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## Lyme disease in paediatrics<sup>☆</sup>



### Enfermedad de Lyme en edad pediátrica

Dear Editor,

Lyme disease is one of the most common tick-borne zoonoses in the northern hemisphere, and its incidence peaks in the paediatric age group.<sup>1</sup> It is caused by spirochetes of the *Borrelia burgdorferi* sensu lato complex, and in Europe it is transmitted by the bite of the *Ixodes ricinus* hard-bodied tick.<sup>1,2</sup>

Its main clinical manifestations are neurologic, cutaneous, musculoskeletal and cardiovascular, and the disease progresses through several stages over time. Stage I (early localized disease) may feature erythema migrans, stage II (early disseminated infection) meningitis, radiculitis, mononeuritis, cranial nerve palsy, carditis, arrhythmias, and acute arthritis; and stage III (late persistent disease) acrodermatitis chronica atrophicans, recurrent chronic arthritis and late neuroborreliosis.<sup>2</sup> Unless the patient presents with erythema migrans, which is a pathognomonic skin lesion, the diagnosis of Lyme disease requires serologic confirmation by enzyme immunoassay (ELISA) and/or western blot testing with compatible clinical manifestations.<sup>1</sup> With adequate antibiotic treatment, the prognosis is generally excellent.<sup>1,2</sup>

We conducted a descriptive, observational and retrospective study between January 2006 and December 2013 with the purpose of determining the incidence of Lyme disease and improving our understanding of its clinical manifestations in the paediatric population of our health area. After obtaining the approval of the ethics board, we reviewed the medical records of individuals aged less than 15 years with a confirmed diagnosis of Lyme disease in the service area of the Hospital Universitario Lucus Augusti of Lugo, which serves a paediatric population of 22,570. The cases included in the study also met the

surveillance case definition of Lyme disease of the Centres for Disease Control and Prevention,<sup>3</sup> as they featured compatible manifestations and were confirmed by ELISA (VIDAS bioMérieux, St Louis, MO, USA) and western blot (EUROLINE-WB, EUROIMMUN AG, Lübeck, Germany), except in patients presenting with erythema migrans. We collected data for the age and sex of patients, history of tick bites, the month and year at diagnosis, clinical manifestations, laboratory data and received treatment (Table 1).

We identified 10 patients in the period under study, which entails a mean incidence of 5.5 cases per 100,000 inhabitants per year, higher than the one described in the general population of other areas of Spain.<sup>4</sup> This data could be explained by the abundance of precipitation, lowland forests and hosts in the region under study, which favour the presence of the vector.<sup>2</sup> Most patients were male and had been diagnosed in August, a summer month during which outdoor activities are more frequent and it is easier to come in contact with the tick, the bites of which are painless, a fact that accounts for only half of the patients remembering being bitten. The most frequent manifestations were cutaneous (40%), followed by neurologic (30%) and articular (10%); furthermore, more than 20% of the patients had both cutaneous and neurologic manifestations. The most common cutaneous manifestation was erythema migrans in the upper half of the body, as opposed to the lower limbs, a location that is more frequent in adults.<sup>1</sup> Meningitis with a predominance of mononuclear cells and elevated proteins in the cerebrospinal fluid is one of the main neurologic manifestations of Lyme disease in children, along with peripheral facial nerve palsy.<sup>1</sup> Radiculitis, which is very frequent in adults,<sup>2</sup> is less common in children, as observed in our study. All patients had a favourable outcome after antibiotic treatment, except for the patient that had articular manifestations, who developed recurrent chronic arthritis, an outcome that may happen in 10% of cases.<sup>5</sup> Polymerase chain reaction testing of the joint fluid in this patient identified *B. garinii*, one of the most prevalent genospecies in Spain.<sup>2</sup> Laboratory tests did not find significant leukocytosis nor elevation of acute phase reactants, and 80% of the patients did not develop fever, which is a characteristic finding in other tick-borne diseases, such as recurrent fever. Antibiotic prophylaxis following the tick bite is not routinely indicated,

<sup>☆</sup> Please cite this article as: Vázquez-López ME, Pérez-Pacina R, Díez-Morrandob C, Díaz P, Castro-Gago M. Enfermedad de Lyme en edad pediátrica. An Pediatr (Barc). 2016;84:234–235.

**Table 1** Epidemiological, clinical, and laboratory characteristics and treatment of the 10 cases of Lyme disease identified during the period under study.

N	Age (years)	Sex	RTB	Month	Year	Manifestations	CSF/JF	Treatment (days/route of administration)
1	10	M	No	Aug	2013	EM (neck)		Doxycycline (21/O)
2	7	M	No	June	2012	EM (shoulder)		Amoxicillin (21/O)
3	11	M	Yes	June	2010	EM (knee)		Amoxicillin-clavulanic acid (10/O)
4	9	M	No	June	2012	EM (side of ribcage)		Doxycycline (21/O)
5	12	F	No	Aug	2006	Meningitis	CSF: Prot, 102 mg/dL WBC, 1500 (99% lymph)	Ceftriaxone (21/IV)
6	4	M	Yes	Sep	2008	Meningitis Facial palsy	CSF: Prot, 100 mg/dL WBC, 465 (90% lymph)	Ceftriaxone (16/IV + 5/IM)
7	1	M	Yes	Aug	2013	Meningitis Facial palsy	CSF: Prot, 36 mg/dL WBC, 60 (95% lymph)	Ceftriaxone (14/IV + 7/IM)
8	6	M	No	Aug	2013	EM (side of ribcage) Meningitis	CSF: Prot, 53 mg/dL WBC, 400 (98% lymph)	Ceftriaxone (14/IV + 7/IM)
9	7	F	Yes	July	2007	EM (armpit) Meningitis Radiculitis	CSF: Prot, 77 mg/dL WBC, 976 (85% lymph)	Ceftriaxone (14/IV + 7/IM)
10	4	F	Yes	Mar	2012	Arthritis	JF: WBC, 19 627 (88% PMN)	Amoxicillin (28/O) Ceftriaxone (15/IV) Methotrexate (SC) Intra-articular corticosteroid

*Abbreviation:* CSF, cerebrospinal fluid; EM, erythema migrans; F, female; IM, intramuscular route; IV, intravenous route; JF, joint fluid; M, male; O, oral route; PMN, polymorphonuclear; Prot, proteins; RBT, remembers being bitten by tick; SC, subcutaneous route; WBC, white blood cells.

and should only be implemented in specific situations, with administration of a single dose of doxycycline by the oral route.<sup>6</sup>

In conclusion, Lyme disease is a zoonosis found in our health area with an incidence higher than those reported in other areas of Spain, although the clinical manifestations and response to treatment of patients in our area do not differ from those observed in other studies. Increased knowledge of this disease among health care professionals will allow a better degree of diagnostic suspicion, earlier treatment, and even the diffusion of preventive measures to avoid tick bites, especially in high-risk areas.

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