

BACKGROUND

Lyme disease is a bacterial infection caused by the spirochete *Borrelia burgdorferi* (*B. burgdorferi*) and was first recognised in the United States in 1975, after a mysterious outbreak of arthritis near Lyme, Connecticut.

For Lyme disease to exist in an area, at least three closely interrelated elements must be present in nature:

- the Lyme disease bacteria,
- the ticks that transmit them, and
- wildlife to provide a blood meal for the ticks in their various life stages.

The disease is spread by the bite of ticks of the genus *Ixodes* that are infected with *B. burgdorferi* and the sheep tick *Ixodes ricinus* (*I. ricinus*) is the most common vector in Europe. This tick has a widespread distribution in the UK and feeds naturally on wild animals (including deer) and birds.

These ticks require 2 to 3 years to complete their life cycle (larva, nymph and adult). At the larval and nymph stages of the lifecycle the tick feeds on an animal then completes its development on the ground. The female adult then feeds while breeding.

Tick larvae feed on small mammals and birds. The nymph and adult *Ixodes* ticks will feed on larger mammals such as sheep, deer, horses or humans. The bacterium can survive within the tick between the different stages of the tick's life and a new host is infected when the tick next feeds.

Ticks that transmit Lyme disease can be found in temperate regions that may have periods of very low or high temperature and a constant high relative humidity at ground level. *I. ricinus* ticks may be found in forested areas, heath and moorland, where animal hosts are plentiful.

The effect of infection in animals is poorly understood as there is little evidence of illness in infected wildlife. Domestic animals however can become infected with Lyme disease bacteria and some of these (dogs for instance) may develop arthritis. Domestic animals can carry infected ticks into areas where humans live, but whether pet owners are more likely than others to acquire Lyme disease is unknown.

Cases have been reported throughout North America, Europe and Asia. The numbers of cases occurring in Scotland are low, with on average, as of November 2005 there are 70 - 80 laboratory confirmed cases reported annually to HPS, although this number is probably an underestimate of the true incidence.

Environmental control of ticks over widespread areas is difficult, and it is therefore essential when visiting known tick areas to adopt precautionary measures to reduce the risk of exposure to tick bites.

HEALTH RISKS

As with other spirochetal infections, Lyme borreliosis generally occurs in stages, with remissions and exacerbations and different clinical manifestations at each stage.

The infection is transmissible by certain Ixodid ticks often associated with deer and wild rodents. There is no evidence of natural transmission from person to person, although there have been rare cases linked to congenital transmission.

Humans acquire Lyme disease from infective nymphs, usually in the late spring and early summer, and from adult ticks, which feed mostly in the autumn and winter, but also in early spring. The tick is not able to transmit the disease until having fed for several hours.

Ticks can attach to any part of the human body but often wander until they find moisture in more hidden and hairy areas such as the groin, armpits and scalp. After exposure to the tick the incubation period for the first stages of the disease is 3 to 32 days but is usually 7 to 15 days. The early stages of disease can be asymptomatic, and the patient can present with later more systemic manifestations of the illness. Later stages of Lyme disease are often difficult to diagnose because its symptoms are similar to those of many other diseases (i.e. joint and nerve problems).

Although in theory Lyme disease could spread through blood transfusions or other contact with infected blood or urine, no such transmission has been documented. There is no evidence that a person can get Lyme disease from the air, food or water, from sexual contact, or directly from wild or domestic animals. There is no convincing evidence, that Lyme disease can be transmitted by insects such as mosquitoes, flies etc.

The illness typically begins (stage 1) with the characteristic expanding skin lesion, called erythema chronicum migrans (ECM) that occurs around the site of the tick bite. These lesions can be very large – the size of a dinner plate or more. The lesions rarely are accompanied by one or more of the following symptoms – malaise, fatigue, headache, stiff neck, myalgia, migratory arthralgias or lymphadenopathy possibly lasting several weeks in untreated patients.

