ThinPrep® General Cytology Lecture Series

Cerebrospinal Fluid Cytology
Benefits of ThinPrep Technology

The use of ThinPrep® General Cytology for cerebrospinal fluid specimens aids in:

- Controlling cell recovery
- Reducing obscuring elements
- Retaining background clues
- Preventing protein precipitation
Cerebrospinal Fluid
The subarachnoid space contains the cerebrospinal fluid. Unlike serous cavities, this space normally contains a volume of fluid that can be as much as 150 ml.
CSF is formed mainly in the ventricles from blood filtered through the choroid plexus. The specific gravity ranges from about 1.004-1.008 and is slightly viscous. Normally, cells are very scant to absent when collected by LP(lumbar puncture). Ventricular fluid specimens, however, are usually much more cellular.
This is a list of what can be found in the CSF. Normally, there are fewer than 5 to 10 cells per cubic mm. If present, ependymal cells will be small columnar or cuboidal cells. Arachnoidal cells may be in cohesive clusters and resemble mesothelial cells. Cuboidal cells from the choroid plexus may appear in groups and are characterized by small, hyperchromatic round nuclei.
Normal CSF at 40X. Very scantly cellular with rare RBC’s, PMN’s and a monocyte.
This is a list of the component that may be found in the ventricular fluid. These are often collected via shunt or needle. Multinucleated giant cells may be seen in patients with a shunt.
Contaminants, both cellular and otherwise are often seen in CSF specimens. Squamous cells, cartilage, muscle and RBC’s can all be introduced into the fluid during collection. Megakaryocytes may be seen in instances when a vertebral body is accidentally nicked.
Bacterial, viral or fungal infection is the most common cause of infectious meningitis. Other rare causes may include parasitic infection, systemic disease, multiple sclerosis or endometriosis.
Bacterial infection may be caused by TB, pneumococcus, or other organisms and is characterized by an inflamed CSF with a low glucose and elevated protein content.

Infection caused by such viruses as CMV or Herpes will present in the CSF as a very active lymphocytic infiltrate. Typically, glucose is unchanged and protein is slightly elevated.

Fungal meningitis can be caused by cryptococcus, aspergillus, candida or other fungi. Cellular reaction to these organisms is rare in immunosuppressed individuals but may be present in those with healthy immune systems.

The specific infectious agent may be identified.
Lymphocytes are typically present in the chronic phase of infection. They may be accompanied by histiocytes, monocytes and/or plasmacytoid cells.
Acute lymphoblastic leukemia (ALL) and undifferentiated stem cell leukemia are the most common types of primary leukemia found in CSF.
ALL in CSF at 60X. Note irregular nuclei in relatively small round cells. Population is singly dispersed.
Primary lymphoma most commonly present is high grade Non-Hodgkin’s type, including large cell, immunoblastic, lymphoblastic, Burkitt’s and undifferentiated.
Lymphoma in CSF at 40X. Cells are loosely clustered and have coarse chromatin and prominent nucleoli. All cells resemble each other very closely.
The most common types that metastasize to CSF are lung, breast and gastric adenocarcinoma.
Metastatic breast adenocarcinoma in CSF at 40x. Note mucin-laden cells at 7:00 position.
Small cell most commonly metastasizes from the lung.
Small cell carcinoma in CSF at 40X. Note nuclear molding and salt and pepper chromatin.
Occasionally, melanoma may present with a more spindled appearance or may be comprised of small, hyperchromatic cells in cohesive groups. There may be intranuclear inclusions.
Melanoma in CSF at 40x.
For more information...

- Refer to your ThinPrep 2000 Operator’s Manual
For more information...

- Visit our website [www.cytyc.com](http://www.cytyc.com), [www.thinprep.com](http://www.thinprep.com) or [www.cervicalscreening.com](http://www.cervicalscreening.com)
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