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Rickettsial Disease

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Introduction

Rickettsial diseases are a group of zoonotic, insect-transmitted infections caused by Gram-negative bacteria of the genus *Rickettsia*. The many species of *Rickettsia* are divided into three main groups: the typhus group, the spotted fever group and scrub typhus [1,2].

The typhus group includes *R. prowazekii* (epidemic typhus transmitted by the human body louse *Pediculus humanus corporis*) and *R. typhi* (endemic murine typhus transmitted by rat fleas). The spotted fever group (usually transmitted by ticks) includes *R. rickettsii* (Rocky Mountain spotted fever [RMSF]), *R. conorii* (Mediterranean Spotted Fever also known as Boutonneuse fever) and *R. africae* (African tick bite fever) [3,4]. Other variants occur worldwide [5,6]. Scrub typhus is caused by *Orientia tsutsugamushi* and is transmitted by mites.

Epidemiology

Global epidemiology

Rickettsial infections occur throughout the world and new species and sub-species of *Rickettsia* species continue to be identified [6].

Typhus group

Endemic typhus occurs globally; in temperate climates it occurs during the summer months and throughout the year in tropical countries.

Epidemic typhus mainly occurs in cooler regions of Africa, South America and Asia, in impoverished populations where people live in close contact and there are favourable conditions for person to person spread of the human body louse.



Spotted fever group (SFG)

Of the SFG rickettsioses, African tick bite fever is endemic to tropical and subtropical areas of sub-Saharan Africa including South Africa, Botswana, Zimbabwe, Tanzania, Ethiopia, The Gambia and Sudan [3,4]. The first suspected cases of the SFG in the Caribbean were noted in Guadeloupe in the 1960s [7]. African tick bite fever has been widely reported in the eastern Caribbean since the 1970s [4,8].

In the USA, RMSF is the most common of the SFG with 500-2000 cases reported annually in recent years [9]. The risk season is predominantly during spring to autumn with most cases occurring in the mid and south Atlantic, and south central states. SFG rickettsioses also occur in parts of South and Central America (Argentina, Brazil, Colombia, Costa Rica, Mexico, and Panama), eastern and western Europe, Australasia and Asia [5].

Rickettsial disease in travellers from England, Wales, and Northern Ireland

Rickettsial disease is rarely reported in UK travellers. Between 2000 and 2005, there were 28 cases reported through the voluntary laboratory reporting system in England, Wales, and Northern Ireland and these may be underestimated [10]. Fourteen were cases of SFG rickettsia, one of *R. mooseri*, and the remainder had no disease or species type specified [10]. Only four reports specified recent travel abroad: two SFG of which one had travelled to Senegal and one to South Africa; the patient with *R. mooseri* travelled to Viet Nam, and one unspecified case travelled to South Africa [11]. Provisional data for 2006 show that there were ten reports [12]; six SFG rickettsia, of which two stated recent travel, one to South Africa and Mozambique [13], and one to the United States [14]; one *R. coronii* with stated travel to South Africa; and three unspecified species, one of which stated travel to South Africa [10].

Risk for travellers

Tick borne rickettsial diseases are considered to be an emerging risk to the traveller worldwide, including for travellers to Europe [15,16]. The exact risk, however, is difficult to determine as many infections are not reported. However, of those rickettsial diseases that are recognised, African tick bite fever and Mediterranean Spotted Fever are the most frequent [15].

Ticks that carry rickettsial diseases inhabit forested, brush or grassy areas and can drop or be brushed onto the clothing of passing humans. Travellers whose activities involve walking through brush and grasslands in southern African countries, in particular South Africa, Botswana and Swaziland and in parts of the Caribbean, are at increased risk of acquiring African tick bite fever [3,4,16,17]. Mediterranean Spotted Fever is occasionally reported in travellers to southern Europe, the Indian sub-continent, and central and east Africa [15].

Endemic typhus, epidemic typhus and scrub typhus are rarely reported in international travellers [15]. Those who stay in budget type accommodation or who may have close contact with louse-infested humans, especially during outbreaks or in refugee settings, may be at increased risk of infection [18].



Transmission

Agents of rickettsial disease are transmitted to humans by several genera of ticks or other arthropods, which ingest the bacteria whilst taking a blood meal from an infected animal or human. RMSF is predominantly transmitted by *Dermacentor* spp. ticks, and African tick-bite fever by *Amblyomma* spp. ticks.

Animal reservoirs for rickettsial disease vary according to the species of bacteria. Rats are the reservoir for murine (endemic) typhus and humans are the reservoir for maintaining epidemic or louse borne typhus. Reservoirs for African tick bite fever include cattle, hippopotamus and rhinoceros [2]. Domestic livestock, rabbits, squirrels and dogs are the reservoirs for RMSF [2].

Signs and Symptoms

Endemic typhus has an incubation period of around 12 days. Illness begins with a high fever, rash, prostration, headache, and muscular pains. Complications are rare and the mortality rate amongst treated patients is 1-2%. Epidemic typhus is usually more severe. Neurological symptoms including meningoencephalitis and delirium, and coma can occur in 50% of cases. Secondary infections can result in myocarditis, bronchopneumonia or gangrene.

After a tick bite, SFG rickettsioses have an incubation period of a few days followed by a febrile illness. In Mediterranean Spotted Fever an eschar (tache noir) typically develops at the site of the tick bite. This resembles a small ulcer, is between two and five centimetres in diameter, and has a black, necrotic centre. On the fourth or fifth day of illness, a generalised rash develops that can involve the palms and soles of the feet.

In African tick bite fever, multiple eschars may be present, but the generalised rash is frequently absent. Lymphadenopathy in the region of the bite is common.

RMSF is associated with malaise, myalgia, headache and chills in addition to a characteristic maculopapular rash involving the palms and soles of the feet. The rash does not blanch with pressure. RMSF is often a more severe illness with multiple organ involvement.

The case fatality rate of African tick bite fever and Mediterranean Spotted Fever is low even without antibiotics. However, the fatality rate of RMSF can be as high as 25% if untreated. With prompt diagnosis and treatment death is uncommon, but is more likely if treatment is delayed or if patients are over 40 years of age.

Treatment

The laboratory diagnosis of rickettsial disease is made by serology, antigen detection, or PCR usually one or two weeks after the onset of illness. Initial diagnosis is therefore based on clinical signs and symptoms following travel to a risk area, and confirmed once treatment has commenced. Many travellers will not recall a bite.

Rickettsial disease responds to antibiotic therapy; tetracyclines are the drug of choice [19].



Prevention

There is no vaccine to prevent any rickettsial disease.

Travellers should be encouraged to practise tick and [insect bite avoidance](#). In tick borne infections, six to ten hours of feeding are required by the tick before rickettsia bacteria begin to be inoculated into the human host. Travellers should inspect themselves regularly for ticks and [remove them promptly](#). Pets should also be inspected for ticks before allowing them to enter the home.

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Link

[NaTHNaC Health Information Sheet on Insect bite avoidance](#)