TYPHUS FEVER

Bioterrorism Agent Profiles for Health Care Workers

Causative Agent: Typhus fever is a rickettsial disease caused by the organism *Rickettsia prowazekii*, a Gram negative, obligate intracellular bacterium.

Routes of Exposure: Humans are exposed to epidemic typhus through arthropod vectors, primarily the human body louse.

Infective Dose & Infectivity: The infective dose is unknown. All people are considered susceptible, though older adults may be more severely affected.

Incubation Period: The incubation period ranges from 1 to 2 weeks, but is usually 12 days.

Clinical Effects: Illness usually starts suddenly with headache, chills, prostration, fever, and generalized body aches. A macular eruption appears in four to seven days, initially on the upper trunk, followed by spread to the entire body, but usually not to the face, palms, or soles. The rash starts as maculopapular, becomes petechial or hemorrhagic, then develops into brownish-pigmented areas. The rash may be more concentrated in the axillae. Changes in mental status are common with delirium or coma. Toxemia is usually pronounced. Myocardial and renal failure can occur when the disease is severe. When untreated, the fever and illness last for 2 weeks.

Lethality: The death rate for untreated epidemic typhus increases with age and varies from 10% to 40%.

Transmissibility: Typhus fever is transmitted from person to person by the body louse, which feeds on the blood of humans. Infected lice excrete rickettsiae in their feces and usually defecate at the time of feeding. People are infected when they rub feces or crush lice in the bite, superficial abrasions, or mucous membranes. Inhalation of infective louse feces in dust may account for some infections. Transmission has also been associated with contact with infected flying squirrels in the United States, their nests, or their ectoparasites.

Primary contaminations & Methods of Dissemination: As a bioterrorism weapon, *R. prowazekii* would most likely be delivered via aerosolization.

Secondary Contamination & Persistence of organism: Direct person-to-person spread of the disease does not occur in the absence of the vector. Rickettsia can remain viable in a dead louse for weeks.

Decontamination & Isolation:

Patients – Standard precautions should be practiced with patients with typhus. Louse-infected people should be treated with pediculocides containing pyrethrins (0.16-33%), piperonyl butoxide (2-4%), crotamiton (10%), or lindane (1%). Several applications may be needed because lice eggs are resistant to most insecticides.

Equipment, clothing & other objects: Washing clothes in hot water kills lice and eggs. Insecticides dusted onto clothing has been effective in epidemics.

Laboratory testing: Culture isolation of *R. prowazekii* is rarely attempted. The preferred serology for acute and convalescent antibodies is the IFA test, although ELISA, microagglutination and latex agglutination are also available. Antibody tests usually become positive in the second week. Rickettsiae an be detected in tissue biopsies by PCR or immunohistochemical assays.

Therapeutic Treatment: Doxycycline is the treatment of choice for epidemic louseborne typhus fever. Therapy should be administered until the patient is afebrile for at least 3 days and clinical improvement is documented; the usual duration of therapy is 7 to 10 days. Severe disease can require a longer course of treatment.

Despite concerns regarding dental staining after use of a tetracycline-class antimicrobial agent in children 8 years of age or younger, doxycycline provides superior therapy for this potentially life-threatening disease. In people who are intolerant of tetracyclines, intravenous chloramphenicol or fluoroquinolones can be considered. Fluoroquinolones are not recommended for people younger than 18 years of age. When faced with a seriously ill patient with possible typhus, suitable therapy should be started without waiting for laboratory confirmation.

Prophylactic Treatment: Vaccine is no longer available in the United States and post-exposure chemoprophylaxis is not indicated. Apply residual insecticide to those who are subject to risk.

Differential Diagnosis: The differential diagnoses should includes febrile illnesses such as anthrax, dengue fever, infectious mononucleosis, leptospirosis, malaria, meningitis, meningococcemia, relapsing fever, Rocky Mountain spotted fever, syphilis, toxic shock syndrome, tularemia, typhoid fever, rubella, measles, and other rickettsial diseases.

References:

Chin J. Control of Communicable Diseases Manual, Seventeenth Edition, American Public Health Association; 2000.

American Academy of Pediatrics. Epidemic Typhus. In: Pickering LK, ed. *Red Book: 2003 Report of the Committee on Infectious Diseases*. Elk Grove Village, IL: American Academy of Pediatrics; 2003: 669-670.

Center for Food Security and Public Health. Typhus Fever – *Rickettsia prowazekii*, Iowa State University College of Veterinary Medicine
http://www.scav.org/Typhus%20Fever%20Fact%20Sheet.htm

For more information call (602) 364-3289

Frequently Asked Questions About Typhus Fever

What is typhus fever?
Typhus fever is a potentially fatal, infectious disease caused by the bacterium *Rickettsia prowazekii*. Also known as epidemic typhus, this disease is transmitted to humans by body lice. Though it has occurred on all continents throughout the world except Australia, typhus fever is not common in the United States.

Who gets typhus fever?
Anyone can get typhus fever, though it is most likely to occur among people living in overcrowded, dirty conditions, with few opportunities to wash themselves or their clothing. As a result typhus fever often occurs when cold weather, poverty, war, and other disasters result in close living conditions where body lice can thrive and spread.

How is typhus fever transmitted?
Typhus fever is transmitted by body lice, which become contagious by feeding on the blood of infected humans. The lice then defecate will feeding on another person and the feces, which contains the typhus fever bacteria, can get rubbed into small wounds such as those caused by scratching lice-infected areas. It is the feces, not the bite of the louse that transmits the illness to humans. It is also possible to become infected through contact with the mucous membranes of the mouth and eyes or by inhaling the dust of dried lice feces. Typhus fever is not spread directly from person-to-person.

Could terrorists use typhus fever?
Typhus fever is considered dangerous and could be used as a biological weapon. However, because it would be difficult to deliver and easy to treat it is not considered a very likely agent.

What are the symptoms of typhus fever?
Symptoms of typhus fever will usually appear within one to two weeks after exposure. Common symptoms include fever, headache, weakness, and muscle aches. Typhus fever also causes a rash composed of both spots and bumps. The rash starts on the back, chest, and stomach, then spreads to the arms and legs. The worst types of complications involve infection in the heart muscle (myocarditis) or brain (encephalitis).

Is typhus fever fatal?
Most people do not die from typhus fever. Patients usually recover with early detection and treatment. However, if left untreated, the death rate can be as high as 10 to 40 percent.

How is typhus fever diagnosed?
Typhus fever is usually diagnosed through blood tests. The organism can also be identified in tissue samples.

Is there treatment for typhus fever?
Effective treatment is possible with antibiotics such as doxycycline, chloramphenicol., or ciprofloxacin.

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