MAYO CLINIC LABORATORIES

Test Definition: ABOPC

Arbovirus Antibody Panel, IgG and IgM, Spinal Fluid

Overview

Useful For

Aiding in the diagnosis of arboviral encephalitis (California [LaCrosse], St. Louis, Eastern equine, and Western equine encephalitis)

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
CAVPC	Calif(LaCrosse) Encep Ab Panel, CSF	Yes	Yes
EEPC	East Equine Enceph Ab Panel, CSF	Yes	Yes
STLPC	St. Louis Enceph Ab Panel, CSF	Yes	Yes
WEEPC	West Equine Enceph Ab Panel, CSF	Yes	Yes

Testing Algorithm

The following algorithms are available:
-Meningitis/Encephalitis Panel Algorithm
-Mosquito-borne Disease Laboratory Testing

Special Instructions

- Meningitis/Encephalitis Panel Algorithm
- Mosquito-borne Disease Laboratory Testing

Method Name

Immunofluorescence Assay (IFA)

NY State Available

No

Specimen

Specimen Type

CSF

Ordering Guidance

This panel tests for 4 arboviruses; to test for a specific arbovirus, the following tests are individually orderable:
-CAVPC / California Virus (La Crosse) Encephalitis Antibody Panel, IgG and IgM, Spinal Fluid
-EEPC / Eastern Equine Encephalitis Antibody Panel, IgG and IgM, Spinal Fluid
-STLPC / St. Louis Encephalitis Antibody Panel, IgG and IgM, Spinal Fluid
-WEEPC / Western Equine Encephalitis Antibody Panel, IgG and IgM, Spinal Fluid

New York State clients: This test is not available for specimens originating in New York.

Specimen Required

Container/Tube: Sterile vial
Preferred: Vial number 1
Acceptable: Any vial
Specimen Volume: 0.7 mL

Forms

If not ordering electronically, complete, print, and send Infectious Disease Serology Test Request (T916) with the specimen.

Specimen Minimum Volume

0.7 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
CSF	Refrigerated (preferred)	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

California (LaCrosse) Virus:
California (LaCrosse) virus is a member of the *Bunyaviridae* family, and it is one of the arthropod-borne encephalitides. It is transmitted by various *Aedes* and *Culex* mosquitoes and is found in such intermediate hosts as the rabbit, squirrel, chipmunk, and field mouse. California meningoencephalitis is usually mild and occurs in late summer. Ninety percent of infections are seen in children younger than 15 years of age, usually from rural areas. The incubation period is estimated to be 7 days, and acute illness lasts 10 days or less in most instances. Typically, the first symptoms are nonspecific, lasting 1 to 3 days, and are followed by the appearance of central nervous system (CNS) signs and symptoms, such as

stiff neck, lethargy, and seizures, which usually abate within 1 week. Symptomatic infection is almost never recognized in those over 18 years old. The most important sequela of California virus encephalitis is epilepsy, which occurs in about 10% of children; almost always in patients who have had seizures during the acute illness. An estimated 2% of patients have persistent paresis. Learning disabilities or other objective cognitive deficits have been reported in a small proportion (2%) of patients. Learning performance and behavior of most recovered patients are not distinguishable from comparison groups in these same areas.

Eastern Equine Encephalitis:
Eastern equine encephalitis (EEE) is within the alphavirus group. It is a low-prevalence cause of human disease in the eastern and Gulf Coast states. EEE is maintained by a cycle of mosquito/wild bird transmission, peaking in the summer and early fall, when humans may become an adventitious host. The most common clinically apparent manifestation is a mild undifferentiated febrile illness, usually with headache. CNS involvement is demonstrated in only a minority of infected individuals and is more abrupt and more severe than with other arboviruses, with children being more susceptible to severe disease. Fatality rates are approximately 70%.

St. Louis Encephalitis:
Areas or outbreaks of St. Louis encephalitis (SLE) since 1933 have involved the western United States, Texas, the Ohio-Mississippi Valley, and Florida. The vector of transmission is the mosquito. Peak incidence occurs in summer and early autumn. Disease onset is characterized by generalized malaise, fever, chills, headache, drowsiness, nausea, and sore throat or cough, followed in 1 to 4 days by meningeal and neurologic signs. The severity of illness increases with advancing age; persons over 60 years have the highest frequency of encephalitis. Symptoms of irritability, sleeplessness, depression, memory loss, and headaches can last up to 3 years.

