

SCRUB TYPHUS FEVER

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Abstract:

This brief review hopes to provide basic information about **Scrub typhus** a zoonotic disease, definition, epidemiological determinants, causes, mode of transmission, incubation period, description of pathology, signs and symptoms, diagnostic evaluation, management include medical, nursing and prophylactic treatment, prevention and health education. Correct and timely recognition of these zoonotic diseases help to prevent the further complications.

Keywords: Scrub typhus, zoonotic, Eschar

Case history

37year female, presented with the complaints of insect bite, Fever (continuous, high-grade, associated with chills &rigors.),severe body ache giddiness, eschar in the abdomen and back, loss of appetite, lower abdominal pain, burning micturition, dysuria for past 3 weeks. Physical examination findings revealed fever 102⁰ F, pulse rate 112/min, BP-80/40mm of Hg,severe dehydration, glossitis, lower abdominal tenderness and hepatosplenomegaly.

Investigations revealed **Microbiology - RICT- strong positive for Scrub Typhus**, biochemistry - Bloodsugar-134mg/dl (Random), Urea-0.8mg/dl, Sodium – 149 meq / l, Potassium 3.8meq/. Sonography shows collapsed liver, gallbladder& wall appears thickened (6mm)suggestive of a calculus cholecystitis. Falciparum malaria, typhoid(MP,MF-negative, Dengue-Non reactive. The treatment plan was T.Doxy10 mg,Inj.Xone1g,T.Paracetamol,500mg, T. Supradyn 5mg, Inj. Pantaprazole40mg IV, T. Emeset 4mg IV, C. Fefolbd, T. Albendazole 400mg, C. BecosuleOD, Inj.Epsolin,100mg, T. Shelcal 500mg, Inj.Chloremphenical,1gm, Inj.Olfloxacin

20mg, T. Sylibus 100mg. IV Fluids NS,100ml/hr,RL100ml/hr..

Introduction:

Of the diseases caused by rickettsia in man, the most widespread is scrub typhus. It exists as a zoonosis in nature between certain species of trombiculid mites and their small mammals.⁽¹⁾Scrub typhus is endemic in Northern Japan, South East Asia, the Western Pacific Islands, Eastern Australia, China, Maritime areas and several parts of South-Central Russia, India and Srilanka. More than 1 million cases occur annually.⁽²⁾

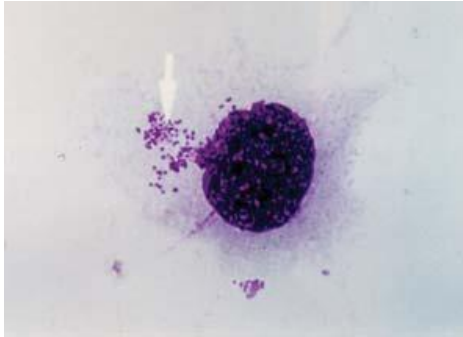


Chigger Miteschigger Mites Fed on the Inner's Ear Lobe of Wild-Caught Rat



Definition:

Scrub typhus is an acute, febrile, infectious illness that is caused by **ORIENTIA (formally Rickettsia) Tsutsugamushi**. It is also known as Tsutsugamushi disease. It was first described from Japan in 1899. Human are accidental hosts in this zoonotic disease²**Epidemiological determinants:**



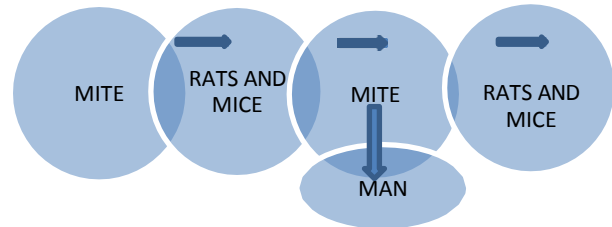
ORIENTIA TSUTSUGAMUSHI under Microscope

Agent factors:

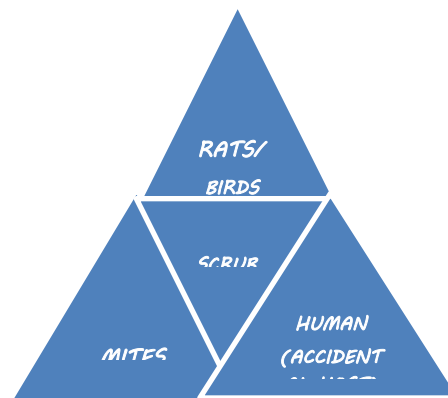
- The causative agent of scrub typhus is RICKETTSIA Tsutsugamushi. There are several serologically distinct strains⁽¹⁾**Reservoir:**
The true reservoir of infection is the trombiculid mite (Leptotrombidium deliense and L. akamushi). The infection is maintained in nature transovarially from one generation of mite to the next. The nymphal and adult stages of the mite are free-living in the soil; they do not feed on vertebrate hosts. It is the larva (chigger) that feed on vertebrate hosts and picks up the rickettsia. The larval stage serves both as a reservoir, through ovarian transmission, and as a vector for infecting humans and rodents⁽¹⁾

Mode of Transmission:

The disease is not directly transmitted from person to person¹



- Source of infection -RAT
- Route of transmission-TROMBICULID MIT
- Susceptible population -ALL
- Infected vector live in jungle, scrub areas and grass land, In south region the occurrence of disease is between May-October, more peak in June-July, In north region between September-December, more peak in October.



