TEST

CSF coccidioides complement fixation test

This test checks spinal fluid for antibodies linked to coccidioidal meningitis

WHAT IT MEASURES
Antibodies to Coccidioides fungi in cerebrospinal fluid

SAMPLE
Cerebrospinal fluid collected by lumbar puncture

FASTING NEEDED?
No

HOW LONG IT TAKES
Usually 30 to 60 minutes

RESULTS IN
Several days to two weeks, depending on laboratory

USED FOR
Diagnosing coccidioidal meningitis

MAIN LIMITATION
A negative result can miss low-antibody infection

Overview

The CSF coccidioides complement fixation test looks for antibodies against Coccidioides fungi in cerebrospinal fluid, or CSF. CSF is the clear fluid surrounding the brain and spinal cord.

Coccidioides causes coccidioidomycosis, also called Valley fever. Most infections affect the lungs, but infection can spread to the tissues covering the brain and spinal cord, causing coccidioidal meningitis.

Complement fixation is a laboratory method used to detect and estimate certain Coccidioides antibodies, mainly immunoglobulin G, or IgG. The CSF sample is collected through a lumbar puncture, also called a spinal tap.

This test is interpreted alongside symptoms, examination findings, imaging, and other CSF results. It cannot confirm or rule out meningitis by itself.

Why the test is ordered

The test may be ordered when a clinician is concerned that a current or previous Coccidioides

infection has reached the nervous system.

Reasons include:

A lumbar puncture is not routinely needed for everyone with Valley fever. It is generally recommended when symptoms or examination findings suggest nervous system involvement, rather than as screening for people without neurological symptoms.[1]

- A persistent or worsening headache after Valley fever
- Confusion, unusual sleepiness, or changes in thinking
- Neck stiffness, vomiting, or sensitivity to light
- New weakness, numbness, balance problems, or double vision
- Abnormal brain imaging or other CSF findings
- Reassessment of known coccidioidal meningitis

Who should have the test

You may be offered this test if you have possible neurological complications of coccidioidomycosis. Infection is more likely after living in or visiting areas where Coccidioides occurs, including parts of the southwestern United States, Mexico, Central America, and South America.[2]

Your clinician will also consider symptoms, previous results, immune system health, pregnancy, medicines, and imaging.

Because collecting CSF is invasive, the expected benefit must be weighed against the risks. If lumbar puncture may be unsafe-for example, because of a bleeding problem or increased pressure caused by a brain mass-other assessment may be needed first.

How to prepare

You do not need to fast for the complement fixation test itself. You can usually eat, drink water, and take regular medicines unless the healthcare team gives different instructions for sedation or another procedure.

Tell the team beforehand if you:

Do not stop a prescribed blood thinner like warfarin or apixaban on your own. The procedure team will explain whether its timing needs to change.

Wear comfortable clothing. Ask whether someone should drive you home, especially if

sedation is planned.

- Take anticoagulants or antiplatelet medicines
- Have a bleeding disorder or very low platelet count
- Have an infection or rash near your lower back
- Have had difficult lumbar punctures or spinal surgery
- May be pregnant
- Have medication allergies

What happens during the test

You usually lie curled on your side or sit leaning forward. The skin on your lower back is cleaned, and local anesthetic is injected to numb the area. This may sting briefly.

A thin needle is passed between the lower spinal bones into the space containing CSF, below the usual end of the spinal cord. You may feel pressure, but report sharp or persistent pain immediately.

The clinician may measure the opening pressure because coccidioidal meningitis can raise CSF pressure. Small amounts of fluid are collected into sterile tubes. Testing often includes cell counts, protein, glucose, fungal culture, or fungal antigen tests as well as antibodies.

The needle is then removed and a dressing applied.

Understanding your results

Results may be reported as negative or as a titer. A titer indicates how far the sample could be diluted while antibodies remained detectable. A higher second number generally means more detectable antibody, but results from different laboratories or methods may not be directly comparable.

