

Lyme arthritis in a young woman: a report of a rare or underdiagnosed disease

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ABSTRACT:

- We report a case of Lyme arthritis in a 18-year-old woman, who presented to the Unit of Infectious Diseases of our hospital, complaining of joint pain for seven months. During the hospitalization, she presented an increase of erythrocyte sedimentation rate, a right maxillary sinusitis and inflammation of hands, wrists and right ankle, with joint effusion shown by MRI; IgM for *Borrelia burgdorferi* were positive by both ELISA test and Western blot. The patient was treated with a first cycle of Amoxicillin for seven days, followed by Penicillin for 21 days. During the next months, she had a relapse of the original symptoms and required a second cycle of antibiotic therapy with penicillin and steroids for 21 days.
- **Key words:** Lyme arthritis, *Borrelia burgdorferi*, Amoxicillin, Penicillin.

BACKGROUND

Lyme boreliosis (LB) is a worldwide multiorgan infection, that involves the skin, joints, nervous system, eyes and heart, transmitted to humans by the bite of an infected tick of the genus *Ixodes*^{1,4}. *Borrelia (B.) burgdorferi sensu lato*, the causative bacterium of LB, is genetically divergent and has been divided into several species or genomic groups². In fact, the genospecies that cause disease in Europe are *B. afzelii*, *B. garinii*, *B. burgdorferi sensu stricto* and occasionally other species such as *B. spielmanii*, whereas in the US *B. burgdorferi sensu stricto* is the only pathogenic genospecies^{1,3}. After the transmission of the spirochete, human LB generally occurs in stages, with different clinical manifestation and evolution^{5,6}. The clinical features of LB may be different in the various geographical areas, primarily as regards the manifestations found in America and those found in Europe and Asia^{1,7}. The prevalence of erythema migrans (EM) is similar in the USA and Northern Europe, but lower in Southern Europe^{4,7}. Acrodermatitis chronic atrophicans (ACA), borrelia lymphadenitis benigna cutis (LABC), and some manifestations of carditis have been detected almost exclusively in Europe^{4,7,8}. Articular involvement seems to be more frequent in the USA than in Europe, in Southern

countries rather than in the North. Neurological damage is more often observed in European countries, whereas in North America milder forms have been reported^{4,7}.

As for the diagnosis, a history of a tick bite often goes unnoticed, moreover, even in the presence of a documented tick bite, it needs to be remarked that not all tick are actually infected. Furthermore, other tick born diseases may present with similar clinical symptoms. LB diagnosis should be based primarily on the clinical presentation, an assessment of tick-exposure risk, and laboratory tests. As a matter of fact, in almost all cases laboratory support is essential because of the nonspecific nature of many clinical manifestations. Culture of spirochetes from patients' specimens is very specific but also very laborious^{9,10}. Serology is usually the first and often the only supporting diagnostic tool, as it is relatively easy to perform, with a recently improved sensitivity and specificity^{9,11,12}. LB serology is based on an initial screening test (usually ELISA), followed by Western blot to confirm ELISA results¹⁰. It needs to be emphasized that these tests may be negative during the first weeks of LB, since the production of antibodies usually takes variable time. Nucleic acid amplification testing using polymerase chain reaction (PCR) technology greatly assists in the detection and identification of a wide range of fastidious pathogens and can detect low copy numbers of *B. burgdorferi*.

feri sensu lato. However, in European LB the spirochetemia is transient and spirochetes are relatively difficult to sample from tissues. Furthermore, detection of DNA by conventional PCR cannot unequivocally establish whether the infection is active or not. At present, targets, primers and methods are not standardized, so test results obtained by different laboratories may show significant variability. Despite these drawbacks, this technique can offer useful diagnostic support in difficult cases¹⁰.

Borrelia spp. responsible for Lyme disease remain highly sensitive to readily available antibiotics, both *in vivo* and *in vitro*^{11,13}. In the absence of neurologic disease, amoxicillin or doxycycline or cefuroxime for 14-28 days are suggested; in the presence of neurologic disease the use of ceftriaxone or cefotaxime or penicillin for 14-28 days or doxycycline for 21-42 days is recommended.

Although progressive or recurrent disease is uncommon, some patients with significant endorgan damage, those with severe arthritis or with longstanding brain or spinal cord inflammation, might have long-term sequelae. Of importance, untreated infections often lead to chronic joint involvement, which may last for years¹³.

CASE PRESENTATION

An 18-year-old Caucasian woman presented to the Unit of Infectious Diseases of the Garibaldi Nesima Hospital, in Catania, referring bilateral joint pain in her upper limbs, for the last seven months. The pain started in lower limbs, subsequently migrating to the upper limbs. Her medical history was characterized by polycystic ovary syndrome on treatment. During the hospitalization the patient had no fever and complained only of joint pain. Her physical examination was negative, except for joint pain upon palpation. Blood exams showed increased erythrocyte sedimentation rate (47 mm/h), negative autoantibodies, red blood cells, white blood cells and platelets series were normal, IgM and IgG for *Brucella* were negative, IgG for *Epstein Barr Virus*, *Cytomegalovirus* and *Herpes Virus-1* were positive (IgM were all negative). An echocardiography showed a mild mitral insufficiency. An MRI report described right maxillary sinusitis and inflammation of hands, wrists and right ankle, with joint effusion. ELISA test for *Borrelia burgdorferi* resulted positive for both IgM and IgG. These results were confirmed by Western blot test, performed only for the IgM antibodies. As for the therapy, the patient was treated with amoxicillin administered orally for seven days, during the hospitalization. She continued the therapy at home with Penicillin for 21 more days.

Six months later, the young woman relapsed, complaining joint pain again. She received a new cycle of penicillin for a total of 21 days, associated with steroids, obtaining the regression of the symptoms.

CONCLUSIONS

This case report describes our clinical experience with a case of Lyme arthritis, which represents a very uncommon disease in our clinical practice. This report aims to remind clinicians the importance to include this infection in the differential diagnosis, especially in those areas of the world where LB is uncommon or rare. Moreover, a careful history of travelling needs to be investigated. In fact, although *Borrelia burgdorferi* is present both in Europe and US, the infrequency of this disease in southern areas may delay the diagnosis. The suspect of this infection and consequently early diagnosis are critical to initiate a targeted therapy avoiding potential long-term consequences.

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