CSF electrophoresis

Ordered for:

1. oligoclonal bands
2. to establish CSF leak

CSF electrophoresis:

1. A transthyretin band (prealbumin) anodal to albumin . This band is not seen in serum electrophoresis.
2. Albumin: in CSF electrophoresis the albumin band is slightly anodal to the albumin band seen in the corresponding serum electrophoresis.
3. The alpha two band is much denser in the serum. The large alpha two MG and haptoglobin do not cross the blood brain barrier. If there is damage to the blood brain barrier or if the CSF is from a traumatic tap, this band is dense in the CSF.
4. Next in CSF: beta one, C3 and then beta two; in serum: beta one and then C3 (more prominent than CSF). The beta two band in CSF corresponds to desialated transferrin (also known as tau protein).

Significant oligoclonal bands:
Two immunoglobulin bands in the CSF with no matching bands in the serum.

Causes of oligoclonal bands:

1. Multiple sclerosis (MS)
2. Subacute Sclerosing Panencephalitis (SSPE)
3. Meningoencephalitis
4. SLE and others

Patients with MS have increased local synthesis of IgG. This is reflected in a high IgG index (upper limit of normal is 0.72)

CSF IgG index = $\frac{\text{CSF IgG/serum IgG}}{\text{CSF albumin/serum albumin}}$

Elevated IgG index also seen in
Meningitis, SSPE, Guillain-Barré syndrome (GBS) and others.

A combination of high IgG index and oligoclonal bands yield confirmatory evidence of MS in more than 90% of cases.

CSF leakage:
Sample: nasal fluid.
Test: beta two transferrin demonstration by immunofixation.

CSF Albumin/Serum Albumin Ratio = (CSF Albumin/Serum Albumin) x 1000

Normal albumin ratio based on Age:

Age	Ratio

17-30	1.7-5.7
31-40	1.8-6.8
41-50	2.0-7.2
51-60	2.1-8.9
>60	3.2-9.0

Interpretation for CSF Albumin/Serum Albumin Ratio:

1.If albumin ratio is normal-> No increase in blood-brain barrier

2.If albumin ratio is high-> check CSF RBC Count

a.If CSF RBC < 50/mm^3 : Increased permeability in blood-brain barrier

b.If CSF RBC > 100/mm^3 : High ratio is due to RBC interference

a.If 50/mm^3 < CSF RBC < 100/mm^3 : Indeterminate; do not report permeability