MAYO CLINIC
Mayo Medical Laboratories

TEST ID: LNBAB

LYME CNS INFECTION IGG WITH ANTIBODY INDEX REFLEX

USEFUL FOR

Aid in the diagnosis of neuroinvasive Lyme disease or neuroborreliosis due to Borrelia species associated with Lyme disease (eg, *B burgdorferi*, *B garinii*, *B afzelli*)

CLINICAL INFORMATION

Lyme disease is a multisystem and multistage tick-transmitted infection caused by spirochetal bacteria in the Borrelia burgdorferi sensu lato (Bbsl) complex. Nearly all human infections are caused by 3 Bbsl species; *B burgdorferi* sensu stricto (hereafter referred to as *B burgdorferi*) is the primary cause of Lyme disease in North America, while *B afzelii* and *B garinii* are the primary causes of Lyme disease in Europe and parts of Asia.

Lyme disease is the most commonly reported tick-borne infection in North America and Europe, causing an estimated 300,000 cases in the United States each year and 85,000 cases in Europe. The clinical features of Lyme disease are broad and may be confused with various immune and inflammatory disorders. The classic presenting sign of early localized Lyme disease caused by *B burgdorferi* is erythema migrans (EM), which occurs in approximately 80% of individuals. Other early signs and symptoms include malaise, headache, fever, lymphadenopathy, and myalgia. Arthritis, cardiac disease, and neurological disease may be later stage manifestations.

Neuroinvasive Lyme disease (NLD) can affect either the peripheral or central nervous system, with patients classically presenting with the triad of lymphocytic meningitis, cranial neuropathy (especially facial nerve palsy) and radiculoneuritis, which can affect the motor or sensory nerves, or both. These symptoms can occur in any combination or alone. Some patients may present with Bannwarth syndrome, which includes painful radiculoneuritis with variable motor weakness.

NLD should be considered in individuals presenting with appropriate symptoms who have had exposure to ticks in a Lyme endemic region of the United States, Europe or Asia. Patients meeting these criteria should be evaluated for the presence of anti-Bbsl antibodies in serum using the standard 2-tiered testing algorithm as recommended by the Centers for Disease Control and Prevention (CDC). Briefly, the STTTA includes testing of serum specimens by an anti-Bbsl antibody ELISA, followed by supplemental testing of all reactive samples using an immunoblot or western blot for detection of IgM- and IgG- class antibodies to Bbsl. Notably, the majority of patients with NLD, more than 99%, will be seropositive in serum. This alongside appropriate exposure history and clinical presentation may be used to establish a diagnosis of NLD.

REFERENCE VALUES

Negative

ANALYTIC TIME

Same day/1 day

SPECIMEN REQUIRED

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Cerebrospinal fluid (CSF) may also be tested for the presence of antibodies to BbsI using the current 2-tiered testing algorithm as defined for serum samples. However, there are currently no interpretive criteria for assessment of anti-BbsI IgM and IgG immunoblot banding patterns in CSF. Additionally, while the presence of antibodies to BbsI in CSF may be due to true intrathecal antibody synthesis, thus indicating CNS infection, antibodies may alternatively be present as a result of passive diffusion through the blood-brain barrier or due to blood contamination of CSF during a traumatic lumbar puncture.

The Lyme CNS Antibody Index (AI) quantitatively measures the level of anti-BbsI antibodies in CSF and serum, ideally collected within 24 hours of each other, and normalizes those levels to total IgG and albumin in both specimen sources. A positive Lyme CNS AI indicates true intrathecal antibody synthesis of antibodies to BbsI, which alongside clinical and exposure history can be used to establish a diagnosis of NLD.

INTERPRETATION

Negative

No antibodies to Lyme disease causing Borrelia species detected in cerebrospinal fluid. A negative result in a patient with appropriate exposure history and symptoms consistent with neuroinvasive Lyme disease should not be used to exclude infection. Testing for antibodies to Lyme disease-causing Borrelia species in serum should be performed.

Reactive

Supplemental testing to determine a Lyme central nervous system antibody index has been ordered. Diagnosis of neuroinvasive Lyme disease should not be established solely based on a reactive screening result.

SPECIMEN REQUIRED

Both cerebrospinal fluid (CSF) and serum are required for this test. CSF and serum must be collected within 24 hours maximum of each other.

Specimen Type
Spinal Fluid

Collection Container/Tube
Sterile vial

Specimen Volume
1.5 mL

Specimen Type
Serum

Collection Container/Tube
Preferred: Serum gel
Acceptable: Red top

Specimen Volume
1.5 mL