

Lyme Disease

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See also: **Bites and Stings guideline** (microguide > Paediatrics and Neonatology > Paediatrics > B)

Background

- caused by a group of bacteria termed *Borrelia burgdorferis* sensu lato (sl) and is spread through being bitten by an infected tick.
- not common in the UK, with an estimated 2,000 to 3,000 new cases each year in England and Wales.
- Ticks are more common in the south of England and particularly in woodland and heath-land areas.

Assessment

In the history:

- ask about recent activities in areas where ticks are known to be highly prevalent (e.g. hiking in heath-land area). NB. Tick needs to harbour borrelia and needs to be on host for > 24 hours to infect.
- See the bites and stings guideline for tick bites if concerns but no signs or symptoms of Lyme disease

Do not rule out the possibility of Lyme disease in people with symptoms but no clear history of tick exposure.

Erythema migrans rash seen in 90% of symptomatic infections – (see images below)

Features of erythema migrans:

- increases in size and may sometimes have a central clearing (see example images)
- is not usually itchy, hot or painful
- usually becomes visible from 1 to 4 weeks (but can appear from 3 days to 3 months) after a tick bite and lasts for several weeks
- is usually at the site of a tick bite.

Erythema migrans is less likely in a patient with a tick bite if:

- rash develops and recedes within 48 hours from the time of the tick bite
- is hot, itchy or painful

It is more likely to be an inflammatory reaction or infection with a common skin pathogen.

Different types of erythema migrans rashes (from NICE guideline NG95):



Classic appearance (©LDA)



Classic appearance (©CDC)



No central clearing (©LDA)



No bull's eye (©LDA)



No central clearing or bull's eye (©PCDS)



Faint bull's eye (©LDA)

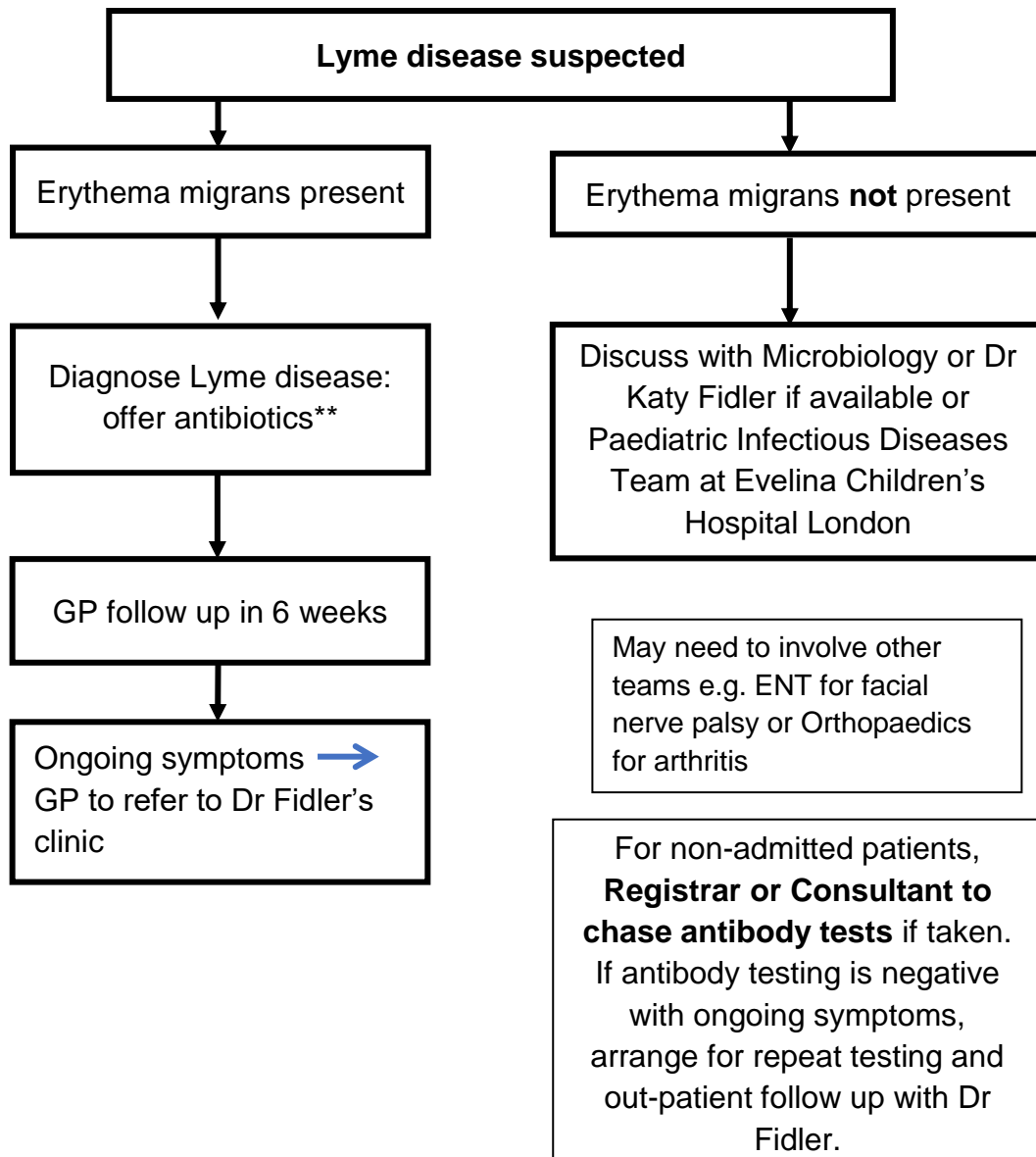
Possible other findings:

