

In the Lymelight:

Rash in a returned traveller

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CASE

A woman aged 73 years presented to a general practice with a persistent rash on her right upper lateral arm, which developed 8 weeks ago during a visit to Germany. The rash was itchy, erythematous (Figure 1) and discoid with a diameter of approximately 15 cm. She also had pain in the right arm and shoulder, but there was no regional lymphadenopathy.

The patient had no recollection of a tick bite, although she had been sitting in grass in Berlin. The rash appeared later and she felt mildly unwell with fatigue later. She was initially offered antibiotics in Europe that she did not take, and then oral antihistamines and a topical steroid that did not help. Only ice relieved the symptoms. The rash was slowly improving over time.

On returning to Australia, the patient suggested it might be Lyme disease, prompting serological testing.¹

QUESTION 1

What are potential differentials for her rash?

QUESTION 2

Which global regions is Lyme disease endemic to?

QUESTION 3

What is the pathophysiology of Lyme disease?

QUESTION 4

What are features of early localised Lyme disease?

QUESTION 5

What are the features of early disseminated Lyme disease?

ANSWER 1

Differentials to consider for an itchy discoid rash include:²

- Cellulitis
- Shingles
- Discoid eczema
- Plaque psoriasis
- Insect (such as mosquito) bite reaction
- Tinea corporis
- Erythema multiforme
- Erythema annulare centrifugum
- Erythema migrans due to *Borrelia* bacteria transmission from tick bite.

ANSWER 2

Regions with endemic Lyme disease are presented in Table 1.³ There is controversy in Australia regarding the existence of locally acquired Lyme disease. The Australian government asserts that the bacteria *Borrelia* is not found in Australian ticks, which was supported by the findings of

a 2016 Senate inquiry.⁴ However, many individuals in Australia attribute symptoms consistent with Lyme disease to local tick bites. The government acknowledges the existence of these illnesses, calling it DSCATT (Debilitating Symptom Complexes Attributed to Ticks).



Figure 1. Erythematous rash on the right upper lateral arm of a woman aged 73 years – the two papules are pre-existing skin lesions, though their appearance was more evident than usual with the rash.

Table 1. Regions where Lyme disease is endemic³

Europe	• Highest cases in central Europe (Czech Republic, Estonia, Lithuania, Slovenia, Austria, Germany, Switzerland, and the Netherlands) • North-eastern Europe • Increasing cases in western Europe
Northern America	• US – north-eastern parts • Canada
Asia	• Western Russia • Japan • Mongolia • China • Korea • Taiwan

ANSWER 3

Lyme disease is caused by the bacteria *Borrelia*, of which there are several subtypes such as *B. burgdorferi sensu stricto*, *B. afzelii* and *B. garinii*, that are transmitted through the bite of the *Ixodes* species of tick. The bacteria spread locally, causing erythema migrans,⁵ and then disseminate to other tissues, including the nervous system, heart, and joints.¹ *Borrelia* evades the immune system through antigenic variation and immune suppression, potentially leading to chronic infection and complications if untreated.⁶

ANSWER 4

The clinical manifestations of Lyme disease can vary depending on whether infection occurred in Europe or North America. These features are generally divided into three phases: early localised, early disseminated and late disease.¹ Early localised Lyme disease occurs within 3–30 days of a tick bite.¹

The key finding is erythema migrans, that has a targetoid appearance: a red expanding outer ring with a central clearing.⁷ This is known as ‘bullseye’ appearance, and it occurs at the site of the tick bite in most cases.⁵

Other initial symptoms of Lyme disease are similar to a nonspecific viral illness and often include fatigue, fever, myalgia, arthralgia, headache and regional lymphadenopathy (near the rash or bite site). Borrelial lymphocytoma is a rare cutaneous manifestation, typically presenting as a small, single bluish-red swelling, often located near the nipple in adults.¹ Following this initial stage, the bacteria may disseminate

systemically via the lymphatic system or blood.¹

ANSWER 5

Features of early disseminated Lyme disease (usually occurs weeks to several months after tick bite) include:

- Arthritis – intermittent or persistent arthritis in a few large joints, especially the knee⁸
- Neurological – meningitis, cranial neuropathy, and motor or sensory radiculoneuropathy⁶
- Cardiac – atrioventricular block, pericarditis¹
- Ocular – keratitis, optic neuritis⁹
- Cutaneous – multiple erythema migrans (multiple erythema migrans equates to disseminated disease, not multiple tick bites).⁵

CASE CONTINUED

The serological diagnosis of Lyme disease was made because of a positive IgG immunoassay, that is then confirmed with a positive specific immunoblot test, taking into account the clinical findings and timeline.¹⁰ Testing for Lyme disease should be performed in a laboratory accredited for Lyme disease testing.¹¹

A full physical examination was done to check for neurological, cardiac and ocular abnormalities and in this case was normal. An electrocardiogram (ECG) was performed to rule out cardiac anomalies and was also normal.

The patient had visited her daughter in Berlin at the onset of her illness and subsequently reported her daughter had also been diagnosed with Lyme disease.

QUESTION 6

How is this condition treated?

QUESTION 7

What are the late complications of Lyme disease?

QUESTION 8

How can infection be prevented?

ANSWER 6

For early localised Lyme disease, oral treatment with doxycycline 100 mg bd for 10 days is highly effective.¹ Alternatives include amoxicillin and cefuroxime.⁶

ANSWER 7

In late Lyme disease (occurring months to a few years after tick bite), complications can include:

- Arthritis – intermittent or persistent arthritis in a few large joints, especially the knee⁸
- Neuropathy/encephalopathy⁶
- Acrodermatitis chronica atrophicans (chronic skin condition in Lyme disease, causing thinning and atrophy)⁶ – only caused by *B. afzelii* infection.

ANSWER 8

Preventive measures for Lyme disease should be considered for travel in endemic regions (Table 1). Unfortunately, there is no vaccine available. Appropriate precautions include:¹²

- Wearing suitable clothing and using DEET insect repellent to deter ticks¹²
- Long sleeves and trousers, pale coloured so that ticks are more readily spotted
- Inspecting the skin for ticks after exposure and promptly removing them¹²
- In Australia, ticks should not be removed but should be killed in situ by freezing with ether-containing sprays or dabbing with permethrin cream – this is because of the risk of allergic reaction to the Australian paralysis tick.¹³ The tick should then be left to drop off.
- Overseas, removal of ticks can be done with tweezers (ideally fine-tipped) placed

as close to the skin surface as possible.

A steady even pressure should be used to pull the tick away from the skin, avoiding twisting or jerking. If mouthparts remain, attempt to remove; if not possible, leave these be.¹⁴

- If bitten, doxycycline may be taken as prophylaxis if the bite is classified as high-risk.¹²
- High-risk if tick species was identified as *Ixodes*, bite occurred in highly endemic area and tick was attached for greater than 36 hours.¹²

CASE CONTINUED

The patient was given doxycycline for 21 days because of persisting pain in the arm and shoulder. The rash resolved rapidly on treatment and the patient made a full recovery. There was a faint residual rash of livedo reticularis at the site of the initial erythema migrans on the arm.

Lyme disease is not notifiable in Australia.

Key points

- Consider tick bite as a potential cause of persistent rash and myalgia/arthralgia in returned travellers from endemic regions.
- Lyme disease is endemic to regions of Europe, Northern America and Asia.
- The treatment for early localised Lyme disease is 10 days of doxycycline 100 mg bd.

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