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Case report

Lyme disease and juvenile idiopathic arthritis – A pediatric case report[☆]



Doença de Lyme e artrite idiopática juvenil – Relato de caso clínico pediátrico

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Introduction

Lyme disease (LD) is an infectious disease caused by spirochetes of the genus *Borrelia* and transmitted by tick bite.

The clinical presentation of LD is divided into three separated phases: an early localized disease, characterized by erythema migrans (EM), an early disseminated disease with potential involvement of the central nervous system and heart, and a late stage of disease with monoarticular or oligoarticular arthritis of large joints. During the early phase, oral antibiotics and, in the case of disseminated disease with neurological or cardiac damage, intravenous antibiotics, are indicated. The arthritis of LD (late stage) should be initially treated with oral antibiotics for a month; intravenous

treatment should be limited to patients with severe or persistent disease.

Several studies have suggested a possible influence of several infectious agents, including *Borrelia*, in the etiopathogenesis of Juvenile Idiopathic Arthritis (JIA).¹

Case report

A 6-year-old female patient with no relevant past medical history was referred to Pediatric Rheumatology consultation, with complaints of pain and swelling of the proximal interphalangeal joints (PIP) of hands and wrist and tibiotarsal joints bilaterally with several months of development and progressive worsening. There was no fever or history of trauma. She

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Fig. 1 – Proximal interphalangeal joints with inflammatory arthritis observed in a Pediatric Rheumatology consultation.

resided in an urban environment in northern Portugal, but with regular visits to relatives living in a rural area, where she had contact with dogs. The family history was irrelevant.

The girl showed multiple circinate erythematous lesions of 2–5 cm diameter, with a 5-month progression, and was refractory to oral and topical antifungal treatment. At physical examination, the patient had signs of inflammation and limitation on active and passive mobilization of all PIP joints of her hands (Fig. 1) and of the knee, tibiotarsal joints and wrists bilaterally; and also multiple circinate erythematous lesions with irregular shapes, scattered on the trunk, upper and lower limbs and neck (Fig. 2).

Given the clinical picture suggestive of LD, antibiotic therapy was instituted with oral amoxicillin 1.5 g/day and ibuprofen 30 mg/kg/day for 21 days.

The laboratory investigation showed normal complete blood count (CBC) and general biochemistry (renal function,



Fig. 2 – Multiple circinate erythematous lesions with irregular shapes, scattered on the trunk and upper limbs.

ALT, AST, alkaline phosphatase, thyroid function, ionogram); erythrocyte sedimentation rate 24 mm/1st hour, C-reactive protein 1 mg/dL, immunological studies with ANA, ANCA and rheumatoid factor negative, C3 and C4 slightly increased (184 mg/dL and 46 mg/dL, respectively), and serology (HIV, CMV, EBV, toxoplasma, VDRL, Weil-Felix reaction and Wright reaction) negative. Serological studies for *Borrelia burgdorferi* were positive (indirect immunofluorescence, IgG 53.30 AU/mL [positive, >10 AU/mL]; IgM: 1.37 [positive, >1.09]). In the face of such results, the diagnosis of EM and arthritis in a context of Lyme disease has been confirmed. The child showed no changes in her heart and eye examination.

In spite of the treatment, the child related the same complaints of arthralgia, with the appearance of new lesions of EM. A cycle of 28 days of intravenous ceftriaxone 2 g/day was then introduced, with complete disappearance of skin lesions.

The resolution of joint symptoms was only temporary; about two months later, re-aggravation of arthralgia complaints and mobility limitation of wrist and PIP joints occurred. There was no recurrence of other signs of arthritis and even of EM.

Taking into account the persistence of the signs and symptoms of chronic arthritis, anti-inflammatory treatment with oral deflazacort (7.5 mg/day) and naproxen (500 mg/day) and also immunosuppression with oral methotrexate (14.5 mg/m²/week) were initiated. Then the child presented a progressive improvement of her pain complaints, but with persistence of a slight limitation to wrist extension. Analytically, there were no new changes. Currently, the patient remains in remission, depending on this therapy; her behavior and response to therapy are absolutely identical to what happens with JIA. Worsening of complaints occurred when a reduction of medication was attempted.

Discussion

LD is predominantly caused by *Borrelia burgdorferi* and, especially in Europe, by *Borrelia afzelii* and *Borrelia garinii*. Being considered as a zoonosis, LD is transmitted by tick bite, commonly of *Ixodes ricinus*.

With significant variations among different geographic areas, the incidence of LD has increased in a sustained manner in the last years.² In Portugal, the incidence is 0.3 cases per 100,000 inhabitants, close to what happens in other European countries.³

The early localized disease emerges 7–14 days after inoculation,⁴ being characterized by EM and systemic symptoms. If left untreated, the erythematous macula at the tick bite site will develop into a non-itchy, annular, erythematous lesion with larger size (5–70 cm), sometimes showing a central clearing. If the treatment is not instituted, there follows the early disseminated disease, characterized by multiple EM lesions, neurological symptoms (e.g., meningitis or cranial nerve palsy) and carditis. During the late stage, monoarticular or oligoarticular arthritis is the most common manifestation. First described by Steere et al.⁵ in 1977, the association between LD and joint symptoms has been widely reported. The joint involvement begins with a large joint, most commonly the knee; however, the edema and erythema are more

obvious than the associated pain. Often, the arthritis is migratory, and if the antibiotic therapy is not started, the complaints will persist over several weeks, followed by spontaneous resolution. However, the problem may recur in another joint.⁶

Unusual developments have been described by several investigators, notably the development of joint complaints toward chronicity in an important proportion of pediatric patients,⁷ and the presence of erosive arthropathy in children unresponsive to antibiotic treatment.⁸

The presence of EM in an individual who resides or recently traveled to an endemic area is sufficient for the diagnosis of LD. On the other hand, in the case of symptoms compatible with disseminated or late disease, serological confirmation should be performed prior to the institution of antibiotic therapy.⁴

The antibiotic of choice in cases of localized disease is doxycycline, amoxicillin or cefuroxime-axetil orally in a course of 14–21 days. Intravenous antibiotic therapy is indicated in cases of cardiac or neurological manifestation, except for those isolated cases of facial paralysis. Lyme arthritis can be treated successfully with oral doxycycline or amoxicillin for one month; however, in some cases an intravenous treatment may be required.⁴

The association between JIA and environmental and other factors such as infection, breastfeeding, immunization, etc. was already mentioned.⁹ Thus, it is believed that the presence of one or more risk factors, such as a *Borrelia* infection in a genetically susceptible individual, may trigger a clinical picture of JIA.¹ However, more studies are still needed to establish a relationship between this environmental factor and JIA, and also to determine what is the actual pathogenic role of different environmental risk factors in triggering this disease.

In this case, the child was found with skin lesions suggestive of disseminated disease; however, the evolution to polyarticular arthritis is not characteristic of Lyme arthritis (which typically is of monoarticular or oligoarticular type), but her clinical picture is strongly suggestive of polyarticular JIA. The cutaneous manifestations disappeared after treatment, with persistence only of chronic arthritis, which was controlled with anti-inflammatory agents and methotrexate.

The presented evolution suggests a strong likelihood that the infection by *Borrelia* was the triggering event of JIA in this patient.

Conflicts of interest

The authors declare no conflicts of interest.

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