

CLINICAL VIGNETTE

Tick-Borne Relapsing Fever

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Case Report

A 58-year-old female with no remarkable past medical history presented with symptoms of recurring fever and left eye pain. Approximately a month prior, the patient developed flu-like symptoms including myalgias and fevers. She saw an internist where conservative management was recommended. One to two weeks later, she relapsed with similar symptoms lasting 3-4 days. Several days after, the patient noticed light sensitivity and pain to her left eye. She was evaluated in the emergency room by ophthalmology and was initiated on prednisone drops for suspected anterior uveitis. About a week after that episode, the patient returned with fevers to 102°-103° along with night sweats. Further workup was initiated included an ANA level at 1:80 and a negative blood smear.

Her travel history was significant for a stay in the mountain cabins about a week before the initial start of her symptoms. She recalls seeing a mouse when she arrived at the cabin which died the next day. She did not have close contact with the mouse. She also saw animals on her hikes including wild deer and sheep. However, she reported no bug bites.

Physical Examination

Patient was healthy appearing in no acute distress. Vital signs were within normal limits, (blood including temperature of 36.5. Sclera were anicteric, there was no lymphadenopathy, lungs were clear, heart was regular rate and rhythm, and abdomen was nontender. No distinct rashes were visible. The patient was alert and oriented, and neurologically intact.

Laboratory Studies

Initial WBC 5.47, HGB 12.0, HCT 36.9, PLT 163. Chemistry panel and liver functions were all within normal limits. Specific UCLA infectious disease tests include:

- Bartonella Henselae IgG (<1:64, negative)
- Bartonella Henselae IgM (<1:64, negative)
- C. Burnetii Abs, IgG Phase I and II (negative)
- C. Burnetii (Q-Fever) Ab, Phase I and II (negative)
- TP-PA nonreactive
- CMV, EBV, Toxoplasma, Cocci antibodies and DNA PCR were negative
- B. Burgdorferi IgM (positive)
- Lyme Disease Ab, Total 2.42 (reference 0.00-1.20)

Testing from Centers of Disease Control and Prevention (CDC) included:

- Bartonella hermsii EIA (enzyme-linked immunosorbent assay), positive
- Bartonella hermsii IgM (western blot), positive
- Bartonella hermsii IgG (western blot), positive

Treatment

Patient was suspected of Tick-borne Relapsing Fever at time of presentation and started on empirical doxycycline 100mg po BID for 14 days while waiting for CDC lab results. She was warned of a possible Jarisch-Herxheimer reaction. The patient completed therapy without complications and her symptoms resolved.

Discussion

Tick-borne Relapsing Fever (TBRF) is caused by bacterial spirochete species including *Borellia hermsii* (*B. hermsii*), *Borellia parkerii*, or *Borellia turicatae*, with *B. hermsii* being the most common causative agent.¹ The bacteria are transmitted by the bite of an *Ornithodoros* tick species.¹ The *Ornithodoros* ticks typically feed on small mammals and rodents including mice, squirrels, and rabbits. The typical scenario for humans to become infected with *B. hermsii* is a mountain cabin that has been infested with rodents and their ticks. If rodents no longer reside there but ticks are still present, humans become the only available host. At night, ticks become active and search for hosts. Ticks commonly enter beds and sleeping bags to feed. The victims often are unaware of having been bitten by these ticks.

TBRF is characterized by recurring episodes of fever accompanied by other non-specific symptoms including headaches, myalgias, arthralgias, chills, vomiting, and abdominal pain. The illness is caused by infection with *Borrelia* species that vary their surface antigens, leading to repeated stimulation of the immune system by each new antigen and a febrile response by the patient.² The serotype-specific surface proteins are expressed sequentially one at a time to which the host has a sequential immunologic response.² Symptoms typically develop within 7 days after the tick bite. The symptoms can last an average of 3 days (range of 3-7 days) and are then followed by an asymptomatic period lasting anywhere from 4 to 14 days.

Symptoms relapse an average of 3 times but can recur up to 10 times in untreated patients.¹ In addition to flu-like symptoms, approximately 25% of patients with TBRF can report diarrhea and eye pain.²

The definitive diagnosis of TBRF may be based on the observation of relapsing fever spirochetes in peripheral blood smears. The organisms are best detected in blood obtained while a person is febrile. Serologic testing is also available through public health laboratories and some private laboratories. Acute serum should be taken within 7 days of symptom onset and convalescent serum should be taken at least 21 days after symptoms start. To confirm the diagnosis of TBRF, *Borrelia* specific antibody titers should increase 4-fold between acute and convalescent serum samples, and convalescent serum anti-body levels should be at least two standard deviations above pooled negative controls.³ Patients infected previously with other species of spirochetes may have false-positive reactions in the ELISA and immunofluorescent antibody analysis (IFA).⁴

Symptoms of TBRF can resolve on their own, but treatment with antibiotics is effective. Antibiotics used to treat TBRF include erythromycin, tetracycline, chloramphenicol, and penicillin. The current recommended duration of antibiotic therapy is 7 days. Infectious disease experts generally recommend tetracycline 500 mg every 6 hours for 10 days as the preferred oral regimen for adults. Erythromycin, 500 mg (or 12.5 mg/kg) every 6 hours for 10 days is an effective alternative when tetracyclines are contraindicated.³

When initiating antibiotics, all patients are recommended to be observed during the first 4 hours of treatment for a Jarisch-Herxheimer reaction. This reaction is characterized by a worsening of symptoms with rigors, hypotension, and fever. It occurs commonly, estimated to happen in up to 50% of cases. Death has been reported as a complication of the reaction, most often secondary to cardiovascular collapse.⁵

Conclusion

TBRF is characterized by recurring fevers separated by afebrile periods and is accompanied by nonspecific constitutional symptoms. The diagnosis requires an accurate characterization of the fever and a thorough travel history of the patient. Antibiotic treatment is effective but patients treated for tick-borne relapsing fever should be monitored closely for Jarisch-Herxheimer reactions. People in endemic regions should avoid rodent and tick infested areas and rodent proofing of cabins can be performed to help in prevention.

REFERENCES

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