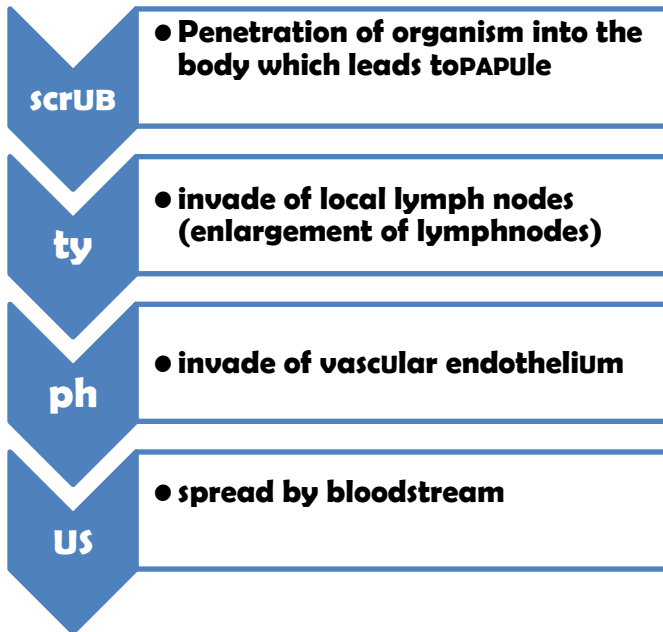
Causes:

Rodents-- > Transmitted by some **trombiculid mites**, the bite of the mites leaves a characteristic black **ESCHAR**, mites present in ear lobe of Rodents, and rodents are in grassland area and finally human affected by the ecosystem⁽⁵⁾

Incubation Period:

- usually 10-12 days, varies from 6-21days⁽¹⁾
- 1st week--systemic toxic symptoms arise
- 2nd week –worse complications
- 3rd week--Convalescence (need treatment)⁽³⁾

Pathophysiology:



Description of Pathology:

1. Due to causes (chigger bites), the organism penetrates into the body which leads to papule (small raised lesion 0.5cm, macopapule 0.5cm above), Eschar, ulcer, lesion formation
2. Invade of local lymph node leads to enlargement of lymph nodes (Axillary lymph nodes, mandibular lymph nodes)
3. Invade of vascular endothelium leads to Hyperemia, systemic Lymphadenopathy, and generalized inflammation of all lymph nodes.
4. Spread by blood streams leads to general symptoms of intoxication⁽⁴⁾

Clinical Manifestation:

Signs:

MaculoPapular rash, Escher, Splenomegaly, Lymphadenopathy

Symptoms:

Fever, Headache Muscle Pain, Cough & Coryza, GI symptoms, Abdominal tenderness



Characteristic Eschar in a Patient

More virulent strain cause Hemorrhage and intra venous coagulation⁽⁴⁾

ESCHAR-major symptom of scrub typhus occurred in 60% of people, Location of Eschar- axillary lymph nodes, inguinal region, perineal region, Scrotal, buttocks, lower abdomen and thigh.

Ulcer- appearance of ulcer surrounded by red areola, covered by black dark scar⁽³⁾

The epidemiological features of Scrub typhus in Asia:

Scrub typhus is endemic to a part of the world known as the -tsutsugamushi triangle, which extends from northern Japan and far-eastern Russia in the north, to northern Australia in the south, and to Pakistan in the west. Scrub typhus is essentially an occupational disease among rural residents in the Asia-Pacific region. An increase in the prevalence of scrub typhus has been reported from some Asian countries, which coincides with the widespread use of β -lactam antimicrobial

drugs and urbanization in rural areas **the status of scrub typhus in the South-East Asia Region:**

The vector of scrub typhus is present in most countries of the South-East Asia Region and it is endemic in certain geographical regions of India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka and Thailand.

