Communicable Diseases Factsheet

Lyme disease – testing advice for NSW clinicians

Last updated: 17 April 2014

Background

Lyme disease (Lyme borreliosis) is a multisystem tick-borne zoonosis caused by spirochaetes of the *Borrelia burgdorferi* genospecies complex. Ticks with *Borrelia burgdorferi* infection are found in temperate forested areas of northern Asia and Europe and North America.

- In Australia, Lyme disease has been detected in returned travellers who have acquired the infection while travelling overseas.
- Although clinical presentations of a 'Lyme-like illness' without a history of overseas travel do occur here, the cause of such conditions has not been determined. While locally-acquired Lyme disease cannot be ruled out, there is currently little evidence that it occurs in Australia.
- Clinicians should keep an open mind about the possibility of locally-acquired Lyme disease.
- Diagnosis of Lyme disease is based on clinical presentation and history, supported by laboratory testing performed in an accredited laboratory.

Laboratory testing

Testing should be performed in NATA-accredited laboratories (listed at www.nata.asn.au).
It is important to include relevant clinical history on the request form, particularly travel history, date of any known tick exposure, date of onset of illness and symptoms, and any antibiotic treatment.

Diagnostic tests - Serology

The recommended testing strategy follows European and US-CDC guidelines for two-step serological testing with a screening immunoassay and a confirmatory immunoblot for antigens from *Borrelia burgdorferi* sensu lato genospecies (including *B. afzelii, B. garinii*).

- IgG tests are preferred as these are more specific than IgM tests. Tests for IgM may also be used if appropriate, depending on the time elapsed since onset of symptoms.
- If the IgG screening test is negative, and recently acquired Lyme disease is clinically suspected, a second serum specimen should be collected 4-8 weeks later.
- If the IgG screening test is positive, the specimen is tested by confirmatory immunoblot for specific IgG. Detection of a specified number of reactive bands is considered diagnostic for *B. burgdorferi* sensu lato infection at some time (i.e. recent or past infection).
- Collect a 5-10ml blood sample for serology and send with the relevant clinical information to your usual pathology service for a screening immunoassay.
- If the screening immunoassay is positive the serum will be referred to a specialist laboratory such as the Institute for Clinical Pathology and Medical Research (ICPMR) (02 9845 6255) or Pacific Laboratory Medicine Services (PaLMS) (02 9926 8470 or 9926 8480) for confirmatory immunoblot.

Diagnostic tests - Direct testing

Direct testing for the organism by nucleic acid testing (eg PCR) and culture for biopsies of suspected skin lesions is encouraged. This testing is available through the PaLMS laboratory (02 9926 4333 or 02 9926 4366).

- It is recommended that clinicians contact PaLMS before collecting specimens.
- Collect a 4mm punch biopsy from the outer margin of the skin lesion consistent with Lyme disease and place in a 5ml sterile container half filled with sterile normal saline. Store and transport the specimen **at room temperature**.

For direct testing of other clinical specimens, discuss first with the specialist testing laboratory (PaLMS).

Interpretation of test results

Diagnosis should be made according to the patient's clinical presentation, their risk of exposure to infected ticks in an endemic area, and results from validated laboratory tests performed in a NATA-accredited laboratory. When interpreting testing results, advice should be sought from a specialist in infectious diseases or clinical microbiology.

The following points should also be considered when interpreting Lyme disease test results:

- An IgM response may be delayed up to 3 weeks after the infection and so may not be detected at the onset of symptoms such as rash or skin lesion. It may also persist for months.
- Specific IgG is usually detectable 4-6 weeks after infection, and may remain elevated for years after clinical remission. A strong IgG response is usually found in disseminated or late-stage Lyme disease.
- If a patient has a chronic illness (months to years) but is seronegative, then Lyme disease is unlikely to be the cause of symptoms and another diagnosis should be sought.
- Antibiotic treatment given early in the course of Lyme disease (eg erythema migrans) may prevent development of antibodies and this should also be considered when interpreting negative test results.
- As with any diagnostic test, a positive result is more likely to be a false-positive if the test is performed on a person with a low likelihood of having the condition, such as testing for Lyme disease in Australia.
- False positive results for Lyme disease antibodies have been reported with other spirochaete infections (such as syphilis, *Treponema denticola* from gum disease, leptospirosis, relapsing fever), and other conditions including EBV infection (mononucleosis), autoimmune diseases (such as rheumatoid arthritis and SLE), bacterial endocarditis, and *Helicobacter pylori* infection.

Additional resources

1. NSW Health *Lyme Disease Factsheet*.
2. Stanek G et al. Lyme borreliosis: Clinical case definitions for diagnosis and management in Europe. Clin Microbiol Infect 2011;17; 69-79
3. CDC. Notice to Readers: Recommendations for test performance and interpretation from the Second National Conference on Serologic Diagnosis of Lyme Disease. MMWR 1995:44(31); 590-591.
4. CDC. Notice to readers: Caution regarding testing for Lyme Disease. MMWR Weekly2005:54(05); 125.
5. Feder HM et al. A Critical Appraisal of "Chronic Lyme Disease". N Engl J Med 2007;357:1422-30.

For further information please call your local Public Health Unit on **1300 066 055** or visit the New South Wales Health website www.health.nsw.gov.au.