A Shift From Manual to Automatic: CSF Cell Counts With the GloCyte® Automated Cell Counter System

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Background

Accurate cerebrospinal fluid (CSF) cell counts are vital for the diagnosis of several diseases including subarachnoid hemorrhage, meningeal infection, demyelinating disease, and central nervous system malignancy. The standard method of counting red blood cells (RBC) and total nucleated cells (TNC) is a manual counting method using the Neubauer Hemocytometer counting chamber, which requires specialized laboratory staff and therefore is time, labor and cost-intensive.

Objectives

This study compared the manual method of CSF cell counts to the GloCyte Automated Cell Counter System, which is for Investigational Use Only.

Methods

The GloCyte Automated Cell Counter System (Advanced Instruments, Inc.) utilizes fluorescent-conjugated antibodies against red blood cells and nucleic acid stain against nucleated cells followed by imaging technology to determine CSF cell counts.

96 CSF samples submitted for clinical analysis were analyzed with both methods within 4 hours of collection. The cell counts obtained by routine analysis with a hemocytometer were compared to the results obtained by the GloCyte instrument. Pearson correlations were performed between the assays using GraphPad Prism v5.0.

## GloCyte Automated Cell Counter

Results

The GloCyte instrument correlates very well with the Clinical Laboratory for both RBCs and TNCs at low cell counts.

42 of 96 samples (44%) and 70 of 91 samples (77%) for RBC and TNC counts, respectively, had ten or fewer cells by both the manual and GloCyte method. At high prevalence of low cell counts, the R^2 values of 0.9794 and 0.9954 for RBC and TNC, respectively, demonstrate the strength of the GloCyte system, even at low cell counts.
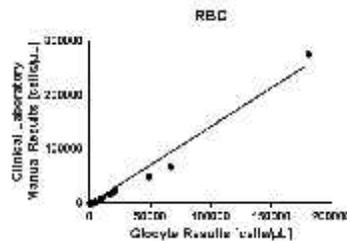
Slope 1.429±0.02138, R^2=0.9794
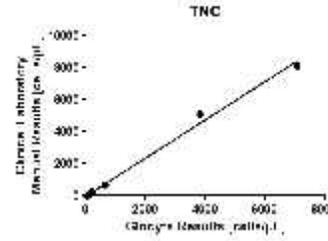
Slope 1.194±0.00862, R^2=0.9954

Results

Repeat analysis with the GloCyte instrument results in excellent reproducibility. The table below shows the coefficient of variation for different samples tested 10 times on a given day.

RBC count (cells/µL)	TNC count (cells/µL)	CV (%)
67	-	9.5
139	-	4.8
-	66	6.5
-	191	4.0

Conclusions

➢ There is excellent correlation between GloCyte and the manual method of CSF cell counts.

➢ The GloCyte system accurately counts cells in the CSF even when few cells are present.

➢ This automated device offers excellent precision and results quickly.

➢ Therefore, GloCyte system improves laboratory quality and throughput.