



TYPHUS

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OBJECTIVES

At the end of this session each student will be able to:

1. Define typhus.
2. Describe the epidemiology of typhus.
3. Describe the cause of typhus.
4. Describe the pathophysiology of typhus.
5. Describe the clinical features of typhus.
6. Describe the complications of typhus.
7. Describe the differential diagnoses of typhus.
8. Investigate patients with typhus.
9. Treat patients with typhus.
10. Describe the prognosis of patients with typhus.
11. Describe the preventive measures for typhus.



Definition

- Typhus refers to a group of infectious diseases that are caused by rickettsial organisms and results in an acute febrile illness.



Epidemiology

Geographical distribution:

A. Epidemic typhus:

- Central and south America.
- Africa.
- Northern china.
- Certain regions of Himalayas.

B. Murine typhus:

- Subtropical and temperate costal regions.

C. Scrub typhus:

- Northern Australia.
- Indian subcontinent.



Epidemiology

- **Age:**

It may occur in people of all ages, but more common in adults.

- **Sex:** No predilection for either sex.

- **Season:**

Typhus is common in summer when the climate is favourable for flea multiplication and propagation.



Cause

Epidemic typhus:

A. Cause: Rickettsia prowazekii.

B. Vector: Body lice.

- Pediculus corporis (common).
- Pediculus capitis.
- Phthirus pubis.

NB: Body lice die 2-3 weeks of infection.

c. Hosts:

- Human beings.
- Flying squirrels.



Cause

Murine typhus:

A. Cause: Rickettsia typhi.

B. Vector:

- Rat flea i.e. xenopsylla cheopis.
- Cat flea i.e. ctenocephalides felis.

C. Hosts:

- Rat (Rattus rattus).
- Cat.
- Human being (infection occurs accidentally).



Cause

Scrub typhus:

A. Cause: *Orientia tsutsugamushi*.

B. Vector: Mites.

- *Leptotrombidium akamushi*.

- *Leptotrombidium deliense*.

C. Hosts:

- Rats.

- Large mammals.

NB: In human beings infection occurs accidentally.



Pathophysiology

- Epidemic typhus is transmitted by body lice, *Pediculus corporis* (an arthropod vector).
- The aetiological agent of epidemic typhus is *Rickettsia prowazekii*, living in the alimentary tract of the louse.



Pathophysiology

- The rickettsia harbouring louse bites a human to engage in human blood meal and causes a Pruritic reaction on the host's skin.
- A louse defaecates as it eats; when the host scratches the site, the lice are crushed and rickettsia is inoculated into the bite wound.
- The rickettsia travel to the blood stream and rickettsaemia develop.



Pathophysiology

- Rickettsia parasitizes the endothelial cells of the blood vessels.
- The organisms proliferate and cause endothelial cellular enlargement with resultant multi-organ vasculitis.



Pathophysiology

- Multi-organ vasculitis may cause thrombosis and small nodules to develop and deposit of leucocytes, macrophages and platelets.
- Gangrene of the distal portions of the extremities, nose, ear lobes and genitalia may occur as the result of thrombosis of supplying blood vessels.



Pathophysiology

- Vasculitis may also result in loss of intravascular colloid with subsequent hypovolaemia and decrease tissue perfusion and possibly organ failure and loss of electrolytes.



Pathophysiology

- After a patient is treated with antibiotics and the disease has seemingly been cured, rickettsia may hang around in body tissues.
- Months, years or even decades after treatment, the organisms may re-emerge and cause a recurrence of typhus called Brill-Zinsser disease (15% of cases).
- How the rickettsia linger silently in a person and by what mechanism recrudescence is mediated are unknown.



History

- Exposure to an endemic area.
- Occupational exposure.
- Indoor overcrowding.
- Lack of personal hygiene.
- Appropriate season.



History

- The incubation period is approximately 12 days for the typhus group.
- Abrupt onset of fever.
- Headache occurs abruptly and continues constantly.
- Non-productive cough.
- Deafness.
- Tinnitus.
- Rigors.
- Myalgia.
- Malaise.



History

- Maculopapular or petechial rash.
- CNS symptoms ranging from mental dullness to coma.
- A painless papule develops at the site related to the chigger bite and subsequently undergoes central necrosis with formation of Eschar.
- History of exposure to natural disaster or war.



Physical examination

- Fever.
- Rash.
- Eschar.
- Tachypnoea.
- Digital gangrene.
- Mild splenomegaly.
- Mild hepatomegaly.
- Conjunctival congestion
- Relative bradycardia consistent with the rise of temperature.
- Lymphadenopathy (regional or generalized).



Complications

- Hypotension.
- Gangrene of the distal portions of the extremities, nose, ear lobes and genitalia.
- Electrolyte imbalance.
- Multi-organ failure e.g. renal failure, liver failure etc.
- Secondary bacterial infection e.g. pneumonia.



Differential diagnoses

- A. Generalized lymphadenopathy:**
- Infectious mononucleosis.
 - Early congenital syphilis.
 - Lymphoma.
 - West Nile encephalitis.
 - HIV disease (WHO clinical stage-1).



Differential diagnoses

- B. Eschar:** Anthrax and bubonic plague.
- C. Fever and rash:**
 - Rock mountain spotted fever.
 - Meningococcaemia.
 - Toxoplasmosis.
 - Rubella.
 - Measles.



Differential diagnoses

- D. Fever:**
 - Brucellosis.
 - Dengue fever.
 - Pyrexia of unknown origin.
 - Leptospirosis.
 - Malaria.
 - Meningitis.
 - Relapsing fever.
 - Toxic shock syndrome.
 - Tulaemia.
 - Typhoid fever.



Investigations

- Renal function test.
- Urinalysis.
- Liver functional tests.
- Full blood picture.
- Electrolytes.
- Indirect immunofluorescence (IFA) or enzyme immunoassay (EIA) testing.
- Polymerase chain reaction (PCR).
- Complement fixation (CF) tests.
- Histology of biopsied tissues sections.



Treatment

- Doxycycline 200 mg PO or IV BD for 3 days, then maintenance dose 100 mg PO or IV BD
Plus
- Chloramphenicol 500 mg 1 g IV 6 hourly (do not exceed 4 g/day)

Alternatives in doxycycline resistance:

- Azithromycin.
- Rifampicin.



Prognosis

- **Uncomplicated cases:**

It is excellent, when the disease is diagnosed promptly and antibiotics are initiated early in the course of illness.

- **Complicated cases:**

It is generally good but varies depending on the severity of specific complication and the health status of the patient at the time of disease onset.



Mortality

Epidemic typhus:

- Untreated person: It is as low as 20% in health individuals and as high as 60% in elderly and debilitated patients.
- Treated patients: 3-4%.
- **Murine typhus:** Untreated is patients is 1-4%.
- **Scrub typhus** is less than 1%.



Prevention

- Avoid exposure to endemic areas.
- Avoid overcrowding indoors.
- Insecticides may be helpful in controlling the arthropod vectors that spread the disease.
- Reduce the rodent host population.
- Wear protective clothing e.g. long-sleeved shirts and long pants, in endemic areas.
- Practice good personal hygiene, including frequent bathing and frequent changing of clothes.



Thank you for your attention



Reference

- Okulicz J.F. Typhus.
www.emedicine.com/med/topic2332.htm Last updated: May 12, 2006.