as Preventable Disease
NEWS

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LYME BORRELIOSIS

Lyme disease is a multisystem disease caused by a spirochete, *Borrelia burgdorferi*. Lyme borreliosis is now considered the most prevalent tick-borne disease; cases occur worldwide. In the US, the disease has been reported by a majority of states, including Texas. However, 80% of these cases have been reported from the Northeastern part of the country.

In man, the risk of acquiring Lyme disease is associated with outdoor activity and arthropod exposure. Cases are reported year-round, with peaks in June and July. All age groups are affected.

B. burgdorferi is also capable of infecting a variety of wild animals. The white-footed mouse and white-tailed deer are the apparent reservoirs in the Eastern US. Among domestic animals, the disease is known to affect dogs, cats, horses, and cattle.

Disease Manifestations

Lyme borreliosis in man is characterized by a lesion referred to as erythema migrans, or EM. This begins as a red macule or papule which expands to form a large annular lesion with central clearing. It often is found at the site of a tick bite. However, current statistics show that 25% of adults and 50% of children do not develop EM. Some of these patients do experience maculopapular, petechial, or vesicular rashes. Accompanying symptoms include fever, chills, headache, stiff neck, arthralgias, myalgias, and extreme fatigue.

Lyme disease can be divided into three stages. Flu-like symptoms and EM represent stage I. During stage II, there may be neurologic abnormalities such as meningitis or encephalitis, cardiac complications (often described as palpitations), and continued migratory musculoskeletal pain. This stage lasts from three days to six weeks. Months to years later, the disease may progress to stage III. During this stage, the patient may exhibit central nervous system involvement (neuroborreliosis may be manifested as a progressive encephalomyelitis, a polyneuritis, or a latent or subclinical neurologic infection), a frank arthritis (especially of the large joints), or chronic dermatologic complications.

In dogs, the predominant symptoms appear to be fever, arthralgia, arthritis, and lameness. Cats seem to exhibit low-grade fever, locomotion problems, lethargy, stiffness, and, sometimes, neurologic manifestations. Symptoms in horses have included fever, arthritis, lameness, and encephalitis. Cows may experience fever, swollen joints, arthritis, and abortion.

Transmission

B. burgdorferi is transmitted by the bite of an infective tick. *Ixodes* species have been incriminated most often. The principle vector in Texas is not yet known, though the spirochete has been isolated from *Amblyomma*, *Dermacentor*, *Rhipicephalus*, and *Ixodes* tick species. The length of time of tick attachment before transmission of spirochetes varies. Presumably, this depends on whether the infective tick has a generalized infection or the organisms are confined to the tick midgut. Oral transmission via splashed urine from an infected animal has been

suggested as an alternate route of infection. Also, maternal transmission to an unborn child through the placenta has been documented. Intrauterine deaths, premature births, and delayed development have been documented. *B. burgdorferi* has been isolated from other arthropods such as fleas, mosquitoes, and deer flies. These are not thought to be effective biological vectors, although they may transmit the spirochete mechanically.

The known vectors of Lyme borreliosis have a three-host life cycle. Reservoir animals, especially small mammals, are involved in maintaining *B. burgdorferi* in nature. The spirochete can be passed transstadially and transovarially, but in the case of Lyme disease, transovarial transmission is not thought to be a very efficient method of maintenance. Birds can act as reservoirs and may be at least partially responsible for the dispersal of the organism throughout the US and other countries. Domestic animals serve to bring infective ticks into the home environment.

Diagnosis

It is best to rely on clinical presentation and epidemiologic information for the diagnosis of Lyme borreliosis. Serologic procedures--the indirect immunofluorescent antibody test (IFA) and enzyme immunoassay (EIA)--may be used in a confirmatory capacity, although both false-negative and false-positive results have been reported. During the acute illness, antibody production is often delayed for several weeks. Also, antibiotic therapy will abort the further manufacture of antibody to *B. burgdorferi*. Finally, cross reactions with other spirochetal infections may occur, resulting in a positive Lyme disease assay. Isolation of spirochetes from clinical specimens such as blood or skin lesions can serve as a method of definitive diagnosis.

Prevention and Control

In most cases, prevention of tick attachment will prevent Lyme borreliosis. This can be accomplished by wearing protective clothing, using repellents, regular inspections to remove unattached ticks, and deticking domestic pets.

Prepared by: Julie Rawlings, MPH, M(ASCP).

ADDITIONAL READING:

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LYME DISEASE, TEXAS, 1987

In 1987, a total of 102 possible Lyme disease cases was reported to the Epidemiology Division. A total of 33 patients met the definition for a confirmed case. A confirmed case is defined as a patient with erythema chronicum migrans or cardiac, neurologic, and/or rheumatologic abnormalities with an indirect fluorescent antibody test result >1:256 to *Borrelia burgdorferi*.

The 33 cases represent a 267% increase over the nine confirmed cases reported in 1986. Figure 1 shows the county of residence for the 33 cases in 1987. A majority (70%) of the cases resided in North-central Texas. Sporadic cases have also been identified throughout Texas.