India

Scrub typhus is prevalent in many parts of India but specific data are not available (16). There have been outbreaks in areas located in the sub-Himalayan belt, from Jammu to Nagaland. There were reports of scrub typhus outbreaks in Himachal Pradesh, Sikkim and Darjeeling (West Bengal) during 2003-2004 and 2007. Outbreaks of scrub typhus are reported in southern India during the cooler months of the year. Scrub typhus is a reemerging infectious disease in India⁽²⁾

Appropriate institution for Research and training on scrub typhus in The south- east Asiaregion:

The Armed Forces Research Institute of Medical Sciences (AFRIMS) Bangkok, Thailand is the WHO Collaborating Centre (CC) for Emerging Diseases that is providing technical support for outbreak investigation and capacity building for diagnosis and control of scrub typhus. The Department of Entomology, AFRIMS is the only laboratory in the world that has the ability to rear and colonize scrub typhus-infected *Leptotrombidium* mites, the vector of *O.tsutsugamushi*⁽²⁾

Diagnostic Evaluation:

Scrub Typhus:

- Black Eschar , central necrosis with red periphery

- Serological test-Weil Felix test (1:60 ratio) 50% of cases positive in second week,
- IFA(Indirect fluorescent Antibody test) positive in first week of illness
- Gold standard staining
- IgG , IgM -1:40 dilution, present 4th day onwards⁽⁵⁾
- Blood Routine- Leukopenia, WBC, Liver function test.
- WEIL FELIX reaction with titer beyond 1:60 a fourfold rise during the course of disease⁽¹⁾

Types of specimen to be collected for laboratory diagnosis:

Different types of samples can be collected for laboratory investigation but it depends on diagnostic method to be used. The laboratory should be contacted in advance to decide on the types of specimen to be collected.

Skin or lymph node biopsy:

- If frozen at -80°C after sampling, shift in dry ice for culture.
- If not frozen at -80°C after sampling, shift at room temperature for PCR.
- If formalin-treated or paraffin-embedded, shift at room temperature for Immune histochemistry.

Heparinized blood:

- Conserve at -80°C and then shift in dry ice for culture.

EDTA blood

- Conserve at +4°C and then shift at room temperature for PCR.

Serum

- Conserve at +4°C, then shift at room temperature. Collect two serum specimens 10 days apart⁽²⁾

Management:**Medical Management:**

- Doxycycline 100 mg BD Continue till 48 hrs. after feversubside.
 - Azithromycin 500 mg OD 7days
 - Rifampicin 300BD 7 days
 - Fluoroquinolones 7 days OD/BD⁽³⁾
- Without treatment disease often fatal. Doxycycline is the most common drug used for scrub typhus and chloramphenicol is alternate drug of choice, Rifampicin and azithromycin are alternative in resistant strains and also Azithromycin is the drug of choice for children and pregnant mothers.⁽⁵⁾

Nursing Management:

- Adequate bedrest
- Advice to drink plenty of water
- Assess for complications
- Assess for signs and symptoms⁽⁴⁾

Prophylactic Treatment:

- It has been shown that a single oral dose of chloramphenicol or tetracycline given every five days for a total of 35 days, with 5-day non-treatment intervals, actually produces active immunity to scrub typhus. This procedure is recommended under special circumstances in certain areas where the disease is endemic.⁽²⁾

Prevention:

- Rat (source of infection)
- Route of Transmission (mites)
- Protect susceptibility (avoid being bitten)
- Insect repellents
- Clearing the vegetation where rats and mice live
- Do not sit or lie on bare ground or grass⁽¹⁾

Rapid Case Identification by Health-Care Workers:

- The early diagnosis of acute scrub typhus can greatly reduce the chance of life threatening complications and guide optimal therapy.
- It will be necessary to increase awareness of empirical therapy options for scrub typhus and to develop diagnostic assays that are affordable, require limited expertise and equipment, and are sensitive and specific such that can be used in endemic, resource poor countries.

Public Education on Case Recognition and Personal Protection:

- Advocacy, awareness and education activities should be targeted at school children, teachers and women groups in endemic areas. Involvement of community-based organizations in prevention and control of scrub typhus is important.

Rodent Control and Habitat Modification:

- *Rodent control* is a multidimensional activity that requires multi sectorial cooperation.
- Different control strategies such as trapping, poisoning and use of natural predators are in practice.
- Rodent control is primarily the responsibility of the agriculture sector-poisoning is a common practice.
- *Habitat modification* will make areas less attractive to commensal rodents and thereby prevent new populations from recolonizing the habitat. Allowing weeds to grow around buildings also encourages rats and mice.
- Good sanitation in and around buildings creates an environment that is less suited for rodent populations.

- Proper sanitation may not eliminate rat populations but often can prevent them from flourishing in high numbers.⁽²⁾

Discussion:

- Case identification; public education; and rodent control and habitat modification are the three pillars of programme aimed at controlling the impact of scrub typhus on the human population. Escher is the most useful diagnostic findings with acute febrile illness in areas endemic for scrub typhus so thorough examined presence over the covered areas such as groin, genitalia, axilla. The Escher could possibly diagnose.

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