

PEDIATRIC RHEUMATOLOGY EUROPEAN SOCIETY CLINICAL GUIDELINES: LYME ARTHRITIS

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Introduction

Lyme arthritis is one of the manifestations of Lyme borreliosis, a tick-transmitted infection caused by the spirochete *Borrelia burgdorferi*. The most frequent manifestations of Lyme borreliosis affect the skin (erythema migrans, lymphadenosis cutis benigna), the central nervous system (neuroborreliosis) and the musculoskeletal system (arthritis, arthralgias, myalgias, and rarely myositis). Manifestations in other organs are possible (e.g. heart and eyes). Lyme arthritis occurs months to years after the tick-bite and shows no seasonal dependency contrary to early manifestations of Lyme borreliosis.

Arthritis presentation

The arthritis is usually manifested as mono- or oligoarticular joint swelling, most frequently involving one or both knees. It is relatively painless. There are frequent relapses and remissions. However, a polyarticular onset and chronic course are possible. In most cases a tick-bite or early symptoms of Lyme borreliosis are not remembered.

Diagnosis

The clinical diagnosis of Lyme arthritis is made by the presence of arthritis with no other known cause and laboratory evidence of infection by *Borrelia burgdorferi*. This laboratory evidence consists of detection of specific IgG-antibodies against *Borrelia burgdorferi*. Other known causes of arthritis need to be excluded. Patients with pre-existing juvenile idiopathic arthritis can rarely also develop Lyme arthritis.

Diagnostic laboratory tests

Standard laboratory testing currently includes an ELISA and immunoblot of IgG-antibodies to *Borrelia burgdorferi*. These laboratory tests are indirect methods detecting antibodies against *Borrelia burgdorferi*. Antibody tests do not demonstrate the presence of active infection. Several methods are used, and there is no standardization of methods outside the United States. Screening tests, mostly enzyme immunoassays (enzyme-linked immunosorbent assay; ELISA) or immunofluorescence assays, are not infrequently false-positive and more rarely false-negative. Since Lyme arthritis is a late manifestation of Lyme borreliosis, patients show many IgG-bands on immunoblotting (Western Blot), and this test can confirm the specificity of positive ELISA results. Patients usually remain seropositive for years, even after successful antibiotic treatment. Thus antibody titers cannot be used to assess the success of antibiotic treatment.

Joint aspiration can usually be avoided, but is necessary in cases of possible septic arthritis. Synovial fluid cell counts do not allow differentiation of Lyme arthritis from other inflammatory arthritides. Culture or polymerase chain reaction (PCR) are possible direct methods to demonstrate infection, but both methods have a low yield and are difficult to perform well. False-positive PCR is a possible diagnostic problem. To reduce false-positivity rates, PCR should be performed using two different primer pairs to detect different parts of *Borrelia burgdorferi*-DNA, preferably including both genomic and plasmid DNA.

Treatment

Antibiotic treatment

Borrelia burgdorferi are killed by many antibiotics. Commonly, clinical improvement takes days to 2 months following the start of antibiotic treatment. Lack of response or relapse occurs in up to 10-20% of patients.

-*Intravenous antibiotics* (recommended duration 14 days): ceftriaxone 50 mg/kg once daily (maximal dose 2g/day, note: out-patient therapy possible). Alternatively, cefotaxime 3 times daily or penicillin G 6 times daily may be used.

-*Oral antibiotics* (recommended duration 30 days): amoxicillin 50 mg/kg in 3 doses or in patients 9 years and older doxycycline 200 mg/day. For patients under 9 years of age with penicillin- and cephalosporin-allergy, an erythromycin class drug is an alternative. In some studies, the combination of roxythromycine (an erythromycin, macrolide class drug) and cotrimoxazole (trimethoprim and sulfamethoxazole combination) was used as a second-line approach.

There is no evidence that prolonged courses of antibiotics are indicated in patients with insufficient response to the antibiotic regimens recommended above. No more than 2 courses should be given and compliance should be assured. In antibiotic-resistant cases, conventional antirheumatic treatment for oligoarthritis is indicated including nonsteroidal antirheumatic drugs, intraarticular steroids, methotrexate and other drugs.

Symptomatic Treatment

Non-steroidal anti-inflammatory drugs or physical therapy may be used as an adjunctive therapy to the antibiotic therapy in some patients.

Interventional

Intra-articular steroids may be used following the second course of antibiotics. Intra-articular steroids should only be utilized after a complete course of antibiotics, as steroids prior to antibiotic treatment may increase the risk of a prolonged course of arthritis.

Surgical

Rarely, patients with persistent arthritis following an adequate course of antibiotics, intra-articular steroids and antirheumatic drug treatment require synovectomy.

Rehabilitation

The prognosis of Lyme arthritis in most patients is excellent. For patients in whom arthritis persists for weeks, physical therapy is indicated.

Prevention

Prompt removal of ticks reduces the risk of transmission of *Borrelia burgdorferi*. A vaccine had been approved for use in North America, but has been removed from the market for economic reasons. Vaccines are not available for use in Europe. The prophylactic use of 200 mg doxycycline has been advocated in American adults following *Ixodes* tick-bites. However, the epidemiology of Lyme borreliosis differs between Europe and North America. No other prophylactic antibiotic regimen has been shown to be effective. The risk of subsequent Lyme borreliosis after a tick-bite is low, and most tick bites are not recognized. Therefore, in Europe, the prophylactic use of antibiotic treatment in an asymptomatic person following a tick-bite is not recommended. However, patients with signs of early Lyme borreliosis, i.e. with erythema migrans, should be treated promptly with antibiotics. Antibiotic treatment of erythema migrans is a very efficient way to prevent late Lyme borreliosis, i.e. Lyme arthritis. Analysis of ticks for evidence of borrelial infection cannot be recommended due to possible false-positive and false-negative results and lack of therapeutic consequences.

References

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