

# Lyme Disease Update 8.10.2023

## Clinical manifestations:

- Early localized – [Erythema migrans](#) at the site of a recent tick bite appearing days to weeks after a bite. It begins as a macule or papule that expands to form a large erythematous lesion, sometimes with partial central clearing. The lesion is typically painless and nonpruritic. It can be distinguished from an allergic response to a bite by large size, gradual expansion, less pruritis, and slower onset. Constitutional symptoms including malaise, HA, myalgia, low grade fever, and arthralgia (without arthritis) may be present. The incubation period from tick bite to single or multiple EM lesions is 3 to 32 days.
- Early disseminated – Multiple EM lesions may appear several weeks after the bite and consist of secondary annular, erythematous lesions similar to the primary. Extracutaneous manifestations of early disseminated infection can include palsies of the cranial nerves, lymphocytic meningitis, radiculitis and carditis. Systemic symptoms may be present at this stage.
- Late Lyme in children presents mainly as arthritis of the large joints (especially the knees). Most cases of arthritis occur without symptoms without a history of the earlier stages of illness or prior treatment. The effusion may be episodic. Rare late manifestations include polyneuropathy, encephalopathy and encephalitis. Late disease may appear months after the tick bite in patients that do not receive antimicrobial therapy.

## Differential Diagnosis

- There are a number of dermatologic conditions that can appear similar to erythema migrans. If there is uncertainty about the rash, you can observe for 24 – 48 hours if the patient is not severely ill; erythema migrans will persist and increase in size over time. If the lesion resolves in a few days, it is likely not erythema migrans.
- Other rashes that are on the differential include: tick bite hypersensitivity reactions, nummular eczema, Tinea corporis, granuloma annulare, spider and mosquito bites, and erythema multiforme.

## Diagnostic Testing

- Diagnosis of early Lyme disease is primarily based on consistent clinical illness with plausible geographic exposure
- Sensitivity of testing is low during early infection, so patients with 1 or more characteristic EM lesions without extracutaneous manifestations should be treated without serologic testing.
- Diagnosis of extracutaneous Lyme disease, including late stage, requires a typical clinical illness, plausible geographic exposure, and a positive serologic test result.
- Standard testing method is a 2-tier serologic algorithm:
  - Initial screening test identifies antibodies via an enzyme-linked immunosorbent assay (ELISA or EIA) or immunofluorescent antibody (IFA) test
  - If the result is equivocal or positive, then a second-tier test is required:
    - Western immunoblot (standard second-tier test), or
    - EIA test that has been specifically cleared by the FDA for use as a second-tier confirmatory test

## Recommended Treatment

Disease Category	Drug(s) and Dose
Erythema migrans (single or multiple) (any age)	Doxycycline, 4.4 mg/kg per day, orally, divided into 2 doses (maximum 200 mg/day) for 10 days <b>OR</b> Amoxicillin, 50 mg/kg per day, orally, divided into 3 doses (maximum 1.5 g/day) for 14 days <b>OR</b> Cefuroxime, 30 mg/kg per day, orally, in 2 divided doses (maximum 1 g/day) for 14 days <b>OR</b> , for a patient unable to take a beta-lactam or doxycycline, Azithromycin, 10 mg/kg/day, orally, once daily for 7 days
Isolated facial palsy	Doxycycline, 4.4 mg/kg per day, orally, divided into 2 doses (maximum 200 mg/day), for 14 days <sup>a</sup>
Arthritis	An oral agent as for early localized disease, for 28 days <sup>b</sup>
Persistent arthritis after first course of therapy	Retreat using an oral agent as for first-episode arthritis for 28 days <sup>b</sup> <b>OR</b> Ceftriaxone sodium, 50–75 mg/kg, IV, once a day (maximum 2 g/day) for 14–28 days
Atrioventricular heart block or carditis	An oral agent as for early localized disease, for 14 days (range 14–21 days) <b>OR</b> Ceftriaxone sodium, 50–75 mg/kg, IV, once a day (maximum 2 g/day) for 14 days (range 14–21 days for a hospitalized patient); oral therapy (using an agent as for early localized disease) can be substituted when the patient is stabilized or discharged, to complete the 14- to 21-day course
Meningitis	Doxycycline, 4.4 mg/kg per day, orally, divided into 1 or 2 doses (maximum 200 mg/day) for 14 days <b>OR</b> Ceftriaxone sodium, 50–75 mg/kg, IV, once a day (maximum 2 g/day) for 14 days

IV indicates intravenously.

<sup>a</sup>Corticosteroids should not be given. Use of amoxicillin for facial palsy in children has not been studied. Treatment has no effect on the resolution of facial nerve palsy; its purpose is to prevent late disease.

<sup>b</sup>There are limited safety data on the use of doxycycline for >21 days in children <8 years of age.

Source: American Academy of Pediatrics, 2021 *Red Book*, Lyme Disease (https://publications.aap.org/redbook/book/347/chapter/5753718/Lyme-Disease-100Lyme-BorreliosisBorrelia). Link to publication [HERE](https://publications.aap.org/redbook/book/347/chapter/5753718/Lyme-Disease-100Lyme-BorreliosisBorrelia)