A positive CSF complement fixation result supports coccidioidal meningitis when it matches your symptoms and other findings. It does not, by itself, show how severe the illness is or predict the outcome.

A negative result means antibody was not detected, but it does not completely rule out infection. Antibody levels may be too low early in the illness or when the immune system produces a weak response.

No titer should be interpreted alone. Laboratories use different methods and reporting ranges,

and the result must be considered with the complete clinical assessment.

What affects the results

Food, coffee, exercise, and time of day are not known to meaningfully change CSF Coccidioides antibody levels.

Factors that may affect interpretation include:

Mention a recent blood transfusion, particularly if blood contaminated the CSF sample.

- Early infection: Antibody may not yet be detectable.
- Reduced immune response: Illnesses or medicines that suppress immunity can cause a negative result despite infection.
- Antifungal treatment: Treatment may change antibody levels, but a falling titer does not prove the infection has cleared.
- Blood in the sample: A traumatic lumbar puncture may introduce serum antibodies into CSF.
- Laboratory differences: Methods, reagents, and reporting practices vary.
- Specimen handling: Delayed transport, contamination, or too little fluid may prevent complete testing.
- Related fungal antibodies: Cross-reactions are possible.

Accuracy and limitations

Finding Coccidioides antibody in properly collected CSF provides meaningful evidence of nervous system infection. It is generally more informative than a positive blood antibody result because blood antibodies do not show that infection has reached the brain or spinal tissues.[1,3]

However, the test can miss meningitis when antibody levels are low, testing occurs early, or immune responses are weakened. A negative result must therefore be compared with CSF white blood cells, glucose, protein, opening pressure, imaging, and symptoms.

Blood contamination, cross-reacting antibodies, and technical differences can contribute to unexpected positive results.

Other tests may include immunodiffusion antibodies, CSF fungal antigen testing, culture, or molecular tests. Culture can remain negative even when meningitis is present, and no available

test independently excludes infection.[3-5]

Risks and complications

The risks come from the lumbar puncture, not the antibody test. Temporary back soreness, bruising, or faintness can occur.

A headache may develop and often feels worse when sitting or standing. It commonly improves with rest, fluids, and time, but a severe or persistent headache may require treatment.

Bleeding and infection are uncommon. Serious neurological complications are rare when the procedure is performed after checking for conditions that could make it unsafe.[6]

Contact the healthcare team promptly for a persistent severe headache, fluid leaking from the puncture site, increasing redness, or fever. Seek emergency care for a seizure, new weakness, loss of bladder or bowel control, severe confusion, or rapidly worsening drowsiness.

What happens next

If the result is negative and other findings are reassuring, routine follow-up may be enough. If suspicion remains, your clinician may recommend additional antibody or antigen testing, culture, imaging, or another lumbar puncture.

A positive result is usually reviewed promptly with an infectious-disease or neurological specialist. Further assessment may include brain imaging, CSF pressure measurement, and discussion of antifungal treatment.

Do not wait for a scheduled review if you develop a severe headache with confusion, a seizure, new weakness, or another rapidly worsening neurological symptom.

Common questions

Can I drink coffee before the test?

Usually, yes. Follow separate instructions if sedation or another procedure is planned.

Does the time of day matter?

No. CSF Coccidioides antibodies do not have a recognized daily pattern.

Can I exercise beforehand?

Ordinary exercise should not affect the result. Avoid strenuous activity if you are unwell, dizzy, or have specific instructions.

Will the lumbar puncture hurt?

The numbing injection may sting, and you may feel pressure. Report sharp or persistent pain immediately.

Can a blood test replace this test?

No. Blood antibodies can support a diagnosis but cannot confirm infection of the brain or spinal tissues.

How soon can I return to normal activities?

Follow your procedure team's instructions. Many people resume light activity soon afterward, but strenuous activity may be limited for the rest of the day.

Sources

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