A Review of the Centers for Disease Control and Prevention's Guidelines for the Clinical Laboratory Diagnosis of Lyme Disease

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Abstract

Objective: The purpose of this paper is to review information regarding the current guidelines for the clinical laboratory diagnosis of Lyme disease as set forth by the Centers for Disease Control and Prevention (CDC) to chiropractic physicians and to discuss the clinical utility of this testing.

Methods: The CDC's website was reviewed to determine what their current recommendations are for the clinical laboratory testing of Lyme disease.

Results: The CDC's established guidelines recommend the use of a 2-tiered serologic testing algorithm for the evaluation of patients with suspected Lyme disease.

Conclusion: This review provides doctors of chiropractic with information to remain current with the CDC's recommended guidelines for Lyme disease testing because patients may present to their office with the associated signs and symptoms of Lyme disease. (J Chiropr Med 2016;xx:1-9)

Key Indexing Terms: *Lyme Disease; Borrelia burgdorferi; Centers for Disease Control and Prevention (US)*

Introduction

There are misconceptions regarding the clinical laboratory diagnosis of Lyme disease, and clinicians may not be aware of the established guidelines for testing. Because symptoms can be nonspecific, it can be difficult for clinicians to determine when it is appropriate to order Lyme disease testing. Inappropriate testing contributes to increased health care costs. It may also lead to misdiagnosis and cause the patient to be exposed to unnecessary antimicrobial treatment. To use and interpret a laboratory test correctly, the clinician must understand its limitations, its diagnostic sensitivity and specificity, and what the test is specifically measuring or detecting. Patients may seek treatment from a doctor of chiropractic for the joint pain, myalgias, and neurologic symptoms that often accompany Lyme disease. The purpose of this review is to provide a brief summary of Lyme disease, present the current laboratory test recommendations by the Centers for Disease Control and Prevention (CDC), describe the diagnostic sensitivity and specificity of laboratory tests, and provide interpretation of test results.

Methods

The CDC's website was reviewed to determine their current recommendations for the clinical laboratory testing of Lyme disease.

Results

The current testing algorithm recommended by the CDC involves 2-tiered serologic testing that detects immunoglobulins in serum against *B burgdorferi* (Fig 1).[1,2]

Discussion

Historical Review

In 1975, the Connecticut State Health Department was contacted regarding cases of 12 children in the community of Old Lyme who had arthritis that was initially diagnosed as juvenile rheumatoid arthritis. Steere et al first acknowledged "Lyme arthritis" as a separate disease process and

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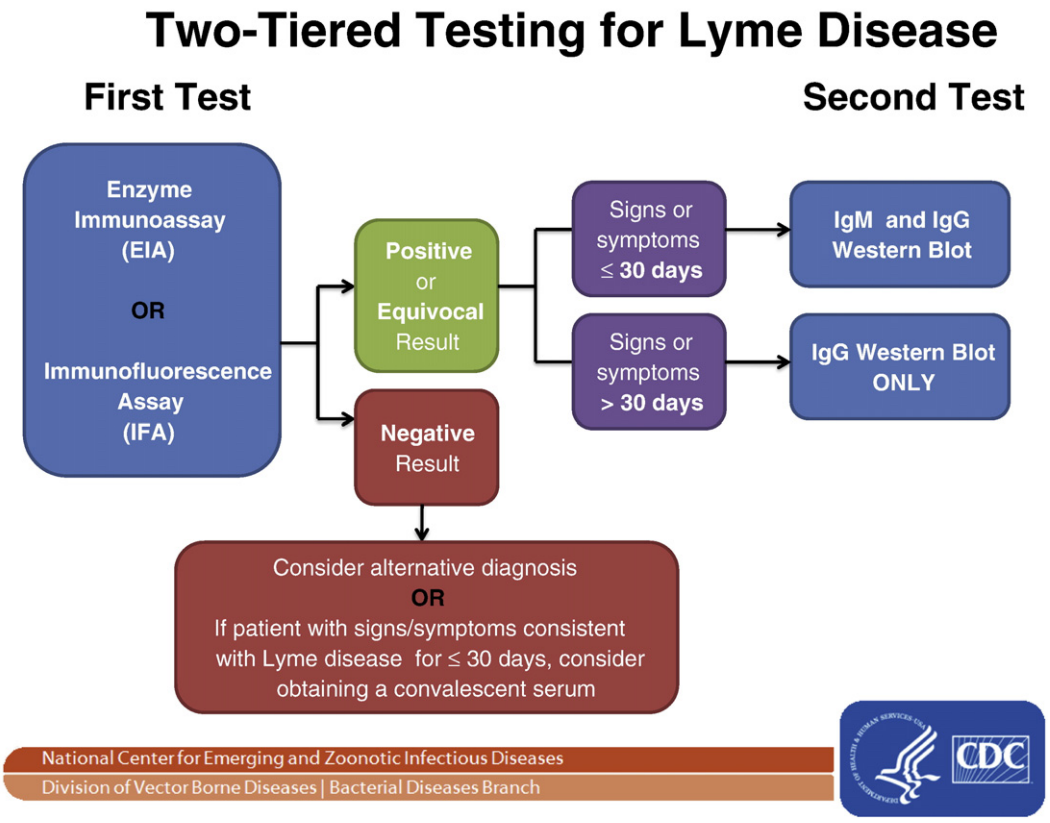

Fig 1. *Centers for Disease Control and Prevention (CDC) recommended laboratory testing algorithm for Lyme disease. (Image reproduced with permission from the CDC. Available from http://www.cdc.gov/lyme/healthcare/clinician_twotier.html.)*

Table 1. *Arthropod Vectors and Etiologic Agents by Geographic Area*[7]

Geography/Region	Vector	Agent [a]
Northeast, Mid-Atlantic, Upper Midwest	*Ixodes scapularis*, also known as the deer tick or black-legged tick	*Borrelia burgdorferi*
West Coast	*Ixodes pacificus*	*B burgdorferi*
Europe	*Ixodes ricinus*	*B afzelii, B garinii*
Asia	*Ixodes persulcatus*	*B afzelii, B garinii*

[a] Most common Lyme disease–causing species in these geographic areas; other borreliae have been identified as causing Lyme disease or a Lyme disease–like illness or have unknown pathogenicity.[37-39]

speculated that it was transmitted by an arthropod vector. They first described "Lyme arthritis" in published reports in 1977.[3]

Burgdorfer et al identified the etiologic agent in 1981.[4] He and his research team were able to isolate spirochetal bacteria from *Ixodes dammini (scapularis)* ticks gathered from an endemic area. These spirochetes reacted with immunoglobulins from patients recovering from Lyme disease.[4]

Epidemiology

Lyme disease, also known as Lyme borreliosis, is the most common tick-borne infection in North America.[5] It is caused by the bacterium *Borrelia burgdorferi*. The disease is endemic in the Northeast, mid-Atlantic, upper Midwest, and the West Coast in northern California and Oregon. The arthropod vector in the Northeast, mid-Atlantic, and upper Midwest is *Ixodes scapularis* (blacklegged or deer tick), and on the West Coast, *Ixodes pacificus*.[6] Lyme borreliosis is also endemic in Europe and Asia, although the arthropod vector and etiologic agents differ (Table 1).[7]

Standardized surveillance and reporting of Lyme disease began in 1991 after it became a nationally reportable disease.[5] From 1992 to 2006, the number of cases increased 101%, and 93% of the cases were from Connecticut, Delaware, Massachusetts, Maryland, Minnesota, New Jersey, New York, Pennsylvania, Rhode Island, and Wisconsin. The majority of the cases occurred in June, July, and August.[5]