- Fever and sweats	- Neck pain or stiffness
- Swollen glands	- Migratory joint or muscle aches and pain
- malaise	- Headache
- fatigue	- paraesthesia
- Cognitive impairment such as memory problems and difficulty concentrating 'brain fog'	- Neurological symptoms e.g. unexplained cranial nerve palsies, meningitis, mononeuritis multiplex or other unexplained radiculopathy, or rarely encephalitis, neuropsychiatric presentations or unexplained white matter changes on imaging
- Inflammatory arthritis affecting 1 or more joints that may be fluctuating and migratory	- Cardiac problems e.g. heart block, pericarditis
- Eyes e.g. uveitis, keratitis	- Skin rashes e.g. acrodermatitis chronica atrophicans, lymphocytoma

Investigation

- **Routine Lyme disease serology: send serum sample (>0.5 mL).** Antibody (ELISA) test performed by lab daily (Monday to Friday). Turnaround time 2-5 days
- If this result is positive, immunoblot testing is needed. Occurs at external lab (taking up to 2 weeks) – initial antibody results not released until immunoblot result is known.
- For testing for **neurological Lyme disease, send paired CSF (>0.5 mL) and serum (>0.5 mL) samples taken on the same day.** If possible, also provide CSF cell count and total albumin, IgG and IgM values.

Investigation and management pathway



**See next page for antibiotic choice and dosing

References

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4. *Lyme borreliosis.* Stanek, G, et al. 9814, 2011, The Lancet, Vol. 379, pp. 461-473.
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6. **National Institute for Health and Care Excellence.** Lyme disease: Erythema Migrans. National Institute for Health and Care Excellence. [Online] April 11, 2018. [Cited: April 24, 2020.] <https://www.nice.org.uk/guidance/ng95/resources/lyme-disease-rash-images-pdf-4792273597>.
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Antibiotics for Lyme disease (NB. Advise use of sunblock cream if taking doxycycline due to risk of photosensitivity)

		1 st choice	1 st alternative	2 nd alternative
Erythema migrans rash +/- non-focal symptoms	< 9 years	Oral amoxicillin	Oral azithromycin	
	9-12 years	Oral doxycycline	Oral amoxicillin	Oral azithromycin
	>12 years	Oral doxycycline	Oral amoxicillin	Oral azithromycin
<i>Treat for 21 days (or 17 days if using azithromycin)</i>				
Cranial or peripheral nervous system involvement	< 9 years	Oral amoxicillin		
	9-12 years	Oral doxycycline	Oral amoxicillin	
	>12 years	Oral doxycycline	Oral amoxicillin	
<i>Treat for 21 days</i>				
CNS involvement	< 9 years	IV ceftriaxone		
	9-12 years	IV ceftriaxone	Oral doxycycline	
	>12 years	IV ceftriaxone	Oral doxycycline	
<i>Treat for 21 days</i>				
Lyme arthritis or acrodermatitis chronica atrophicans	< 9 years	Oral amoxicillin	IV ceftriaxone	
	9-12 years	Oral doxycycline	Oral amoxicillin	IV ceftriaxone
	>12 years	Oral doxycycline	Oral amoxicillin	IV ceftriaxone
<i>Treat for 28 days</i>				
Lyme carditis (haemodynamically stable)	< 9 years	IV ceftriaxone		
	9-12 years	Oral doxycycline	IV ceftriaxone	
	>12 years	Oral doxycycline	IV ceftriaxone	
<i>Treat for 21 days</i>				
Lyme carditis (haemodynamically unstable)	< 9 years	IV ceftriaxone		
	9-12 years	IV ceftriaxone	Oral doxycycline	
	>12 years	IV ceftriaxone		
<i>Treat for 21 days</i>				

Dosing information

Drug	Dose
Oral Amoxicillin	Body weight ≤ 33kg: 30mg/kg TDS Body weight 34kg+ : 1g TDS
Oral Azithromycin	Body weight ≤ 51kg: 10mg/kg OD Body weight 51kg+ : 500mg OD
Oral Doxycycline	Body weight ≤ 45kg: 2.5mg/kg BD on Day 1, then OD to continue <i>In severe infection use 2.5mg/kg BD for entire course of treatment</i> Body weight 45kg+ : 100mg BD or 200mg OD <i>If CNS involvement DOUBLE the dose</i>
IV Ceftriaxone	Body weight ≤ 50kg: 80mg/kg (max 2g) ONCE each DAY <i>If CNS involvement give 80mg/kg (max 4g)</i> Body weight 50kg+ : 2g ONCE each DAY <i>If CNS involvement give 2g TWICE each DAY</i>