



LYME BORRELIOSIS

1. **Agent:** *Borrelia burgdorferi*, a spirochete first identified in 1982.

2. **Identification:**

a. **Symptoms:** Lyme borreliosis generally occurs in stages.

Early Lyme Borreliosis: Although stages may overlap or occur alone, illness may begin with a characteristic skin lesion called erythema migrans (EM) in 60% of cases. This rash appears as a red macule or papule that expands in an annular manner, sometimes with multiple similar lesions. Fever, malaise, fatigue, headache, stiff neck, myalgia, migratory arthralgias, and lymphadenopathy may accompany or precede EM.

Neurologic Manifestations: Weeks to months after the onset of early Lyme disease, neurologic abnormalities may develop in untreated patients. The typical pattern is fluctuating meningoencephalitis with superimposed cranial (particularly facial) nerve palsy and peripheral radiculo-neuropathy.

Cardiac Manifestations: Within several weeks after onset, about 8% of untreated patients develop cardiac involvement (most commonly fluctuating degrees of atrioventricular block that resolves spontaneously).

Arthritis: Weeks to years after the original illness, about 50% of untreated patients develop arthritis. Early involvement typically is manifested by migratory pain, often without swelling. Frank arthritis may develop subsequently with marked swelling and pain in one or more joints, primarily large joints, e.g., the knee.

b. **Differential Diagnosis:**

Early disease: Aseptic meningitis, hepatitis, mononucleosis, ehrlichiosis.

Late disease: Rheumatic fever, disseminated gonococcal infection, multiple sclerosis, Guillain-Barré syndrome,

Reiter's syndrome, rheumatoid arthritis, oligoarticular form of juvenile rheumatoid arthritis.

c. **Diagnosis:** Based on clinical findings. Serological testing (EIA or IFA) may be useful but lacks sensitivity, especially in early disease. A two-step testing procedure using flagellar protein-based EIA followed by IgM and IgG Western blot of all positive and equivocal specimens is recommended. Culture from biopsy at the outer margins of EM lesion is 90% sensitive. PCR is available from research laboratories.

3. **Incubation:** 7-10 days average, range 3-32 days.

4. **Reservoir:** Wild animals; e.g., *Neotoma* spp. (wood rat) and deer are important in California.

5. **Source:** Infected *Ixodes* species ticks; other arthropods have been found containing *B. burgdorferi*, but their ability to transmit is questionable.

6. **Transmission:** Bite of *Ixodes* tick. 36-48 hours of attachment is usually required for transmission.

7. **Communicability:** Not transmitted from person to person.

8. **Specific Treatment:** Amoxicillin is a good treatment for adults or children with early disease. Doxycycline in adults and phenoxymethyl penicillin for children with early disease resolves illness and reduces the likelihood of later complications. Intravenous penicillin or ceftriaxone is effective for meningitis, late stage, and refractory illness.

REPORTING PROCEDURES

1. **Reportable.** *California Code of Regulations*, Title 17, Section 2500.

Report Form: LYME DISEASE CASE REPORT (DHS 8470, 7/04 fillable).



2. Epidemiologic Data:

- a. Travel 30 days prior to onset of erythema migrans or early disease.
- b. History of tick bite.
- c. History of possible exposure to ticks, e.g., hiking in chaparral, dogs with ticks, etc.
- d. Occupational exposure.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigation not required by district staff. Advise ACDC regarding suspect cases; ACDC will supply diagnosing physician with appropriate form or investigate. Initiate investigation within 7 days of notification.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Use tick repellents.
2. Wear protective clothing in wooded areas.
3. Control ticks on domestic animals.
4. Avoid tick-infested areas when feasible.
5. Check periodically for and carefully remove attached ticks after return from tick-infested areas.

DIAGNOSTIC PROCEDURES

Serology: To California Department of Health Services Microbial Disease Laboratory via Public Health Laboratory

Container: State Special Serology (serum separator tube)

Laboratory Form: State Special Serology (Lab 413).

Examination Requested: Lyme Borrelia.

Material: Clotted whole blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Serologic tests for Lyme borreliosis lack sensitivity and are not standardized, so interpretation of test results is difficult. Only confirmed cases are reported to the CDC. In addition to clinical findings associated with Lyme disease, one of the following laboratory criteria must be met: 1) isolation of *Borrelia burgdorferi* from a clinical specimen, or 2) demonstration of diagnostic immunoglobulin M or immunoglobulin G antibodies to *B. burgdorferi* in serum or cerebrospinal fluid (CSF). A two-test approach using a sensitive enzyme immunoassay or immunofluorescence antibody followed by Western blot is recommended.

The case history form must accompany the specimen(s).