CLINICAL IMAGES

A Rash

A 31-year-old, otherwise healthy woman presented to a clinic in California with a rash on her arm (Figure). Ten days earlier she had traveled by car from Michigan.

What is the diagnosis? What is the clinical course? What is the pathophysiology? What is the treatment?

Figure. The target lesions.

DIAGNOSIS

Erythema migrans (Lyme disease).

CLINICAL COURSE

This patient had the target lesions of erythema migrans (EM), an early clinical finding of Lyme disease. Although she did not recall being bitten by a tick, her traveling companion found a tick in her bed while in a hotel in Salt Lake City, Utah, 11 days before presentation. Ten days before presentation, the patient noticed what appeared to be “mosquito bites” on her arm. These resolved, but then reappeared on the day before presentation as the target lesions shown in the Figure. Because the patient had recently graduated from medical school, she recognized the lesions as EM. She presented to the clinic, where a 10-day course of doxycycline was prescribed. A Lyme titer was negative. The lesions resolved within 24 hours of starting antibiotic treatment.

BACKGROUND

Erythema migrans is considered pathognomonic for the early localized stage of Lyme disease. It can occur between 7 and 14 days after the bite of an *Ixodes scapularis* tick, which transmits the spirochete *Borrelia burgdorferi*. The EM typically starts near the tick bite and spreads outward with central clearing, creating the well-known “target lesion.” Because the tick must feed for at least 24 to 36 hours before transmission of the spirochete, the risk of acquiring Lyme disease from a tick that is found and removed is only 1.2% to 1.4%, even in highly endemic areas.¹ Diagnosis of Lyme disease is made clinically, correlated with local epidemiology. Despite its name, Lyme disease can occur in many areas of the United States and Europe. Details by state can be found on the American Lyme Disease Foundation website (available at: <http://www.aldf.com/usmap.shtml>). The enzyme-linked immunosorbent assay Lyme titer is only 90% sensitive. Immunoglobulin M peaks between 3 and 6 weeks after onset; immunoglobulin G peaks after 8 weeks. Other routine laboratory tests are not helpful.²

PATHOPHYSIOLOGY

If untreated, Lyme disease can progress to early disseminated disease within 4 weeks. This stage features arthralgias, malaise, fatigue, and headaches. In severe cases, meningitis, with laboratory findings similar to those of aseptic meningitis, myocarditis, atrioventricular block, and persistent neurologic deficits, most commonly seventh nerve palsy that may be bilateral, can occur. Late manifestations of Lyme disease include arthritis and chronic encephalopathy characterized by memory disturbance, paranoia, or depression. Acrodermatitis chronica

atrophicans, a bluish-red discoloration with associated swelling on the extensor surfaces of the hands and feet, has been described in some cases in Europe.²

TREATMENT

First-line therapy for localized Lyme disease is doxycycline, 100 mg twice daily by mouth for 10 to 21 days, or amoxicillin 500 mg (15 mg/kg) 3 times daily by mouth for 14 to 21 days. Amoxicillin is indicated for patients who are allergic to doxycycline, for pregnant or nursing women, and for children younger than 8 years of age. Treatment of disseminated disease depends on the degree of cardiac or neurologic involvement. Intravenous ceftriaxone, 2 g daily for 14 to 28 days, is generally recommended, in addition to treatment for specific manifestations. For asymptomatic tick bites, the Infectious Disease Society of America does not recommend routine antimicrobial prophylaxis or serologic testing for Lyme disease; rather, their clinical guidelines suggest that a single dose of doxycycline be offered to adult patients (200 mg) and to children more than 8 years of age (4 mg/kg, to a maximum dose of 200 mg) when all of the following circumstances exist: 1) the attached tick can be reliably identified as an adult or nymphal *I scapularis* that is estimated to have been attached for >36 hours on the basis of the degree of engorgement of the tick with blood or certainty about the time of exposure to the tick; 2) prophylaxis can be started within 72 hours of the time that the tick was removed; 3) ecologic information indicates that the local rate of infection of these ticks with *B burgdorferi* is >20%; and 4) doxycycline treatment is not contraindicated.³ The time limit of 72 hours is suggested owing to the lack of data on the efficacy of chemoprophylaxis for tick bites when the tick is removed after longer than 72 hours.

For more information, go to: <http://www.cdc.gov/lyme/>; <http://www.idsociety.org/lyme/>; or <http://www.aldf.com/>.

Acknowledgment

Special thanks to Dr Gus Garmel for suggesting submission of this article, and for his guidance throughout residency.

Natacha Chough, MD
Stanford/Kaiser Emergency Medicine Residency
Stanford University Medical Center
Palo Alto, CA

References

1. Steere AC. Lyme disease. *N Engl J Med*. 2001;345:115–125.
2. Stanek G, Strle F. Lyme borreliosis. *Lancet*. 2003;362:1639–1647.
3. Wormser GP, Dattwyler RJ, Shapiro ED, et al. The clinical assessment, treatment, and prevention of Lyme disease, human granulocytic anaplasmosis, and babesiosis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis*. 2006;43:1089–1134.