

Missouri Lyme Disease: 1989 through 1992

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The existence and characteristics of Lyme disease in Missouri are being discussed. Centers for Disease Control (CDC) surveillance criteria are being used and symptom patterns of cases reported nationally and in Missouri are compared. The results show that Missouri Lyme disease is consistent with a true borreliosis.

Key words: Lyme disease, Signs and Symptoms, Surveillance Definition

BACKGROUND

With increasing frequency, physicians in Missouri have diagnosed and reported cases of Lyme disease that have met the rigorous Centers for Disease Control (CDC) surveillance criteria. Missouri had previously been considered a nonendemic state, and there has been some controversy over whether or not these cases represent a true borreliosis.

METHODS

To address this issue, we analyzed data from all cases of Lyme disease reported to the Missouri Department of Health from 1989 through 1992 that were confirmed as meeting the CDC surveillance case definition. These data were then compared to the 1990 national Lyme disease statistics reported by the CDC at the Fifth International Conference on Lyme Borreliosis in 1992 (1).

All physician-diagnosed cases of Lyme disease in Missouri from 1989 through 1992 that met CDC's surveillance criteria were analyzed according to signs and symptoms and compared with national reporting data. Additionally, photographs of physician-diagnosed erythema migrans in Missouri were collected and presented for comparison.

RESULTS

The confirmed Lyme cases from 1989 through 1992 were separated according to the presence of the following signs or symptoms: erythema migrans, arthritis, Bell's palsy, radiculoneuropathy, encephalitis or meningitis, and second or third degree heart block.

Missouri cases were compared to national cases with regard to the distribution of signs and symptoms in the two groups (Table 1).

In a total of 672 Missouri Lyme disease cases from 1989 through 1992 that met CDC's surveillance criteria, signs and symptoms occurred in the following percentages: erythema migrans 50.9%; arthritis 64.7%; Bell's palsy 4.9%; encephalitis or meningitis 1.49%; second or third degree heart block 1.33%; and radiculoneuropathy 4.46%.

DISCUSSION

The 672 Missouri Lyme disease cases were broken down into signs and symptoms and compared by percentage to the 4966 national cases in 1990. Both the Missouri and the national groups met the CDC surveillance case definition. In four of the five categories, i.e., arthritis, Bell's palsy,

encephalitis or meningitis, and second or third degree heart block, the Missouri experience as a percent of total cases exceeded the 1990 national percent data. In all but the arthritis category, the results were strikingly similar.

There is speculation that many Missouri physicians do not report Lyme disease unless there is overt arthritis. Although more than the 30.5% 1990 national figure, Missouri arthritis percentages are strikingly similar to the 60% arthritis figure given by Steere et al. (2, 3).

In effect, reports made in a single year are an accumulation of cases that have developed over several years. The true ratio of acute versus chronic cases may change in a specific year if previous to that year the diagnosis and treatment of that disease did not exist. This phenomenon might skew the relative percentages of signs, making a chronic sign like arthritis, for instance, appear far more common and an acute sign like erythema migrans appear less common. It could be argued that because physicians in Missouri were unaware of Lyme disease until recently, present reporting does not accurately reflect the typical distribution of acute and chronic cases.

CONCLUSION

We conclude that Lyme disease reported in Missouri is similar in terms of signs and symptoms to Lyme disease reported nationally and is consistent with a borreliosis. The geographic distribution of Lyme disease in the United States has been both changing and controversial. Oliver et al. (4) challenges previous geographic restrictions based upon the presence of the *Ixodes (I.) dammini* deer tick species by demonstrating that *I. dammini* is not a separate tick species but is the same as *I. scapularis*, which is prevalent in Missouri. *Borrelia (B.) burgdorferi* has been isolated in Oklahoma (5,6), Georgia (7), Florida (7), and Texas (8). Spirochetes morphologically consistent with *B. burgdorferi* and which stain variably with monoclonal antibodies for *B. burgdorferi* have been observed in Missouri ticks by one of the authors and other researchers (9-12). Additionally, pictures of Missouri erythema migrans cases have been published (13).

We conclude that Lyme disease reported in Missouri is similar in terms of signs and symptoms to Lyme disease reported nationally.

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TABLE 1
Missouri and National Lyme Disease Compared by Signs and Symptoms (Cases Confirmed as Meeting CDC Surveillance Criteria)
1989 through 1992

	Missouri 1989 through 1992		1990 National		1990 National Excluding Missouri Cases	
	Total Cases	% of Total	Total Cases	% of Total	Total Cases	% of Total
Total cases confirmed CSTE/CDC	672	100	5171	100	4966	100
Erythema migrans	342	50.9	3736	72.2	3632	73.1
Arthritis	435	64.7	1657	32	1515	30.5
Bell's palsy	33	4.91	200	3.9	193	3.9
Encephalitis or meningitis	10	1.49	50	0.97	47	0.95
Second or third degree heart block	9	1.33	25	0.48	25	0.50
Radiculoneuropathy	30	4.46	No data		No data	

REFERENCES

1. Paul WS, Craven RB, Campbell GL, Dennis DT. Epidemiology of Lyme disease in the United States, 1990. Abstract #343. V Int. Conf. on Lyme Borreliosis. Arlington, Virginia, 1992.
2. Steere AC. Lyme disease. NEJM. 321:586-595, 1989.
3. Steere AC, Schoen RT, Taylor E. The clinical evolution of Lyme arthritis. Ann. Intern. Med. 107:725-731, 1987.
4. Oliver JH, Owsley MR, Hutcheson JH, James AM, Chen C, Irby WS, Dotson EM, McLain DK. Conspecificity of the ticks *I. scapularis* and *I. dammini* (Acari: Ixodidae). J. Med. Entomol. 30(1):54-63, 1993.
5. Kocan AA, Mukolwe W, Murphy RW, et al. Isolation of *Borrelia burgdorferi* (Spirochaetales: Spirochaetaceae) from *Ixodes scapularis* and *Dermacentor albipictus* Ticks (Acari: Ixodidae) in Oklahoma. J. Med. Entomol. 29(4):630-633, 1992.
6. Kocan AA, Mukolwe SW, Barker RW, et al. Lyme disease in Oklahoma: An ecological approach to determining wildlife reservoirs and potential vectors [abstract 281]. Program and Abstracts of the V Int. Conf. on Lyme Borreliosis, Arlington, VA, 1992.
7. Oliver JH, Chandler, Luttrell P, James AM, McGuire BS, Stallknecht D. Isolation and transmission of the Lyme disease spirochete from the southeastern United States. Proc. Natl. Acad. Sci. 90:7371-7375, 1993.
8. Tetlow GJ, Fournier PV, Rawlings JA. Isolation of *Borrelia burgdorferi* from arthropods collected in Texas. Am. J. Trop. Med. Hyg. 44:469-474, 1991.
9. Feir D, Reppell C. *Borrelia burgdorferi* in Missouri. The Missouri Academy of Science Occasional Paper No. 8, 1990, pp. 12-18.
10. Li B-W, Feir D, Xie C-S, et al. Detection and molecular analysis of *Borrelia burgdorferi* in Missouri ticks by PCR [abstract 315]. Program and abstracts of the V Int. Conf. on Lyme Borreliosis. Arlington, VA, 1992.
11. Donnell HD. The enigma of Lyme disease in Missouri. MO Med. 89(10):714-716, 1992.
12. Fobbs M. Lyme disease in Missouri? MO Epidemiol. 15(2):8,9,23, 1993.
13. Masters EJ. Erythema migrans, rash as key to early diagnosis of Lyme disease. Postgrad. Med. 94(1):133-142, 1993.