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CSF analysis

Cerebrospinal fluid (CSF) analysis is a group of laboratory tests that measure chemicals in the cerebrospinal fluid. CSF is a clear fluid that surrounds and protects the brain and spinal cord. The tests may look for proteins, sugar (glucose), and other substances.

How the Test is Performed

A sample of CSF is needed. A lumbar puncture, also called a spinal tap, is the most common way to collect this sample. Less common ways to take a fluid sample include:

- Cisternal puncture
- Removal of CSF from a tube that is already in the CSF, such as a shunt, ventricular drain, or pain pump
- Ventricular puncture

After the sample is taken, it is sent to the laboratory for evaluation.

Your health care provider will ask you to lie flat for at least one hour after the lumbar puncture. You may develop a headache after the lumbar puncture. If it happens, fluids and drinking caffeinated beverages such as coffee, tea or soda may help.

How to Prepare for the Test

Your provider will tell you how to prepare for lumbar puncture. Make sure to let them know all of the medicines you are taking in case any adjustment is needed.

Why the Test is Performed

Analysis of CSF can help detect certain conditions and diseases. All of the following can be, but are not always, measured in a sample of CSF:

- Antibodies and DNA of common viruses
- Bacteria (including that which causes syphilis, using a VDRL test)
- Cell count
- Chloride
- Cryptococcal antigen
- Glucose

- Glutamine
- Lactate dehydrogenase
- Oligoclonal banding to look for specific proteins
- Myelin basic protein
- Total protein
- Whether there are cancerous cells present (CSF cytology)
- Opening pressure

Normal Results

Normal results include:

- Antibodies and DNA of common viruses: None
- Bacteria: No bacteria grows in a lab culture
- Cancerous cells: No cancerous cells present
- Cell count: 0 to 5 white blood cells (all mononuclear) and 0 red blood cells
- Chloride: 110 to 125 mEq/L (110 to 125 mmol/L)
- Fungus: None
- Gamma globulin: 3% to 12% of the total protein
- Glucose: 50 to 80 mg/dL or 2.77 to 4.44 mmol/L (or greater than two-thirds of blood sugar level)
- Glutamine: 6 to 15 mg/dL (410.5 to 1,026 micromol/L)
- Lactate dehydrogenase: less than 40 U/L
- Oligoclonal bands: 0 or 1 bands that are not present in a matched serum sample
- Protein: 15 to 60 mg/dL (0.15 to 0.6 g/L)
- Opening pressure: 70 to 180 mm of water
- Myelin basic protein: Less than 4ng/mL

Normal value ranges may vary slightly among different laboratories. Talk to your provider about the meaning of your specific test results.

The examples above show the common measurements for results for these tests. Some laboratories use different measurements or may test different specimens.

What Abnormal Results Mean

An abnormal CSF analysis result may be due to many different causes, including:

- Cancer
- Encephalitis (such as Herpes simplex, West Nile, and Eastern Equine Encephalitis virus)
- Hepatic encephalopathy
- High blood sugar (hyperglycemia)

- Infection
- Inflammation
- Reye syndrome
- Meningitis due to bacteria, fungus, tuberculosis, or a virus
- Multiple sclerosis (MS)
- Alzheimer disease
- Pseudotumor cerebrii
- Normal pressure hydrocephalus

Alternative Names

Cerebrospinal fluid analysis

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Review Date 4/29/2023

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