Ninteen (58%) of the 33 cases were male. Cases ranged in age from 3 to 68 years, median 32 years. A majority of cases (91%) were white. Patients had onset of symptoms in each month except December. More than half had onset in April through July.

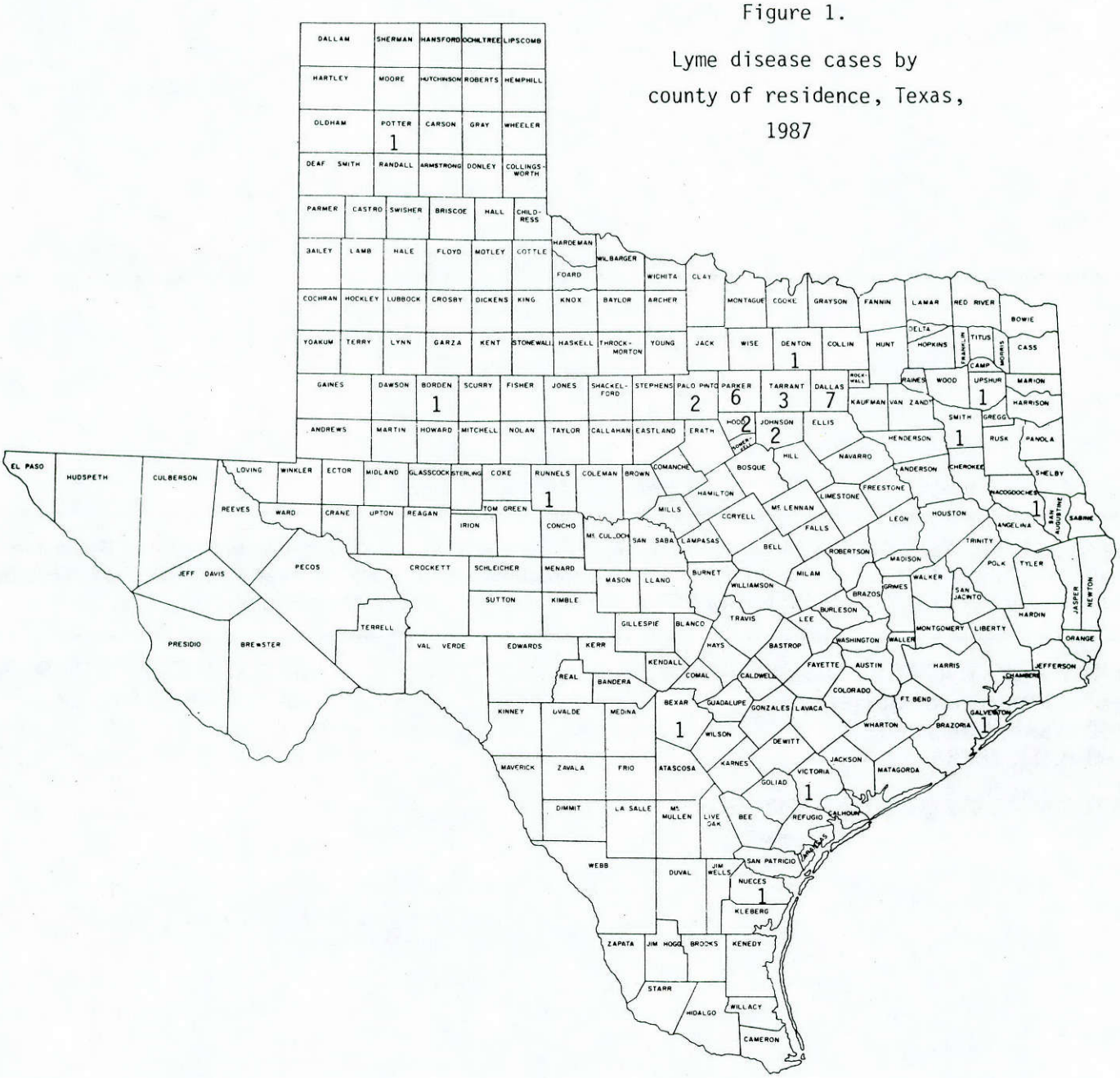
Twelve patients experienced at least one lesion described as EM. Eight patients had two or more lesions. The lesions ranged in size from 2 cm to 40 cm with a median of 4 cm and were usually present on the chest, arms, or legs. Twenty-one patients experienced rheumatologic abnormalities, and 18 experienced neurologic abnormalities. Cardiac abnormalities were reported for two patients. Concurrent neurologic and rheumatologic abnormalities were reported in 12 patients. Of the 21 patients with rheumatologic abnormalities, the elbows (62%) and knees (57%) were primarily involved. The most common neurologic symptoms were limb weakness, impaired memory, and increased irritability. Six patients experienced encephalitis or meningitis. Two patients experienced Bell's palsy. None of the patients died.

Eight patients recalled an attached tick before onset of symptoms; three patients recalled a flea bite.

Prepared by: Jeffery P. Taylor, MPH, Infectious Disease Program Director, Epidemiology Division, Texas Department of Health.

Figure 1.

Lyme disease cases by county of residence, Texas, 1987



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