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Tick-borne relapsing fever

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DESCRIPTION

A previously healthy 58-year-old man presented to an emergency department with a 3-day history of intermittent drenching sweats with rigours, diarrhoea, fatigue and decreased oral intake. These symptoms began a week after the patient returned from a summer vacation to a rural community in Central Oregon. On examination, temperature was 37.3°C, heart rate was 74 beats per minute and blood pressure was 88/56 mm Hg. The patient appeared diaphoretic. Laboratory evaluation was notable for a peripheral platelet count of 26 K/cu mm, white blood cell count of 6.38 K/cu mm, serum creatinine of 2.11 mg/dL, aspartate aminotransferase of 101 U/L and alanine aminotransferase of 102 U/L. A peripheral blood smear revealed the presence of multiple corkscrew-shaped organisms (figure 1).

The constellation of symptoms and pattern of laboratory findings was consistent with tick-borne relapsing fever (TBRF), however the patient never noticed or removed a tick during his vacation.¹ The patient was started on oral doxycycline 100 mg two times per day for a planned 10-day course. Within 2 hours of the first dose of doxycycline, the patient became delirious, tachycardic and diaphoretic, with a fever of 40.2°C, consistent with a Jarisch-Herxheimer reaction, an inflammatory response to antibiotic treatment of a spirochaetal infection. The pathogenesis is hypothesised to be due to lipoproteins that are released with lysis of spirochaetes and the ensuing cytokine stimulation.² The patient subsequently improved with supportive therapies and antipyretics. Two-tiered serologic testing via immunoassay and IgM western blot later returned positive for *Borrelia hermsii*, confirming the diagnosis of TBRF. Other spirochaetal infections were considered, including *Treponema pallidum* and *Leptospira*. However, those organisms are too small to be visualised by light microscopy. The presence

Learning points

- ▶ Consider tick-borne relapsing fever in the differential diagnosis for patients who present with an undulating febrile illness, compatible travel history and characteristic laboratory pattern.
- ▶ When corkscrew-shaped organisms are visible, light microscopy is a useful aid in differentiating tick-borne relapsing fever from other spirochaetal infections.
- ▶ The Jarisch-Herxheimer reaction is characterised by the onset of fever, rigours and hypotension 1 to 4 hours after starting antibiotic therapy in patients with a spirochaetal infection.

of corkscrew-shaped organisms on peripheral blood smear is pathognomonic for *Borrelia* infection and can confirm the diagnosis before the return of serologic testing.³

TBRF in the Northwestern region of North America is most commonly due to *B. hermsii*, a spirochaete transmitted from the rodent-associated *Ornithodoros hermsii* tick through a painless bite, often occurring at night when it is known to feed.⁴ TBRF typically presents after a week-long incubation period with a pattern of undulating fevers for 3 days, followed by a week without symptoms.⁵ *B. hermsii* is a corkscrew-shaped bacteria, approximately 3 to 25 µm in length, easily visualised with light microscopy.⁵ Exposure to *B. hermsii* peaks in July and August when travellers come in contact with the *O. hermsii* tick while vacationing to summer cabins or rural vacation homes in endemic regions.⁴

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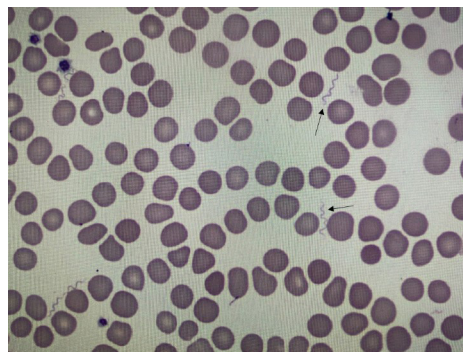


Figure 1 A peripheral blood smear demonstrating the presence of multiple corkscrew organisms (arrows), pathognomonic for *Borrelia* infection.



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