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# Lyme disease

## Part II. Management and prevention

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2. Reading of the Source Article
3. Achievement of a 70% or higher on the online Case-based Post Test
4. Completion of the Journal CME Evaluation

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##### Learning Objectives

After completing this learning activity, participants should be aware of the differential diagnoses of erythema migrans, be able to select appropriate diagnostic testing and provide appropriate therapy based on the stage of disease, and be able to categorize and recommend effective measures to prevent the transmission of Lyme disease.

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Lyme disease (LD) is most often diagnosed clinically, and the differential diagnosis of erythema migrans may be challenging. Recent advances have raised questions about the efficacy of traditional diagnostic modalities, but may soon facilitate consistent identification of patients with Lyme borreliosis. Therapeutic recommendations vary with the stage of disease, and treatment usually leads to complete resolution. The management of patients with "chronic Lyme disease" is controversial. A number of preventative measures have been evaluated; those involving the avoidance of tick bites with protective clothing and insect repellents remain the simplest and most effective. (J Am Acad Dermatol 2011;64:639-53.)

**Key words:** acrodermatitis chronica atrophicans; *Borrelia burgdorferi*; chronic Lyme disease; erythema migrans; Lyme borreliosis; Lyme disease; lymphocytoma cutis; neuroborreliosis; personal protective behavior; ticks.

Lyme borreliosis (LB), an infectious disease endemic to several parts of the world, is caused by strains of the *Borrelia burgdorferi* sensu lato complex.<sup>1-7</sup> This illness is often diagnosed clinically based on characteristic symptoms and dermatologic examination. However, the diagnosis and management of Lyme disease (LD) may be challenging because, like syphilis, it may have atypical manifestations and multisystem involvement.<sup>8-15</sup> The differential diagnosis of erythema migrans (EM), the usual finding of early stage disease, may be broad.<sup>16,17</sup> In addition, laboratory techniques that are currently used to diagnose LD have proven problematic.<sup>18</sup> Moreover, from our experience, culturing the organism is time intensive, even from its most accessible site, the skin, and has been restricted to research laboratories. Serologic testing has come to the forefront in diagnosis,<sup>19-24</sup> but these widely-used tests have significant limitations.<sup>18,25</sup> In this update, we will discuss selected diagnostic and therapeutic advances in LD. We will describe the controversy surrounding “chronic Lyme disease” and cover personal, environmental, and pharmacologic methods of prevention.

## DIFFERENTIAL DIAGNOSIS

- **Lyme disease may resemble human granulocytic ehrlichiosis, babesiosis, or Southern tick-associated rash illness, and their respective areas of endemicity may overlap**
- **A number of conditions may be considered in the differential diagnosis of erythema migrans, including insect bite hypersensitivity reactions, cutaneous infections, urticaria, erythema multiforme, erythema annulare**

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## centrifugum, granuloma annulare, and erythema infectiosum

Because LD is often seen with atypical signs and symptoms, differentiating it from other clinical entities can be problematic. Human granulocytic ehrlichiosis and babesiosis may produce fever, headache, and other constitutional symptoms similar to those of LD, but no skin eruption.<sup>26,27</sup> Moreover, in the eastern and south central United States, another tick-borne zoonosis caused by *Borrelia lonestari* has been described.<sup>28-31</sup> It is transmitted by the Lone Star tick (*Amblyomma americanum*). Patients with this spirochetal disease, termed Southern tick-associated rash illness (STARI), have an annular rash with central clearing similar to EM,<sup>32</sup> constitutional symptoms, musculoskeletal complaints, and neurologic deficits.<sup>29</sup> Compared to EM, the erythematous patches of STARI tend to be smaller, with more notable central clearing.<sup>30</sup> Patients with STARI usually have negative serology for LD.<sup>30</sup>

Other conditions often considered in the differential diagnosis of EM include insect bite hypersensitivity reactions, erysipelas, cellulitis, localized scleroderma, granuloma annulare, tinea corporis, drug eruptions, urticaria, erythema multiforme, erythema annulare centrifugum, erythema infectiosum, and nummular eczema.<sup>13,16,17</sup> Many of these can often be excluded with a clinical history of a tick bite and an enlarging, erythematous, annular patch. Unlike EM, most arthropod bite hypersensitivity reactions manifest within 24 to 48 hours of attachment and resolve spontaneously within days.<sup>13,17</sup> Cutaneous bacterial infections, such as erysipelas and cellulitis, may often be differentiated from EM by a neutrophilic leukocytosis.<sup>16,17</sup> Although tinea corporis may produce rashes with erythematous edges and clear centers, they are less well demarcated and expand more slowly.<sup>17</sup> In addition, they often have a scaly edge that is not seen in erythema migrans.

## DIAGNOSIS

- **The diagnosis of Lyme disease can often be made clinically**

### CAPSULE SUMMARY

- The enlargement of erythema migrans is often the key to its recognition.
- The differential diagnosis of erythema migrans may be extensive because atypical variants are not uncommon.
- Initial serologic diagnosis, when indicated, requires a two-tiered system, with an enzyme-linked immunosorbent assay followed by Western blot.
- Treatment consists of oral antibiotic therapy for early, uncomplicated Lyme disease and parenteral antibiotic therapy for disseminated disease or neuroborreliosis.
- Treatment leads to complete resolution in most cases.

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