

## Physician Guide to Lyme Disease

**Agent:** *Borrelia burgdorferi*, a spirochete.

### Symptoms:

Symptoms can be vague and diagnosis can be difficult. Clinical manifestations occur in three stages:

#### Early localized:

About 70-80% will have a red macule or papule that expands slowly in a circular manner, often with a central clearing (referred to as a “bull’s-eye” rash). This lesion is called EM for erythema migrans. The EM occurs at the site of the tick bite. For case surveillance purposes, they must reach 5 cm in diameter to be considered EM. The center of the rash may be vesicular or necrotic. The early localized stage usually occurs 1-2 weeks following exposure.



Other clinical manifestations include malaise, fatigue, fever, headache, stiff neck, myalgia (muscle aches), arthralgia (joint pain), and/or lymphadenopathy (swollen lymph nodes). The initial disease may last for weeks in untreated patients; symptoms may be intermittent and variable. In some patients, this initial presentation will be inapparent.

#### Early disseminated:

If untreated, approximately 10% of patients may develop chronic disease weeks to months after the initial symptoms. This can occur about 3-5 weeks after the primary tick bite and presents as multiple erythema migrans, usually smaller than the primary lesion. Other symptoms can include:

- Nervous system:
  - Any of the following, alone or in combination: lymphocytic meningitis; cranial neuritis, particularly facial palsy (may be bilateral); radiculoneuropathy; or, rarely, encephalomyelitis. Encephalomyelitis must be confirmed by demonstration of antibody production against *B. burgdorferi* in the CSF, evidenced by a higher titer of antibody in CSF than in serum.
    - *Note: Headache, fatigue, paresthesia, or mildly stiff neck alone is not criteria for neurologic involvement.*
- Cardiovascular system:
  - Acute onset of high-grade (2<sup>nd</sup> or 3<sup>rd</sup> degree) atrioventricular conduction defects that resolve in days to weeks and are sometimes associated with myocarditis.
    - *Note: Palpitations, bradycardia, bundle branch block, or myocarditis alone are not criteria for cardiovascular involvement*

**Late disease:**

Arthritis is the typical manifestation of late disease. Since only 80% of cases have a visible acute (or early localized) presentation, late disease may be the first indicator of Lyme disease.

- Musculoskeletal system:
  - Recurrent, brief attacks (weeks or months) of objective joint swelling in one or a few joints, sometimes followed by chronic arthritis in one or a few joints.
    - *Note: Manifestations not considered as criteria for diagnosis include chronic progressive arthritis not preceded by brief attacks and chronic symmetrical polyarthritis. Fibromyalgia syndromes alone are not criteria for musculoskeletal involvement.*

**Severity:**

If untreated, Lyme disease can cause chronic illness, but is rarely fatal.

**Differential diagnosis:**

- Allergic reactions
- Erythema multiforme
- Herpes simplex or varicella zoster virus
- Reactive or juvenile rheumatoid arthritis
- Chronic fatigue syndrome or fibromyalgia

**Clinical case definition:**

Either:

- Erythema migrans of at least 5 cm OR
- At least one of the above mentioned rheumatologic, neurologic, or cardiologic late onset manifestations (for which an alternative diagnosis is not found) along with a reactive IgG Western Blot.

**Laboratory criteria for diagnosis:**

In Utah, Lyme disease is typically diagnosed serologically. The total or IgM immunoglobulin test cross reacts with many other conditions and has insufficient specificity to base a diagnosis upon. If reactive, the following tests should be ordered to confirm the diagnosis:

- a. If the symptom onset is <30 days, order an IgM Western Blot
- b. If the symptom onset is >30 days, order an IgG Western Blot

The specificity of the IgM Western Blot is poorer than the IgG Western Blot due to the interpretive criteria.

Culture has 100% specificity, but it is technically demanding, few laboratories offer this option, and it tends to have poor sensitivity.

PCR may have adequate sensitivity and specificity (depending upon the laboratory), but is not widely offered.

A two-test approach for active disease and for previous infection using a sensitive enzyme immunoassay (EIA) or immunofluorescent assay (IFA) followed by a Western immunoblot was the algorithm of choice. All specimens positive or equivocal by a sensitive EIA or IFA should be tested by a standardized Western immunoblot. Specimens negative by a sensitive EIA or IFA need not be tested further. When Western immunoblot is used during the first 4 weeks of disease onset (early LD), both immunoglobulin M (IgM) and immunoglobulin G (IgG) procedures should be performed. A positive IgM test result alone is not recommended for use in determining active disease in persons with illness greater than 1 month's duration because the likelihood of a false-positive test result for a current infection is high for these persons. If a patient with suspected early LD has a negative serology, serologic evidence of infection is best obtained by testing of paired acute- and convalescent-phase serum samples. Serum samples from persons with disseminated or late-stage LD almost always have a strong IgG response to *Borrelia burgdorferi* antigens.

**Epidemiology:**

Utah has a tick vector for Lyme disease, *Ixodes pacificus*. There is now definite proof that Lyme disease can be acquired in Utah. Lyme disease should be considered for individuals with appropriate clinical presentation and test results.

**Treatment:**

	<b>Adults</b>	<b>Children</b>
<b>EM</b>	Doxycycline Amoxicillin Localized EM – treat 2 weeks Early disseminated EM – treat 3-4 weeks*	Under 9: Amoxicillin
<b>Lyme arthritis</b>	4 week course of oral agents	4 week course of oral agents
<b>Neurologic symptoms</b>	IV ceftriaxone IV penicillin Treat for 3-4 weeks	

\* If allergic to penicillins or tetracycline, try cefuroxime axetil or erythromycin.

**Management of people exposed to Lyme disease:**

Lyme disease is not transmitted from person to person. Maternal transmission of this disease is possible but has not been well documented.

**Reporting:**

Lyme disease is a reportable disease in Utah. Epidemiology will use collected case data to define geographic regions where Lyme disease is present in Utah.

**References:**

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