Lyme disease
Reference for Health Care Providers

Aetiologic Agent

Lyme disease is a tick-borne zoonotic disease caused by the bacterium, Borrelia burgdorferi (B. burgdorferi), a spirochete first identified in North America in 1982.

Clinical Presentation

Lyme borreliosis is generally divided into three stages in which infected persons may experience any of the following symptoms:

Early localized disease

Erythema migrans (EM) or "bull's eye" rash at the site of a recent tick bite, fever, malaise, headache, myalgia, neck stiffness, fatigue, and arthralgia. EM occurs in 60-80% of patients. EM represents a response to the bacterium as it spreads intradermally from the site of the infecting tick bite. EM appears 1-2 weeks (range: 3-30 days) after infection and persists for up to 8 weeks.

Early disseminated disease

If untreated, the bacterium causing lyme disease can disseminate via the bloodstream to other body sites and provoke damage to body tissues at those sites. Symptoms can include:

- Cutaneous signs (i.e., multiple EM lesions).
- Neurological symptoms (i.e., meningitis, radiculopathy, encephalopathy, cranial neuropathy, mononeuritis multiplex, subtle cognitive difficulties, motor and sensory radiculoneuropathy).
- Cardiac symptoms, such as pericarditis, myocarditis, conduction abnormalities (i.e., atrioventricular node block or ventricular node block).
- Other manifestations, such as uveitis, keratitis, conjunctivitis, mild hepatitis, splenomegaly.

Late disease

May develop in people with early infection that was undetected or not adequately treated. Involves the heart, nervous system and joints; arrhythmias, heart block and sometimes myopericarditis; recurrent arthritis affecting large joints (i.e., knees); peripheral neuropathy; central nervous system manifestations – meningitis; encephalopathy (i.e., behavior changes, sleep disturbance, headaches); and fatigue.

Transmission

Lyme disease is transmitted by a blacklegged deer tick carrying B. burgdorferi bacteria. Infection does not occur until an infected tick has been attached for at least 24 hours. There is no evidence of person-to-person spread.

Incubation Period

For early, localized disease: 3 to 30 days after tick exposure with a mean of 7-10 days; early stages of the infection may not be apparent and the person may present with later manifestations.

HOW TO CONTACT US

DAYTIME REPORTING
Mon-Fri: 8:30 a.m. - 4:30 p.m.
1-800-922-0096

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Diagnosis

- Diagnosis is primarily based on clinical and epidemiological findings. **Laboratory testing is used to support clinical suspicion of Lyme disease.**
- Serological evidence using the two-tier enzyme-linked immuno-sorbent assay (ELISA) and Western Blot criteria (as described by the guidelines of the Canadian Public Health Laboratory Network) is used to support clinical diagnosis of Lyme disease.
- Only serum samples are acceptable for serology.

Important considerations:

- Initial negative serological tests in patients with skin lesions suggestive of EM should have testing repeated after 2 to 4 weeks, however if patients are treated during this time, subsequent testing may be negative.
- Sera that are negative for antibodies using an EIA should not be subjected to Western Blot testing.
- The possibility of false-positive Western blot results (particularly only IgM western blot reactivity) should not be ignored. Serological screening tests have limitations to their specificity, therefore, screening patients with non-specific subjective symptoms is strongly discouraged.
- When patients are treated very early in the course of illness, antibodies may not develop.

Reporting

Patients who have or may have Lyme disease shall be reported to the local health unit. For a copy of the lyme disease report form, visit: www.swpublichealth.ca/reporting-forms-infectious-diseases

Treatment

Treatment of adults and children older than 8 years of age with lyme disease[2]

Erythema migrans or early disseminated disease, including Bell's palsy, but without other CNS involvement	• Doxycycline 100 mg po bid x 14–21 days (contraindicated during pregnancy and lactation. Not recommended for children < 8 years) • Amoxicillin 500 mg po tid x 14–21 days • Cefuroxime 500 mg po bid x 14–21 days
Early Lyme with CNS involvement	• Ceftriaxone 2 g IV once daily x 14–28 days • Pen G 4 x10^6 units IV q 4 h x 14–28 days • Doxycycline 100–200 mg po bid x 28 days (alternative if others not possible)

Treatment of children 8 years of age or younger with lyme disease[2]

Early localized disease	• Amoxicillin 50mg/kg/day po in 3 divided doses [maximum 500 mg per dose] for 14-21 days[2] • For children allergic to penicillin, cefuroxime 30 mg/kg/day po in 2 divided doses [maximum of 500 mg per dose] for 14-21 days[2]
Early disseminated and late disease: persistent/recurrent arthritis, carditis and meningitis/encephalitis	• Ceftriaxone or penicillin IV at pediatric dosing

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Removing and submitting ticks for testing

As of June 1, 2016, submitters are required to complete and submit the new "Surveillance Form for Tick Identification" which is available at www.publichealthontario.ca/Requisitions when submitting ticks for identification by the Public Health Ontario Laboratory (PHOL).

As per Infectious Disease Society of America (IDSA) guidelines, tick testing should not be used for diagnosis and management of Lyme disease. PHOL's tick identification service, and subsequent PCR testing on blacklegged ticks to detect various humans pathogens performed at PHAC's National Microbiology Laboratory (NML) is for surveillance purposes only. The tick testing program is primarily used to monitor emerging tick populations in Ontario. Certain parts of Ontario, including Long Point Provincial Park, Rondeau Provincial Park and Pinery are known areas for established tick populations. Therefore, submitting ticks from areas where ticks are already established does not provide additional information. For further information on known risk areas, please refer to the Ontario Lyme disease estimated risk areas map, which provides data on the geographical distribution of blacklegged ticks (Ixodes scapularis).

PHOL turnaround time (TAT) for tick identification is up to three weeks, though during peak season it may be delayed. The NML TAT for Lyme disease PCR for ticks is up to six months.

References

1. Ministry of Health and Long Term Care. (2015). Infectious Disease Protocol – Appendix A: Disease-Specific Chapter. Available online at: www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/lyme_disease_chapter.pdf
2. Infectious Disease Society of America. (2006). The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis,and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America. Available online at: https://academic.oup.com/cid/article/43/9/1089/422463

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