



FIGURE 211-3 **Top:** Papulovesicular lesions on the trunk of the patient with rickettsialpox shown in Fig. 211-2. **Bottom:** Close-up of lesions from the same patient. (Reprinted from A Krusell et al: *Emerg Infect Dis* 8:727, 2002. Photos obtained by Dr. Kenneth Kaye.)

10–17 days, during which the eschar and regional lymphadenopathy frequently go unnoticed, disease onset is marked by malaise, chills, fever, headache, and myalgia. A macular rash appears 2–6 days after onset and usually evolves sequentially into papules, vesicles, and crusts that heal without scarring (Fig. 211-3); in some cases, the rash remains macular or maculopapular. Some patients develop nausea, vomiting, abdominal pain, cough, conjunctivitis, or photophobia. Without treatment, fever lasts 6–10 days.

Diagnosis and Treatment Clinical, epidemiologic, and convalescent serologic data establish the diagnosis of a spotted fever–group rickettsiosis that is seldom pursued further. Doxycycline is the drug of choice for treatment.

FLEA-BORNE SPOTTED FEVER



An emerging rickettsiosis caused by *R. felis* occurs worldwide. Maintained transovarially in the geographically widespread cat flea *Ctenocephalides felis*, the infection has been described as moderately severe, with fever, rash, and headache as well as CNS, gastrointestinal, and pulmonary symptoms.

EPIDEMIC (LOUSE-BORNE) TYPHUS

Epidemiology The human body louse (*Pediculus humanus corporis*) lives in clothing under poor hygienic conditions and usually in impoverished cold areas. Lice acquire *R. prowazekii* when they ingest blood from a rickettsemic patient. The rickettsiae multiply in the louse's mid-gut epithelial cells and are shed in its feces. The infected louse leaves a febrile person and deposits infected feces on its subsequent host during its blood meal; the patient autoinoculates the organisms by scratching. The louse is killed by the rickettsiae and does not pass *R. prowazekii* to its offspring.



Epidemic typhus haunts regions afflicted by wars and disasters. An outbreak involved 100,000 people in refugee camps in Burundi in 1997. A small focus was documented in Russia in 1998; sporadic cases were reported from Algeria, and frequent outbreaks occurred in Peru. Eastern flying squirrels (*Glaucomys volans*) and their lice and fleas maintain *R. prowazekii* in a zoonotic cycle.

Brill-Zinsser disease is a recrudescence illness occurring years after acute epidemic typhus, probably as a result of waning immunity. *R. prowazekii* remains latent for years; its reactivation results in sporadic cases of disease in louse-free populations or in epidemics in louse-infested populations.

Rickettsiae are potential agents of bioterrorism (Chap. 261e). Infections with *R. prowazekii* and *R. rickettsii* have high case–fatality ratios. These organisms cause difficult-to-diagnose diseases and are highly infectious when inhaled as aerosols. Organisms resistant to tetracycline or chloramphenicol have been developed in the laboratory.

Clinical Manifestations After an incubation period of ~1–2 weeks, the onset of illness is abrupt, with prostration, severe headache, and fever rising rapidly to 38.8°–40.0°C (102°–104°F). Cough is prominent, developing in 70% of patients. Myalgias are usually severe. A rash begins on the upper trunk, usually on the fifth day, and then becomes generalized, involving the entire body except the face, palms, and soles. Initially, this rash is macular; without treatment, it becomes maculopapular, petechial, and confluent. The rash often goes undetected in black skin; 60% of African patients have spotless epidemic typhus. Photophobia, with considerable conjunctival injection and eye pain, is common. The tongue may be dry, brown, and furred. Confusion and coma are common. Skin necrosis and gangrene of the digits as well as interstitial pneumonia may occur in severe cases. Untreated disease is fatal in 7–40% of cases, with outcome depending primarily on the condition of the host. Patients with untreated infections develop renal insufficiency and multiorgan involvement in which neurologic manifestations are frequently prominent. Overall, 12% of patients with epidemic typhus have neurologic involvement. Infection associated with North American flying squirrels is a milder illness; whether this milder disease is due to host factors (e.g., better health status) or attenuated virulence is unknown.

Diagnosis and Treatment Epidemic typhus is sometimes misdiagnosed as typhoid fever in tropical countries (Chap. 190). The means even for serologic studies are often unavailable in settings of louse-borne typhus. Epidemics can be recognized by the serologic or immunohistochemical diagnosis of a single case or by detection of *R. prowazekii* in a louse found on a patient. Doxycycline (200 mg/d, given in two divided doses) is administered orally or—if the patient is comatose or vomiting—intravenously. Although under epidemic conditions a single 200-mg oral dose is effective, treatment is generally continued until 2–3 days after defervescence. Pregnant patients should be evaluated individually and treated with chloramphenicol early in pregnancy or, if necessary, with doxycycline late in pregnancy.

Prevention Prevention of epidemic typhus involves control of body lice. Clothes should be changed regularly, and insecticides should be used every 6 weeks to control the louse population.

ENDEMIC MURINE TYPHUS

Epidemiology *R. typhi* is maintained in mammalian host/flea cycles, with rats (*Rattus rattus* and *R. norvegicus*) and the Oriental rat flea (*Xenopsylla cheopis*) as the classic zoonotic niche. Fleas acquire *R. typhi* from rickettsemic rats and carry the organism throughout their life span. Nonimmune rats and humans are infected when rickettsia-laden flea feces contaminate pruritic bite lesions; less frequently, the flea bite transmits the organisms. Transmission can also occur via inhalation of aerosolized rickettsiae from flea feces. Infected rats appear healthy, although they are rickettsemic for ~2 weeks.



Murine typhus occurs mainly in Texas and southern California, where the classic rat/flea cycle is absent and an opossum/cat flea (*C. felis*) cycle is prominent. Globally, endemic typhus occurs mainly in warm (often coastal) areas