DermNet NZ

Authoritative facts about the skin from the New Zealand Dermatological Society Incorporated.

Rickettsial diseases

What are rickettsial diseases?

Rickettsial disease encompasses a group of diseases caused by the microorganisms *rickettsiae*.

Rickettsiae occupy a position between bacteria and viruses. They can only survive inside cells. Rickettsial diseases vary considerably in severity from self-limiting mild illnesses to severe life-threatening infections, particularly if complications arise. The organisms cause disease by damaging blood vessels in various tissues and organs. In severe cases multiple tissues and organs are affected.

Because these diseases are potentially serious, you must seek urgent medical attention if there is any suspicion that you may have one of these infections.

What are the types of rickettsial diseases?

Rickettsial diseases basically fall into 3 groups.

Spotted fever group	Typhus group	Other rickettsial diseases
• Rocky mountain spotted fever (RMSF) • Rickettsialpox • Boutonneuse fever	• Louse-borne typhus • Brill-Zinsser disease (relapsing louse-borne typhus) • Murine typhus	• Tsutsugamushi disease (scrub typhus) • Q fever • Ehrlichiosis

Who gets rickettsial diseases?

Rickettsial diseases occur rarely in New Zealand. They occur all over the world but some types of rickettsial diseases are more prevalent in certain geographic locations.

Rickettsial disease	Geographic locations where most prevalent
RMSF	• Primarily in the continental United States and rarely elsewhere
Rickettsialpox	• Large cities in Russia, South Africa, and Korea
Boutonneuse fever	• Mediterranean countries, such as Spain, Italy, and Israel
Louse-borne typhus Brill-Zinsser disease	• Europe, Asia and Africa • In the last 2 decades African countries, especially Ethiopia and Nigeria, have reported most cases
Murine	• Large cities around the world with high rat infestations (this includes Auckland)
Tsutsugamushi disease	• Japan, Solomon Islands and Pakistan

Q fever	• Australia, Canada and other parts of the world where humans come into contact with infected animals

How do you get rickettsial diseases?

Most rickettsial diseases are spread to humans by arthropods such as ticks, lice, mites and fleas. Q fever is different in that it is spread via airborne droplets.

Disease	Causative rickettsia	Transmitting vector/carrier
Rocky Mountain Spotted Fever (RMSF)	*R rickettsii*	• Vector: wood tick, dog tick and Lone Star tick • Humans become incidental host after being bitten by infected adult tick
Rickettsialpox	*R akari*	• Vector: house mouse is the natural host of the mouse mite transmitting rickettsialpox • Distribution: Russia, South Africa, Korea
Boutonneuse fever	*R conorii*	• Vector: various ticks including dog ticks
Louse-borne typhus	*R prowazekii*	• Vector: lice (*Pediculus humanus*)
Brill-Zinsser disease	*R prowazekii*	• Vector: lice • Reactivation of the organism from a latent state up to decades after primary infection
Murine	*R typhi* and *R felis*	• Transmitted between rats by a rat flea • Humans accidentally infected by the faeces of infected fleas
Tsutsugamushi disease	*O tsutsugamushi*	• Vector: larval trombiculid mites in soil and scrub
Q fever	*C burnetii*	• Vector: Airborne droplets from infected cattle , sheep goats, rodents and cats • Slaughterhouse and animal research workers at risk • Ticks transmit the disease to rodents and domestic animals but are seldom the cause of human infection • Organism remains latent in infected host until a stressor such as birth activates it. At this point, it multiplies and contaminates the animals surrounding, being a potential source of infection for months.

What are the signs and symptoms of rickettsial diseases?

Signs and symptoms differ slightly depending on the type of rickettsial disease. However, like other viral or bacterial exanthems, most patients present with fever, headache and malaise (feeling generally unwell) and a widespread rash of some description.

Rickettsial disease	Characteristic signs and symptoms

RMSF	• Onset gradual or abrupt, starting about 2–8 days after a tick bite • Fever, headache, confusion, aching muscles, gastrointestinal symptoms • Rash from day 2–3 consisting of of small red blotches on wrists and ankles that become widespread and sometimes blister • 20% of cases do not develop rash (spotless RMSF)
Rickettsialpox	• Irregular fluctuating fever occurs and lasts for <1 week • Headache, chills, aching muscles, runny nose, sore throat, nausea and vomiting, abdominal pain • Red raised spot develops at site of mite bite, later forming a dry scab (eschar) • Rash distributed on the face, neck, trunk and extremities, and is easily confused with rash of varicella (chickenpox)
Boutonneuse fever	• Fever, headache, malaise, aching muscles • Rash appears on days 3–5 of illness, spreading from the extremities to the trunk, neck, face, palms and soles within 36 hours • Rash is spotty and blotchy and may persist for 2–3 weeks • In half the cases, a dry scab known as a tache noire (black spot) develops
Louse-borne typhus Brill-Zinsser disease	• Abrupt onset occurring 1–2 weeks after louse bite • Fever and intractable headache • On days 4–7 of illness, rash appears, spreading from trunk to extremities (face, palms and soles are usually not affected) • Rash initially splotchy, developing into raised red spots • Brill-Zinsser disease is usually milder
Murine	• Similar to louse-borne typhus but tends to have a milder and shorter course • Flea-bite does not have an exchar
Tsutsugamushi disease	• Generalised swelling of the lymph nodes is common • Fever and headache • Rash occur 1–3 weeks after a mite bite and is a dry scab-like lesion • Rash usually only around the trunk and has a short duration
Q fever	• Onset is usually abrupt with fever, intractable headache, chills, muscle pain, cough and chest pain • Usually no rash appears • Pneumonitis (lung involvement) occurs in more than half of patients

Diagnosis of rickettsial diseases

Serology is the mainstay to confirm diagnosis of rickettsial diseases. This is a blood test that detects the presence of antibodies to rickettsial antigens.

What is the treatment for rickettsial diseases?

All rickettsial diseases should be treated with antibiotic therapy. They should be started early in the first week of illness to be most effective and to produce a good outcome. Doxycycline is the drug of choice. Chloramphenicol may be used as an alternative. Supportive therapy with electrolyte and fluid maintenance are also essential to the

management of patients with rickettsial diseases, particularly if there are signs of low blood pressure, electrolyte disturbances, and blood coagulation (clotting) problems (DIC).

Rickettsialpox is a self-limiting disease and occasionally antibiotics may not be necessary, especially if the condition is mild and/or the patient is an infant or young child.

What are the complications from rickettsial diseases?

Complications are uncommon for most rickettsial diseases, especially if diagnosed early and appropriate treatment initiated promptly. Rickettsialpox is a self-limiting disease and has no complications. Complications that may occur in some rickettsial diseases include:

- Bronchopneumonia
- Congestive heart failure
- Multi-organ failure
- Deafness
- Disseminated intravascular coagulopathy (DIC)
- Myocarditis (inflammation of heart muscle)
- Endocarditis (inflammation of heart lining)
- Glomerulonephritis (inflammation of kidney)

Related information

On DermNet NZ:

- Exanthems

Other websites:

- Rickettsial disease – emedicine dermatology, the online textbook

DermNet does not provide an on-line consultation service.
If you have any concerns with your skin or its treatment, see a dermatologist for advice.