CSF CELL COUNT

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PURPOSE

To provide instruction for performing manual analysis of cerebrospinal fluid specimens.

BACKGROUND

Analysis of cerebrospinal fluid is indicated in the differentiation of meningeal infection, subarachnoid hemorrhage, CNS malignancy, and demyelinating diseases. Automated cell counts for CSF have not been validated.

RELATED DOCUMENTS

R-W-HEM1437	Hematology CJD Protocol
R-W-SPC0215	Spinal Fluid Processing
R-W-HEM1405	Hemocytometer Counts
R-W-HEM1428	Cytocentrifuge Use
R-PO-HEM0108	Pathologist Review of Blood and Body Fluids-Criteria
R-W-HEM1401	Body Fluid Cell Count

SPECIMEN REQUIREMENTS

HANDLING: Deliver ASAP to lab. Store at 2-8°C. Specimens held 1 week.
NOTE: If you receive a CSF specimen labeled CJD PROTOCOL, refer to protocol HEMATOLOGY CJD PROTOCOL for specimen handling precautions.

VOLUME: Minimum volume: 1.0 ml.

ALIQUOT: Distribute tubes as follows, unless specified differently by physician:
Tube #1: Specimen for Hold, or 2nd Cell Count/Diff (CSF RBC T1)
Tube #2: Chemistry
Tube #3: Microbiology
Tube #4: Hematology, 1st Cell Count/Diff

STABILITY: CSF fluids are performed stat within 1 hour to prevent cell lysis.

EQUIPMENT/SUPPLIES

- Hematology Analyzer diluent, Turks or CSF diluting fluid, certified dilution pipettes, tips, and plastic tubes.
- Wright-Giemsa Stain/Stainer, microscope
- Cytocentrifuge, cytospin chambers, filters, slides, 6% Albumin
- Hemocytometer or disposable C-Chip counting chamber, cover glass, petri dish, capillary tubes.
- 10% bleach, if CJD PROTOCOL in effect.

QUALITY CONTROL

1. Performance/documentation of a background count is required by examining diluent (Hematology Analyzer, Turks, CSF diluting fluid or other diluent) under the microscope for cellular contamination or debris. Record on your laboratory worksheet or according to your site lab protocol.

2. Cell counts are performed in duplicate by counting each side of the hemocytometer. The counts must agree within 20%.

3. One manual body fluid cell count control specimen must be analyzed for each 8 hours of patient testing.

4. A cytospin slide is submitted for pathologist review. Refer to Pathologist Review of Blood and Body Fluids-Criteria R-PO-HEM0108.

INSTRUCTIONS

1. Create a worksheet in RQW for your Workcenter/ Test site and record all results.

2. Inspect the specimen visually. Note the presence of clots or cell clumps. Use phrase footnote: BF CLOT or BF CLUMP if present.

3. Determine the color of the fluid and appearance.

4. Record the volume of the total specimen collection for all tubes.

5. Centrifuge an aliquot if indicated to check for xanthochromia. The supernatant may appear pale orange-yellow color.

6. Perform a manual cell count for WBC'S and RBC's. See work instruction, Hemocytometer Counts, R-W-HEM1405. **NOTE:** Turks or CSF diluting fluid may be used, when necessary, to ensure accurate distinction of erythrocytes from other cell types. Document on your worksheet the type of diluting fluid, if used. Correlate the manual cell count with the number and proportion of cells on the cytospin slide.

7. Determine if RBC crenation is present. Report as a percentage of the total count. Rule out crenation due to contaminants on the chamber surface.

8. If the WBC Count is less than 5 cells/mm^3, do not perform a differential. Result the BF COMMENT as "SEE COM" and add the phrase footnote BFDIF (WBC=5 or less per microliter. Differential not performed). Result the remaining cell groups in Cerner as "N/A".

9. Prepare cytospin slide(s). See work instruction, Cytocentrifuge Use, R-W-HEM-1428. Stain with Wright or Wright-Giemsa stain on the slide stainer.

10. Perform a Differential as specified below:
    - First, scan the entire cellular area for malignant cells, clumps or abnormal cells and make a footnote if present.
    - Correlate the number and proportion of cells on the cytospin slide with the manual cell count results.
    - Differentiate between Neutrophils, Lymphs, Monocytes and Others.
    - Cells identified as Other include macrophage, eosinophils, basophils, plasmacytes, tumor cells and nucleated RBC's.
    - Atypical cells should be quantified in the OTHER field with the footnote BF ATY, "Atypical Cells, pending pathologist review".
    - If bacteria or fungus is noted, determine if it is intracellular or extracellular. Rule out stain or slide contamination as the cause. Result the BF COMMENT as SEE COM and add a footnote. **NOTE:** The

presence of bacteria/fungus (non-contaminant) in CSF is a Critical Result and must be called to the ordering physician or unit STAT.

- Submit the slide for pathologist review (Refer to Pathologist Review of Blood and Body Fluids-Criteria R-PO-HEM0108).

INTERPRETATION (Reference Ranges)

Cell Counts (CSF)	WBC	0-10 /mm³
	WBC (neonates)	0-30 /mm³
	RBC	None
Differential	Neutrophils	0-5%
	Lymphocytes	50-100%
	Monocytes	0-30%
	Other	not usually present and may indicate an abnormality
Appearance	Clear	
Color	Colorless	
Xanthochromia	Absent	

ORDERING AND RESULTING

- Order codes for cerebrospinal fluids include: CSF PN, CELL CSF, CSF RBC T1 (for additional RBC cell count on Tube 1, if requested)
- Results are reported in the LIS.

Reporting Man CT CSF

- See work instructions for Hemocytometer Counts, R-W-HEM1405 and Body Fluid Cell Count, R-W-HEM1401.
- XANTHO CSF: present or absent.

Reporting the CSF Differential

- A number must be entered for each cell type
- See work instruction Body Fluid Cell Count, R-W-HEM1401.
- Macrophages are reported as OTHER for CSF analysis**.**
- **Note - Mesothelial cells are not found in CSF**

MANUAL CALCULATION FOR CELL COUNTS

See work instruction Hemocytometer Counts, R-W-HEM1405.

REFERENCES

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4. Ross and Neely. Textbook of Urinalysis and Body Fluids. Appleton-Century-Crofts, Connecticut: 1983.
5. Henry, John Bernard. Clinical Diagnosis and Management by Laboratory Methods, 19th edition. W.B. Saunders, Co., 1996, pp556-557, pp.469-47

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☐ *No significant change to process in above revision. Per CAP, this revision does not require further Medical Director approval.*			
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