MAYO CLINIC LABORATORIES

Test Definition: WNVCI

West Nile CSF Interpretation

Overview

Useful For

Aids in diagnosis of central nervous system infection with West Nile virus

Method Name

Only orderable as part of a profile. For more information see WNC / West Nile Virus Antibody, IgG and IgM, Spinal Fluid.

Enzyme-Linked Immunosorbent Assay (ELISA)

NY State Available

Yes

Specimen

Specimen Type

CSF

Specimen Required

Only orderable as part of a profile. For more information see WNC / West Nile Virus Antibody, IgG and IgM, Spinal Fluid.

Supplies: Sarstedt 5 mL Aliquot Tube (T914)
Collection Container/Tube: Sterile vial
Submission Container/Tube: Plastic, 5-mL aliquot tube (T914)
Specimen Volume: 1 mL

Specimen Minimum Volume

0.8 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
CSF	Refrigerated (preferred)	7 days	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

West Nile virus (WNV) is a mosquito-borne flavivirus (single-stranded RNA) that primarily infects birds but can also infect humans and horses. WNV was first isolated in 1937 from an infected person in the West Nile district of Uganda. Until the viral infection was recognized in 1999 in birds in New York City, WNV was found only in the Eastern Hemisphere, with wide distribution in Africa, Asia, the Middle East, and Europe.(1-3) Most recently, in 2012, a total of 5,674 cases of WNV were reported to the CDC, among which 2,873 (51%) were classified as neuroinvasive disease (eg, meningitis or encephalitis) and 286 (5%) cases resulted in death.(2)

Most people who are infected with WNV will not develop clinical signs of illness. It is estimated that about 20% of those who become infected will develop West Nile fever with mild symptoms, including fever, headache, myalgia, and occasionally a skin rash on the trunk of the body. Case fatality rates among patients hospitalized during recent outbreaks have ranged from 4% to 14%. Advanced age is the most important risk factor for death, and patients older than 70 years of age are at particularly high risk.(1)

Laboratory diagnosis is best achieved by demonstration of specific IgG and IgM class antibodies in serum specimens. PCR (LCWNV / West Nile Virus, Molecular Detection, PCR, Spinal Fluid) can detect WNV RNA in specimens from patients with recent WNV infection (ie, 3-5 days following infection) when specific antibodies to the virus are not yet present. However, the likelihood of detection is relatively low as the sensitivity of PCR detection is approximately 55% in cerebrospinal fluid and approximately 10% in blood, from patients with known WNV infection.

Reference Values

Only orderable as part of a profile. For more information see WNC / West Nile Virus Antibody, IgG and IgM, Spinal Fluid.

IgG: Negative
IgM: Negative
Reference values apply to all ages.

Interpretation

IgM:
A positive result is consistent with the acute phase of West Nile virus (WNV) meningitis or encephalitis. In the very early stages of acute WNV infection, IgM may be detectable in cerebrospinal fluid (CSF) before it becomes detectable in serum.

A negative result may indicate absence of disease. However, specimens drawn too early in the acute phase may be negative for IgM-class antibodies to WNV. If WNV central nervous system infection is suspected, a second specimen should be collected in 1 to 2 weeks and tested.

IgG:
A positive result may indicate recent or past central nervous system (CNS) infection with WNV. Clinical correlation is necessary.

This assay is unable to distinguish between intrathecal antibody synthesis and serum antibodies introduced into the CSF

at the time of lumbar puncture or from a breakdown in the blood-brain barrier. Positive results should be interpreted with other laboratory and clinical data prior to a diagnosis of CNS infection.

Cautions

Test results should be used in conjunction with clinical evaluation, exposure history and other available diagnostic procedures.

The significance of negative test results in immunosuppressed patients is uncertain.

False-negative results due to competition by high levels of IgG, while theoretically possible, have not been observed.

False-positive results may occur in patients infected with other flaviviruses, including dengue virus, St. Louis virus, and Zika virus and in persons previously infected with West Nile virus (WNV).

Because closely related arboviruses exhibit serologic cross-reactivity, it sometimes may be epidemiologically important to attempt to pinpoint the infecting virus by conducting plaque reduction neutralization tests (PRNTs) using an appropriate battery of closely related viruses. Such testing is available through the CDC and select public health laboratories.

WNV antibody results for cerebrospinal fluid (CSF) should be interpreted with caution. Complicating factors include low antibody levels found in CSF, passive transfer of antibody from blood, and contamination via a traumatic lumbar puncture.

Clinical Reference

1. Petersen LR, Marafin AA: West Nile Virus: a primer for the clinician. Ann Intern Med 2002;137:173-179
2. MMWR: West Nile Virus and Other Arboviral Diseases-United States, 2012. 2013;62(25):513-517
3. Brinton MA: The molecular biology of West Nile Virus: a new invader of the western hemisphere. Ann Rev Microbiol 2002;56:371-402
4. Centers for Disease Control and Prevention (CDC). Provisional Surveillance Summary of the West Nile Virus epidemic. United States, January-November 2002. MMWR Morb Mortal Wkly Rep 2002;51(50):1129-1133
5. Centers for Disease Control and Prevention (CDC). Investigations of West Nile Virus infections in recipients of blood transfusions. MMWR Morb Mortal Wkly Rep 2002;51(43):973-974

Performance

Method Description

IgG:
Polystyrene microwells are coated with recombinant West Nile virus (WNV) antigen. Diluted serum specimens and controls are incubated in the wells to allow specific antibody present in the specimens to react with the antigen. Nonspecific reactants are removed by washing, and peroxidase-conjugated antihuman IgG is added and reacts with specific IgG. Excess conjugate is removed by washing. Enzyme substrate and chromogen are added, and the color is allowed to develop. After adding the Stop reagent, the resultant color change is quantified by a spectrophotometric reading of optical density (OD). Specimen OD readings are compared with reference cutoff readings to determine results.(Package insert: Flavivirus [West Nile] ELISA IgG. Focus Technologies, Cypress, CA 10/16/2012)

IgM:
Polystyrene microwells are coated with the antihuman antibody specific for IgM (u-chain). Diluted serum specimens and controls are incubated in the wells, and IgM present in the specimen binds to the antihuman antibody (IgM specific) in the wells. Nonspecific reactants are removed by washing. WNV antigen is then added to the wells and incubated. If anti-WNV IgM is present in the specimen, the WNV antigen binds to the anti-WNV in the well. Unbound WNV antigen is then removed by washing the well. Mouse anti-flavivirus conjugated with horseradish peroxidase (HRPO) is then added to the wells and incubated. If WNV antigen has been retained in the well by the anti-flavivirus in the specimen, the mouse anti-flavivirus: HRPO binds to WNV antigen in the wells. Excess conjugate is removed by washing. Enzyme substrate and chromogen are added, and the color is allowed to develop. After adding the Stop reagent, the resultant color change is quantified by a spectrophotometric reading of OD that is directly proportional to the amount of antigen-specific IgM present in the specimen. Specimen OD readings are compared with reference cutoff OD readings to determine results.(Package insert: Flavivirus [West Nile] IgM Capture ELISA. Focus Technologies, Cypress CA 6/1/2015)

PDF Report
No

Day(s) Performed
Monday, Wednesday, Friday

Report Available
Same day/1 day

Performing Laboratory Location
Rochester

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
WNVCI	West Nile CSF Interpretation	69048-7

Result ID	Test Result Name	Result LOINC® Value

WNVCI	West Nile CSF Interpretation	69048-7