Western Equine Encephalitis:
The virus that causes Western equine encephalitis (WEE) is widely distributed throughout the United States and Canada; disease occurs almost exclusively in the western states and Canadian provinces. The relative absence of the disease in the eastern United States probably reflects a paucity of the vector mosquito species, *Culex tarsalis*, and possibly a lower pathogenicity of local virus strains. The disease usually begins suddenly with malaise, fever, and headache, often with nausea and vomiting. Vertigo, photophobia, sore throat, respiratory symptoms, abdominal pain, and myalgia are also common. Over a few days, the headache intensifies; drowsiness and restlessness may merge into a coma in severe cases. In infants and children, the onset may be more abrupt than for adults. WEE should be suspected in any case of febrile CNS disease from an endemic area. Infants are highly susceptible to CNS disease, with about 20% of cases in patients under 1 year of age. There is an excess of male patients with WEE clinical encephalitis, averaging about twice the number of infections detected in female patients. After recovery from the acute disease, patients may require from several months to 2 years to overcome the fatigue, headache, and irritability. Infants and children are at a higher risk of permanent brain damage after recovery than adults.

Reference Values

CALIFORNIA VIRUS (La CROSSE) ENCEPHALITIS ANTIBODY
IgG: <1:1
IgM: <1:1
Reference values apply to all ages.

EASTERN EQUINE ENCEPHALITIS ANTIBODY

IgG: <1:1
IgM: <1:1
Reference values apply to all ages.

ST. LOUIS ENCEPHALITIS ANTIBODY
IgG: <1:1
IgM: <1:1
Reference values apply to all ages.

WESTERN EQUINE ENCEPHALITIS
IgG: <1:1
IgM: <1:1
Reference values apply to all ages.

Interpretation

Detection of organism-specific antibodies in the cerebrospinal fluid (CSF) may suggest central nervous system (CNS) infection. However, these results are unable to distinguish between intrathecal antibodies and serum antibodies introduced into the CSF at the time of lumbar puncture or from a breakdown in the blood-brain barrier. The results should be interpreted with other laboratory and clinical data prior to a diagnosis of CNS infection.

Cautions

All results must be correlated with clinical history and other data available to the attending physician.

False-positive results may be caused by breakdown of the blood-brain barrier, or by the introduction of blood into the cerebrospinal fluid (CSF) at collection.

Since cross-reactivity with dengue fever virus does occur with St. Louis encephalitis antigens, and, therefore, cannot be differentiated further, the specific virus responsible for positive results may be deduced by the travel history of the patient, along with available medical and epidemiological data, unless the virus can be isolated.

Eastern and Western equine encephalitis viruses show some cross-reactivity; however, antibody response to the infecting virus is typically at least 8-fold higher.

Clinical Reference

Piantadosi A, Kanjilal S: Diagnostic approach for arboviral infections in the United States. J Clin Microbiol. 2020 Nov 18;58(12):e01926-19. doi: 10.1128/JCM.01926-19

Performance

Method Description

The indirect immunofluorescent antibody (IFA) assay is a 2-stage “sandwich” procedure. In the first stage, the patient cerebrospinal fluid (CSF) is diluted in Pretreatment Diluent for IgM and phosphate buffered saline (PBS) for IgG, added to appropriate slide wells in contact with the substrate, and incubated. Following incubation, the slide is washed in PBS,

which removes unbound CSF antibodies. In the second stage, each antigen well is overlaid with fluorescein-labeled antibody to IgM and IgG. The slide is incubated allowing antigen-antibody complexes to react with the fluorescein-labeled anti-IgM and anti-IgG. After the slide is washed, dried, and mounted, it is examined using fluorescence microscopy. Positive reactions appear as cells exhibiting bright apple-green cytoplasmic fluorescence against a background of red negative control cells. Semi-quantitative endpoint titers are obtained by testing serial dilutions of positive specimens.(Package inserts: Arbovirus IFA IgM and Arbovirus IFA IgG Instructions for Use. Focus Diagnostics; Rev 02, 05/01/2018)

PDF Report
No

Day(s) Performed
May through October: Monday through Friday
November through April: Monday, Wednesday, Friday

Report Available
Same day/1 to 4 days

Specimen Retention Time
2 weeks

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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
86651 x 2
86652 x 2
86653 x 2
86654 x 2

LOINC® Information

MAYO CLINIC LABORATORIES

Test Definition: ABOPC

Arbovirus Antibody Panel, IgG and IgM, Spinal Fluid

Test ID	Test Order Name	Order LOINC® Value
ABOPC	Arbovirus Ab Panel IgG and IgM, CSF	49094-6

Result ID	Test Result Name	Result LOINC® Value
26365	Calif(LaCrosse) Encep Ab, IgG,CSF	9539-8
26366	Calif(LaCrosse) Encep Ab, IgM,CSF	9540-6
26369	East Equine Enceph Ab, IgG, CSF	In Process
26370	East Equine Enceph Ab, IgM, CSF	10899-3
26367	St. Louis Enceph Ab, IgG, CSF	21509-5
26368	St. Louis Enceph Ab, IgM, CSF	21510-3
26371	West Equine Enceph Ab, IgG, CSF	9315-3
26372	West Equine Enceph Ab, IgM, CSF	9316-1