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Background

Accurate, STAT cerebrospinal fluid (CSF) cell counts are critical in the diagnosis of meningitis, malignancy, demyelinating disease, and hemorrhage. Due to historical limitations with the linearity of automated analyzers, CSF cell counts have traditionally been performed manually with a hemocytometer and the aid of a brightfield optical microscope. Manual cell counting is time-consuming, subjective due to reliance on human interpretation, and requires a high degree of skill. This poses significant challenges for clinical laboratories of all sizes facing unprecedented med tech shortages. The purpose of this study was to evaluate the impact of implementing the GloCyte Automated Cell Counter for CSF, an FDA-cleared device with linearity down to 0 cells/ μ L, on result turnaround times.



Methods

Result turnaround time data for CSF specimens processed in the hematology lab at MercyOne Des Moines Medical Center, a 600-bed hospital in Des Moines, Iowa, was analyzed in a retrospective study of two cell counting methods– (1) manual cell counting using a Neubauer-Improved hemocytometer and (2) GloCyte, a benchtop cell counting device that uses fluorescence technology and highly specific reagents to automate RBC and TNC cell counts in less than 5 minutes. Turnaround times for 227 CSF specimens counted manually during an approximately six-month period prior to the implementation of GloCyte (January 2, 2017 to June 29, 2017) were compared to those for 133 specimens analyzed on GloCyte over a similar duration (January 4, 2021 to June 30, 2021). In this study, turnaround times were defined as the time between specimen arrival in the lab and result verification. Correlation between the methods was previously established in the MercyOne Des Moines Medical Center laboratory.

Results

The data demonstrated a significant, 16–30-minute improvement in turnaround times with GloCyte compared to the manual hemocytometer method. Median turnaround times, analyzed to adjust for add-ons that resulted in longer turnaround times pre- and post-GloCyte implementation, were 1:38h for specimens counted manually versus 1:08h for specimens analyzed on GloCyte. The average turnaround time for the 227 CSF specimens counted manually was 2:03h compared to 1:46h for the 133 samples analyzed on GloCyte. The MercyOne Des Moines Medical Center laboratory processed 456 CSF cell counts in 2022, equating to a reduction in turnaround time of 122–228 hours annually with the implementation of GloCyte.

Conclusion

This study demonstrates that GloCyte can be implemented to significantly improve turnaround times for CSF cell counts. The MercyOne Des Moines Medical Center laboratory realized several benefits from the reduction in turnaround times– GloCyte has (1) freed up significant tech time for other tasks, (2) standardized CSF cell counting to mitigate tech to tech variability, (3) increased lab staff satisfaction and decreased stress levels, and (4) increased physician satisfaction. For MercyOne Des Moines Medical Center’s sister site, MercyOne West Des Moines Medical Center, a 146-bed hospital that infrequently performs CSF cell counts, GloCyte has provided peace of mind in performing cell counts accurately with techs of all skill levels.