

Tick-borne relapsing fever due to *Borrelia hermsii* in British Columbia

Case Reports

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Relapsing fever is a spirochetal infection caused by various *Borrelia* species. It is transmitted by the bite of a soft-shelled tick of the *Ornithodoros* species of the family Argasidae. Each species of *Borrelia* is believed to have a natural tick vector. *B. hermsii* is carried by *O. hermsi*, and, though frequently recognized in the western United States, it has rarely been noted in British Columbia and never in any other part of Canada.

Case reports

Case 1

In July 1984 a 43-year-old man became ill in Vernon, BC, while he was holidaying at his cabin by Kalamalka Lake. His illness was sudden in onset, with fever, chills, profound weakness, myalgia and severe headache. On the fourth day he presented to Vernon Jubilee Hospital because of the recurrent nature of his fever and chills. The patient had travelled to Vernon from Prince George, BC, 20 days before becoming ill. There was no travel history of note, and he had never previously experienced a similar illness, although his son had been investigated for recurrent fever 1 year earlier.

At the time of admission his temperature was 39.6°C and he had tachycardia. There were no other abnormal signs. No bites were found, but the patient had noticed what he considered to be fleabites around his perineum about 1 or 2 days before onset of his illness. His hemoglobin level was 152 g/L, leukocyte count $6.4 \times 10^9/L$ (with 45% neutrophils, 29% band forms, 14% monocytes and 12% lymphocytes) and platelet count $44 \times 10^9/L$. Spirochetes typical of *Borrelia* were noted on examination of the blood smear for the differential leukocyte count. Motile forms were present in the thioglycollate blood culture bottle when it was

examined after 48 hours of incubation but did not remain viable.

A diagnosis of relapsing fever due to *Borrelia* sp. was made, and the patient was given tetracycline, 250 mg administered orally every 6 hours. The patient's fever resolved within 24 hours, and after 3 days he was well enough to be discharged from hospital.

A serum sample was later reported to be positive for antibodies to *B. hermsii* (titre of 1:64 in an indirect immunofluorescence test done by W. Burgdorfer, Rocky Mountain Laboratory, Hamilton, Montana).

Case 2

One year previously the patient's son, then aged 14 years, had been admitted to hospital with relapsing fevers, chills, anorexia and frontal headaches. He gave a history of a recent mosquito bite. A physical examination gave unremarkable results apart from a temperature of 38.7°C and tachycardia. His hemoglobin level was 116 g/L, leukocyte count $3.3 \times 10^9/L$ and platelet count $73 \times 10^9/L$. A bone marrow aspirate was normal. The smears were reviewed after the father's illness had been diagnosed, but spirochetes were not found. Urine and blood samples yielded no organisms when cultured. The patient recovered rapidly without antibiotics. His fever recurred four or five times over the next year, and further investigations, including a computed tomographic scan of his skull, at another hospital did not reveal the cause of his illness, which was presumed to be viral.

An indirect immunofluorescence test done by W. Burgdorfer showed a titre of antibody to *B. hermsii* of 1:128 in the patient's serum, which confirmed the illness as relapsing fever due to *B. hermsii*.

Comments

Both patients became ill while holidaying at their cabin, located in an area heavily forested with fir and pine trees. There are many rodents around, particularly chipmunks, which *O. hermsi* is

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known to parasitize.¹ The tick bite is usually painless and occurs nocturnally, with feeding generally lasting for less than 1 hour.² A search for samples of ticks has been unsuccessful.

The first cases of relapsing fever in Canada were described in 1933 by Palmer and Crawford³ and occurred in the Kootenay area of British Columbia. Six cases were diagnosed, but spirochetes were demonstrated in only two. In 1937 Campbell-Brown reported the disease in two loggers from the Vernon area,⁴ but no blood smears were examined. No further cases were recognized until this report, which confirms British Columbia to be an endemic focus of the disease.

O. hermsi was not described in Canada until 1949, when 26 specimens were found in a bird's nest in Summerland, BC (about 80 km south of Vernon);⁴ none were found to be infected with *Borrelia*. To date no Canadian specimens of the tick have been found to be infective.

Canadian experience with relapsing fever is very limited, and knowledge of the disease has been extrapolated from American studies. Research is particularly needed to establish the distribution of the tick vectors, their infectivity, the types of rodents parasitized and the extent of infection within the human population.

The diagnosis of relapsing fever in the early stages requires examination of smears of blood taken during febrile episodes. *Borrelia* is best recognized in wet smears well stained with a

Romanowsky stain and examined with dark-field illumination. Even so, only about 70% of smears will give positive results,⁵ and help from a public health laboratory will be required. In addition, information about the patient's recent sleeping habits should be obtained.

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