

## PRACTICE PARAMETER: DIAGNOSIS OF PATIENTS WITH NERVOUS SYSTEM LYME BORRELIOSIS (LYME DISEASE)

### (Summary Statement)

Report of the Quality Standards Subcommittee of the American Academy of Neurology

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**Overview.** The Quality Standards Subcommittee (QSS) of the American Academy of Neurology (AAN) is charged with developing practice parameters for neurologists on clinical disorders, diagnostic procedures, and treatment modalities. The selection of topics is based on such factors as prevalence or frequency of use, potential for improving health outcomes and/or reducing variation in practice patterns, economic impact, and adequacy of scientific evidence. Although studies have appeared in the literature, the diagnosis of nervous system Lyme disease and subsequent treatment decisions remain difficult.<sup>1</sup>

**Justification.** The term "Lyme disease" was introduced in 1977 to describe a form of large joint oligoarthritis occurring in childhood following tick bites. Within a few years, the responsible tick-borne spirochete, *Borrelia burgdorferi*, was identified. Subsequent studies revealed Lyme borreliosis to be a multisystem infectious disease with prominent neurologic, cardiac, and dermatologic manifestations. Limitations in diagnostic technology result in confusion, because all readily available tests are indirect—that is, they indicate possible exposure to the causative organism, *Borrelia burgdorferi*, not active infection. This practice parameter describes the diagnostic testing available and outlines the clinical neurologic syndromes associated with Lyme disease. It is hoped that the neurologist will utilize this information to make appropriate decisions in the diagnosis and treatment of the patient with possible Lyme disease and to improve health care.

**Description of the process.** A Medline search from 1966 through May 1992 yielded 283 abstracts when the key words "Lyme disease," "Lyme borreliosis," "*Borrelia burgdorferi*," and "erythema migrans" were cross-referenced against "nerve," "nervous system," and "central nervous system." Careful review of the 283 abstracts and review of additional papers identified in other directed literature searches resulted in the identification of 39 relevant technical/scientific papers, 32 descriptive clinical papers, and 8 randomized, but not blinded, treatment trials. Seventy-nine papers were reviewed in detail; 59 were considered relevant to this paper. Draft documents were reviewed by the QSS of the AAN, a volunteer panel of practicing neurologists, and a number of other physician organizations.

**Conclusion.** Based on the literature review and expert opinion, the following recommendations are supported as **guidelines** (see definitions).

- I. Diagnosis of definite nervous system Lyme disease requires:
  - A. Possible exposure to appropriate ticks in an area where Lyme disease occurs
  - B. One or more of the following:
    1. Erythema migrans or histopathologically proven *Borrelia* lymphocytoma or acrodermatitis
    2. Immunologic evidence of exposure to *B. burgdorferi*
    3. Culture, histologic, or polymerase chain reaction (PCR) proof of the presence of *B. burgdorferi*
  - C. Occurrence of one or more of the neurologic disorders described below, after exclusion of other potential etiologies. Additional testing may be necessary. CSF analysis for cells, protein, and intrathecal production of specific antibody is indicated if CNS infection is suspected.
    1. Causally related neurological disease
      - a. Lymphocytic meningitis with or without cranial neuritis, painful radiculoneuritis, or both
      - b. Encephalomyelitis

- c. Peripheral neuropathy
  - 2. Causally related syndrome
    - a. Encephalopathy
- II. Causal relationship asserted but highly unlikely
- A. Multiple sclerosis
  - B. Amyotrophic lateral sclerosis
  - C. Dementia
- III. Based on a literature review and expert opinion, the following recommendations are supported as **options**.
- A. Localized disease is usually responsive to oral antimicrobial regimens (e.g., doxycycline or amoxicillin for 3 weeks).
  - B. CNS infection probably requires parenteral antimicrobial therapy (e.g., ceftriaxone or cefotaxime for 2 to 4 weeks), although limited data suggest oral regimens may be efficacious in acute meningitis.

#### Recommendations for future research

1. Development of a better understanding of the pathophysiology of *B. Burgdorferi*-related neurologic disease
2. Improvement of diagnostic technology
3. Outcome-based treatment studies

#### Definitions for classification of evidence

**Class I**—Evidence provided by one or more well-designed randomized, controlled clinical trials.

**Class II**—Evidence provided by one or more well-designed clinical studies such as case control and cohort studies.

**Class III**—Evidence provided by expert opinion, nonrandomized historical controls, or case reports of one or more.

#### Definitions for strength of recommendations

**Standards**—Generally accepted principles for patient management that reflect a high degree of clinical certainty (i.e., based on class I evidence, or, when circumstances preclude randomized clinical trials, overwhelming evidence from class II studies that directly addresses the question at hand, or from decision analysis that directly addresses all the issues).

**Guidelines**—Recommendations for patient management, which may identify a particular strategy or range of management strategies and reflect moderate clinical certainty (i.e., based on class II evidence or decision analysis that directly addresses the issue or strong consensus of class III evidence).

**Practice options/advisories**—Other strategies for patient management for which there is unclear clinical certainty (i.e., based on inconclusive or conflicting evidence or opinion).

**Practice parameters**—Results, in the form of one or more specific recommendations, from a scientifically based analysis of a specific clinical problem.

**Medical societies invited to comment on this practice parameter (\*indicates those who provided comment):**

IMCARE (Internal Medicine Center to Advance Research & Education)  
 American College of Rheumatology  
 American College of Physicians\*  
 American Academy of Family Physicians\*

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This statement is provided as an educational service of the American Academy of Neurology. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all of the circumstances involved.

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**Reference**

1. Halperin JJ, Logigian EL, Finkel MF, Pearl RA. Practice parameters for the diagnosis of patients with nervous system Lyme borreliosis (Lyme disease). *Neurology* 1996;46:619-627.

This statement is based on the background paper with complete bibliography written by Drs. John J. Halperin, Eric L. Logigian, Michael F. Finkel, and Richard A. Pearl (*Neurology* 1996;46:619-627). The background paper is available from the American Academy of Neurology upon request.

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