Lyme disease in Canada

Lyme disease was first recognized in 1975 in Lyme, Connecticut.[1] The disease, caused by the spirochete *Borrelia burgdorferi*, which was first identified in 1982, is usually transmitted to humans by infected ticks, although in endemic areas biting flies and mosquitoes have been implicated.[2] The most important vector is the deer tick, *Ixodes dammini*. Ticks also infect numerous types of domestic animals and other wild animals, so that there is wide geographic spread of the microorganism and worldwide distribution of the disease.

In Canada several species of ticks capable of transmitting *B. burgdorferi* have been identified, and in several instances ticks have been found to be infected with the organism (Table I). The first cases of the disease in domestic animals in Canada were diagnosed in two horses in southeastern British Columbia just after the 1987 spring tick season.[8]

The infection is acquired during the warm months, May to August, when ticks are active and outdoor activities such as camping, fishing and hiking are at their peak. In areas known to be endemic for Lyme disease the following preventive measures can be taken: wear clothing that provides adequate body coverage; periodically check clothing and exposed body surfaces of both humans and pets for ticks; and immediately carefully remove any ticks that are found.

In 75% of cases early signs and symptoms include a slowly expanding red rash, erythema chronicum migrans (ECM), around the bite.[9] Later symptoms in untreated cases involve the heart, nervous system or joints. Any combination of the following five features can contribute to the diagnosis: history of a tick bite; geographic exposure history; ECM; cardiac, neurologic or joint symptoms; and serologic status. Not all these features need be present in every case. For example, a recent Connecticut study found that 79% of the patients with joint symptoms had not reported antecedent ECM, and only 61% of those with ECM had been aware of a tick bite within 30 days before the onset of the rash.[10]

Tetracycline, given orally, is recommended for patients with early manifestations; penicillin and erythromycin are also effective. Children and pregnant women should be treated with penicillin. Transplacental transmission of *B. burgdorferi* has been documented and may be associated with an increased risk of an adverse outcome of pregnancy.[11] Penicillin is also recommended for the treatment of established arthritis.[11]

Thirteen cases of Lyme disease in humans

Table I — Distribution of ticks in Canada known to be capable of transmitting *Borrelia burgdorferi*

Tick (and size*)	Animal host	Location†
Ixodes dammini (0.5–2.7 mm)[3]	Mice and deer	Long Point (Lake Erie), Ont.[6]
	Not known‡	Summerside, PEI§
Ixodes pacificus (0.3–2.6 mm)[4]	Many wild and domestic animals	Southern British Columbia[4]
Dermacentor variabilis (0.6–5.2 mm)[5]	Many wild and domestic animals	Southern Manitoba[4] and Ontario,[4,6] southeastern Saskatchewan[4] and southwestern Nova Scotia[4,7]

*In unengorged state. The sizes vary for larvae, nymphs, and adult males and females.
†*Ixodes dammini* and *Dermacentor variabilis* specimens from Long Point only were found to be infected with *B. burgdorferi*.
‡One tick was removed from a 14-year-old boy who remained asymptomatic.
§The information from this area was acquired through personal communication.

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were diagnosed in Canada between 1977 and 1987. Of the seven indigenous cases five were acquired in Ontario (in Chatham,[12] Dryden, Huntsville,[13] Long Point [Lake Erie] and Thunder Bay), and one was acquired in Pigeon Lake, Alta.;[14] these six cases occurred in Canadian residents. The other indigenous case was acquired in Chicoutimi, PQ, by a visitor from France.[15] The remaining six cases were acquired outside the country (four in the United States and one each in Germany[16] and Yugoslavia). (The information about several cases was acquired through personal communication.) The disease is not reportable in any province. Most of the indigenous cases were confirmed serologically by either indirect immunofluorescence antibody (IFA) testing or enzyme-linked immunosorbent assay (ELISA).

The laboratory tests currently used to diagnose Lyme disease (i.e., IFA testing and ELISA) have low sensitivity, especially in the early stage of the disease[10,11] and in cases in which antibiotic treatment was given early in the course of the illness.[10] In addition, the specificity of these tests is variable,[10] seropositivity having frequently been reported for asymptomatic people.[17] Consequently, in all cases clinical information is essential in the evaluation of laboratory results. Furthermore, because of the limitations of the serologic testing, laboratory reports alone cannot be used for routine surveillance. However, because the clinical signs of the disease are nonspecific, serologic testing is particularly useful in confirming clinically compatible cases in areas in which Lyme disease is not known to be endemic. Isolation of the organism is also possible but is not routinely performed.

Serologic testing for evidence of Lyme disease is still not common in Canada. However, as awareness of the disease increases, greater demand by physicians for laboratory assistance in diagnosis can be expected. Evidence of such a trend has already been noted at the Laboratory Services Branch of the Ontario Ministry of Health, Toronto, where the number of specimens submitted for serologic testing rose from 7 in 1985 and 12 in 1986 to 56 in 1987 (Dr. Robert Notenboom: personal communication, 1988). The 1985 and 1986 specimens were all seronegative, but 5 (9%) of the 1987 specimens were seropositive. In contrast, in 1986 in Connecticut, an area known to be endemic, the seropositivity rate was 24% in 5175 submitted specimens.[10]

Some provinces have expressed interest in identifying endemic areas and in conducting serologic studies on people living in those areas. Such studies would improve our understanding of the ecologic and clinical aspects of Lyme disease in Canada as well as provide an estimate of the disease's prevalence.

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