residence/travel in mite-infested areas.
- Exact prevalence varies widely because diagnosis and surveillance differ between regions.

3. Causative organism & transmission

- Organism: Orientia tsutsugamushi — an obligate intracellular Gram-negative bacterium.
- Vector: larval trombiculid mites (chiggers), especially Leptotrombidium species.
- Reservoir/amplifying hosts: small mammals, particularly rodents, maintain the mite–bacterium cycle.
- Humans are accidental hosts.
- Person-to-person transmission does not normally occur.



4. Pathogenesis

- Infected chigger larvae feed on humans and inoculate O. tsutsugamushi.
- The organism infects vascular endothelial cells and mononuclear phagocytes.
- Intracellular replication produces endothelial injury and a systemic inflammatory response.
- Vasculitis and increased vascular permeability contribute to tissue edema and organ dysfunction.
- Severe disease may cause pulmonary, hepatic, renal, neurologic, or cardiovascular involvement.

O. tsutsugamushi infection → endothelial infection → vasculitis / capillary leak

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Systemic inflammation + microvascular dysfunction

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Fever, rash, lymphadenopathy, organ involvement

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In severe cases: ARDS, encephalitis, myocarditis, AKI, shock, multiorgan failure

5. Clinical features

- Incubation: usually about 6–21 days after the infective bite.
- Fever is the dominant feature; often accompanied by headache, myalgia, malaise, and chills.
- At the site of bite, a papule evolves into a flat black eschar (the groin and the abdomen being the most common sites followed by the chest and axilla). Eschar: a painless or mildly painful necrotic lesion at the bite site; highly suggestive when present, but may be absent.
- Rash: maculopapular or macular; variable and not always present.
- Lymphadenopathy and hepatosplenomegaly may occur.



FIGURE 43.—Typical eschar seen in scrub typhus indicates site of infection by the trombiculid mite. The lesion, generally up to 1 cm in diameter, consists of a central tough black scab surrounded by a slightly elevated, dull red areola; it is neither painful nor pruritic. (Courtesy, Carlton Reiley, M.D.)

6. Severe disease & complications

- Pulmonary: pneumonitis, acute respiratory distress syndrome (ARDS).
- Neurologic: meningitis/meningoencephalitis, altered sensorium, seizures.
- Cardiovascular: myocarditis, arrhythmias, hypotension, shock.
- Renal/hepatic: acute kidney injury and hepatitis/transaminitis.
- Other: thrombocytopenia, DIC, multiorgan dysfunction.
- Risk of complications increases with delayed recognition and treatment.

7. Laboratory investigations

- CBC: thrombocytopenia is common; leukocyte count may be normal, low, or elevated.
- Liver function tests: transaminases may be elevated.
- Renal function: urea/creatinine and electrolytes, especially in severe disease.
- Inflammatory markers: CRP and/or ESR may be elevated.
- Chest imaging and pulse oximetry/ABG when respiratory involvement is suspected.
- ECG ± echocardiography if myocarditis or cardiac involvement is suspected.

8. Confirmatory / specific tests

- Serology: IgM ELISA is commonly used for diagnosis; interpretation depends on timing and local validation.
- Indirect immunofluorescence assay (IFA) is a reference serologic method in many settings.
- PCR can detect Orientia DNA, particularly early in illness, where available.
- Weil–Felix (OX-K) is inexpensive but has limited sensitivity and specificity; it should not be relied upon when better tests are available.
- Paired serology demonstrating a significant rise in antibody titre can support diagnosis.

9. Diagnosis: practical approach

- Think of scrub typhus in an acute undifferentiated fever with exposure to endemic areas.
- Look carefully for an eschar: scalp, axillae, groin, inframammary area, genital region, etc.
- Supportive clues: thrombocytopenia + transaminitis + lymphadenopathy/rash ± pulmonary or neurologic features.
- Send appropriate diagnostic testing, but do not delay effective therapy in a clinically compatible, high-risk patient.
- Always consider malaria, dengue, enteric fever, leptospirosis, rickettsial infections, and other causes of acute fever.

10. Treatment

- Without treatment, fever subsides spontaneously after 2 weeks, but the mortality rate may be 10 to 30%.
- First-line therapy: doxycycline.
- Adults: doxycycline 100 mg orally twice daily is commonly used; treatment duration is generally about 7-15 days or according to local guidance/clinical response.
- Azithromycin is an important alternative, particularly in pregnancy and in situations where doxycycline is unsuitable.
- Azithromycin 500 mg od for 3 days or Chloramphenicol 500 mg qid orally for 7 to 15 days
- Severe disease may require IV therapy and supportive management in a hospital setting.
- Treat complications: oxygen/ventilatory support, fluids and vasopressors when indicated, renal support, seizure management, etc.

Treatment: key points

- Clinical improvement can be rapid after appropriate therapy; transient worsening may occur after treatment because of a Jarisch–Herxheimer-like reaction.
- Do not wait for serologic confirmation when clinical suspicion is high and the patient is seriously ill.
- Choice and duration of therapy should follow current local/national guidance, pregnancy status, age, severity, and drug contraindications.
- Monitor severe cases for respiratory failure, shock, renal injury, myocarditis, and neurologic complications.

11. Prevention

- Avoid exposure to mite-infested vegetation when possible.
- Wear long sleeves, long trousers, and protective footwear during field/outdoor exposure.
- Use appropriate insect/mite repellents according to local recommendations.
- Promptly remove/clean contaminated clothing and shower after high-risk outdoor exposure.
- Environmental control is difficult because the mite–rodent cycle is complex; prevention focuses mainly on reducing human exposure.

12. High-yield

- Organism: Orientia tsutsugamushi.
- Vector: larval trombiculid mite (chigger).
- Classic clue: fever + eschar ± rash/lymphadenopathy.
- Important labs: thrombocytopenia, transaminitis; assess renal and pulmonary involvement.
- Diagnosis: serology/PCR where available
- Treatment: doxycycline is the usual first-line drug; azithromycin is an important alternative.
- Untreated severe disease can progress to multiorgan failure.

Suggested references

- WHO / regional public-health guidance on scrub typhus and rickettsial diseases.
- CDC: Rickettsial diseases and scrub typhus resources.
- Standard medical textbooks: Harrison’s Principles of Internal Medicine; Davidson’s Principles and Practice of Medicine.
- Current national/local guidelines should be checked for drug choice, dosing, pregnancy, and duration.