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Guidance

Lyme disease: diagnosis and treatment

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1. Laboratory investigations

Before diagnostic tests are requested, a patient's risk of exposure to ticks should be properly assessed and the clinical history evaluated for features compatible with Lyme borreliosis (LB) . Tests should not be requested if there is no significant risk of a patient having LB. It is important that relevant clinical information is provided when samples are submitted for testing.

Lyme disease laboratory services and clinical support are provided at the rare and imported pathogens laboratory (<https://www.gov.uk/government/collections/rare-and-imported-pathogens-laboratory-ripl>) (RIPL), Public Health England Porton.

The most commonly used tests look for antibodies to *Borrelia burgdorferi* (Bb), the organism that causes LB. An infected person's immune system produces antibodies in response to Bb infection, just one of the mechanisms used by the body to fight infection. The antibody response takes several weeks to reach a detectable level, so antibody tests in the first few weeks of infection may be negative. It is rare for patients to have negative antibody tests in longstanding infections.

Laboratory diagnosis in the UK follows a two-step approach using commonly available antibody screening tests as a first stage, followed by immuno-blotting (western blotting) of samples that give reactive or equivocal results in the screening tests. Sensitive screening tests are used because they can detect low levels of antibodies but they have the disadvantage of producing occasional false positive results in samples from some patients with other conditions. These include glandular fever, syphilis, other infections, rheumatoid arthritis, other autoimmune conditions and some neurological conditions. Samples giving reactive or indeterminate screening test reactions are then tested in a more detailed system, called immunoblot or western blot, to confirm the presence of Bb-specific antibodies. These second-stage tests allow laboratory workers to give a more accurate assessment of the presence of Bb antibodies.

2. Treatment

The oral antibiotics doxycycline, amoxicillin or cefuroxime axetil are recommended for 2 weeks (range 10 to 21 days) for erythema migrans. Facial palsy and other complications need longer treatment (3 to 4 weeks).

The usual adult doses of these antibiotics are:

- doxycycline 100mg twice daily
- amoxicillin 500mg three times daily
- cefuroxime axetil 500mg twice daily.

Doxycycline use is contraindicated for children aged under 12 years and for pregnant and breastfeeding women. Intravenous treatment, usually with ceftriaxone for 2 weeks (range 10 to 28 days), is recommended for some neurological presentations and occasionally for second-line treatment of arthritis and for some other uncommon presentations. The usual adult dose of ceftriaxone is 2g daily.

Erythromycin is not recommended for treating any stage of LB, as it has a high failure rate. Newer macrolides such as azithromycin or clarithromycin may be used if first and second-line antibiotics are contraindicated, but patients should be carefully followed up clinically, as treatment failures can occur with these agents.

Longstanding neuroborreliosis may be slow to respond to treatment, as damaged nerve tissue is slow to heal.

Re-treatment may be indicated in occasional cases of neuroborreliosis and arthritis. Seek specialist advice about treatment in difficult cases (see the referral pathway) (<https://www.gov.uk/government/publications/lyme-disease-diagnosis-and-treatment>).

3. Vaccine

There is no vaccine against Lyme borreliosis currently available in Europe or North America. Research into new vaccines is continuing, but no product is likely to be available in the new future.

4. Co-infections

Other infections can be transmitted by bites from infected ticks. These include:

- anaplasmosis
- babesiosis
- Q fever

All are rare tick-transmitted infections in the UK; Q fever is more frequently acquired through other transmission routes. In some parts of Europe ticks can transmit a virus which causes tick-borne encephalitis for which a vaccine is available. If a tick-transmitted co-infection occurs with LB it may give an atypical clinical presentation. Clinicians should be aware of the possibility of co-infections, which may also influence treatment choice.

RIPL (<https://www.gov.uk/government/collections/rare-and-imported-pathogens-laboratory-ripl>) offers additional tests for many of these agents, which are available to qualified medical practitioners on request if the clinical details support their use.