Within weeks to months (stage 2), the spirochete may spread to many other sites, particularly the nervous system (e.g. nerve pains, facial palsy or rarely meningitis), joints (e.g. arthralgia and mono-arthritis), heart or other skin sites. Symptoms fluctuate and may last for months or may become chronic.

Weeks to years after onset (stage 3), swelling and pain in large joints may develop and recur for several years. In an individual patient, however, the infection is highly variable, ranging from brief involvement in only one system to chronic, multi-system involvement of the skin, nerves, and joints for a period of years.

Infection can be treated effectively by early administration of antibiotics orally, except for objective joint and neurological abnormalities, which may respond to intravenous therapy.

Those considered at greater risk of contracting Lyme disease include the occupational groups of farmers and forestry workers, along with those who participate in recreational activities such as hill walking and camping etc. Serological studies of these groups have shown evidence of past infection in 10-15%.

LEGISLATIVE POSITION

- Lyme disease is a Notifiable Disease and as such is covered by The Public Health (Notification of Infectious Diseases) (Scotland) Regulations 1988/89.
- Employers have a responsibility under Sections 2 and 3 of the Health & Safety at Work etc Act 1974 and in particular, responsibility in relation to The Management of Health & Safety at Work Regulations 1999 (SI 1999 No. 3242).
- Occupiers of land could be liable in terms of section 79(1) of the Environmental protection Act 1990 and in terms of Section 2 of the Occupiers Liability (Scotland) Act 1960.

PRINCIPLES OF GOOD PRACTICE**Occupational Groups at Risk**

- Occupational groups that come into contact with deer or work in woodland or on moorland are at risk. This includes farmers and forestry workers.
- Where there is any possibility of exposure, workers require to be made aware of possible risks and protective measures to reduce risks.

Protective measures include:

- Exposed skin requires to be kept to a minimum. Long trousers should be tucked into socks, together with long sleeves fastened at the cuffs and closed shoes. Insect repellents can be used on outer clothing to prevent ticks attaching.
- Walk in the centre of paths in order to avoid overhanging grass, bushes and undergrowth.
- Clothing and skin should be checked for the presence of ticks when working in a tick-infested area. Outer clothing should be changed before going home to prevent transmission to household members.
- The body should be checked thoroughly and any attached ticks carefully removed. Ticks should be removed by tugging gently but firmly with blunt tweezers near the head of the tick until it releases its hold on the skin. To lessen the chance of contact with the bacterium, try not to crush the tick's body or handle the tick with bare fingers. Swab the area thoroughly with an antiseptic to prevent bacterial infection.
- If a bite remains inflamed, the rash around it starts to spread or if any subsequent illness occurs, medical advice should be sought and the occupational health specialist or GP informed of the tick bite.
- Pets should be checked for ticks. Insect repellent collars may reduce the likelihood of tick bites.

Members of the public at risk:

Members of the public who participate in outdoor activities such as hill walking and camping etc should be made aware of possible risks and appropriate measures to adopt to reduce these risks.

Protective measures include:

- Tick-infested areas should be avoided, especially in May, June and July, or particular attention should be paid to reducing the likelihood of tick bites e.g. using established pathways.
- As highlighted for occupational groups, members of the public should keep exposed skin to a minimum. Long trousers should be tucked into socks, together with long sleeves fastened at the cuffs and closed shoes. Insect repellents can be used on outer clothing to prevent ticks attaching.
- If houses are located in known tick infested areas consideration should be given to clearing long grass, bushes and undergrowth around the house and the perimeter of the garden, as this will reduce the numbers of ticks in close locality.
- Clothing and skin should be checked for ticks when in a tick-infested area. Remove carefully any attached ticks to the skin. Ticks should be removed by tugging gently but firmly with blunt tweezers near the head of the tick until it releases its hold on the skin. To lessen the chance of contact with the bacterium, try not to crush the tick's body or handle the tick with bare fingers. Swab the area thoroughly with an antiseptic to prevent bacterial infection.
- If a bite remains inflamed or if any subsequent illness occurs medical advice should be sought and the GP informed of the tick bite.
- Pets should be checked for ticks. Insect repellent collars may reduce the likelihood of tick bites.

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