EVALUATION OF CELL-DYN® 1800 HEMATOLOGY ANALYSER

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INTRODUCTION

The Cell-Dyn 1800 is a new hematology analyser with a throughput of 60 specimens per hour. It provides a basic blood count with a 3-part white blood cell differential. Due to its capacity the Cell-Dyn 1800 is well suited in a small clinical laboratory as a primary analyser or a backup to an instrument in a medium-size clinical laboratory. Previously the Cell-Dyn 1800 has been compared to another 18-parameter hematology analyser (1), but not to an instrument capable of performing automated 5-part WBC differential, like the Cell-Dyn 3500SL. In this study we compared the performance of the Cell-Dyn 1800 to Cell-Dyn 1600CS and Cell-Dyn 3500SL hematology analysers. The evaluation was carried out according to the Finnish Labquality recommendations (2).

MATERIALS AND METHODS

Instruments

- Cell-Dyn 1600CS, Abbott Diagnostics, USA
- Cell-Dyn 1800, Abbott Diagnostics, USA
- Cell-Dyn 3500SL, Abbott Diagnostics, USA

Reagents and samples

For each analyser we used reagents made by instrument manufacturer (Abbott Diagnostics, USA). All reagents were kept at room temperature. The Cell-Dyn 1800 was calibrated against comparison instruments with fresh normal patient samples.

For comparison study we used fresh patient samples from laboratory daily routine anticoagulated with K₂EDTA. Samples were first tested with Cell-Dyn 3500SL or Cell-Dyn 1600CS and then tested within 4 hours with Cell-Dyn 1800. Cell-Dyn 16 Tri-Level Control (Abbott Diagnostics, USA) was used to test the precision of the Cell-Dyn 1800.

Data analysis

Data analysis was performed using Analyse-It + Clinical Laboratory for Microsoft Excel v1.67 (Analyse-It Software Ltd., UK).

RESULTS

Precision

Analytical variation was evaluated by assaying three levels of commercial control in duplicates twice per day in total of 5 days. Within-run and between-run imprecision was calculated. Between-run imprecision for different blood count parameters varied from 0.3% to 6.1%. The highest CV% was observed in platelet counting at a level of 54 x 10⁹/l. The results of imprecision analysis are presented in Table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Concentration (10⁹/l)</th>
<th>Carryover (%)</th>
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</thead>
<tbody>
<tr>
<td>WBC</td>
<td>26.8 +/- 0.5</td>
<td>0.00</td>
</tr>
<tr>
<td>PLT</td>
<td>680 +/- 14</td>
<td>0.37</td>
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</tbody>
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Carryover

Carryover was determined for white blood cells and platelets by analysing a high patient sample followed by 3 background counts. Carryover was well below manufacturer’s limits for white blood cells and platelets (<1%). The results for carryover are presented in Table 2.

Method comparison

Cell-Dyn 1800 was compared to Cell-Dyn 1600CS and Cell-Dyn 3500SL. All samples were first run on both reference analysers. Then the same samples were analysed on the Cell-Dyn 1800 within four hours. The correlation coefficients of different parameters between Cell-Dyn 1800 and Cell-Dyn 1600CS were excellent ranging from 0.984 to 0.996. Correlation between Cell-Dyn 1800 and Cell-Dyn 3500SL parameters were also excellent ranging from 0.976 to 0.995. The method comparison results are summarised in Table 3 and graphical plots of Cell-Dyn 1800 vs. Cell-Dyn 3500SL are presented in figures 2 and 3.

CONCLUSIONS

In the present study the analytical performance of Cell-Dyn 1800 was evaluated. The study was performed under routine conditions. The precision of Cell-Dyn 1800 was very good. The results of Cell-Dyn 1800 demonstrated minimal carryover. Excellent correlations of Cell-Dyn 1800 results to Cell-Dyn 1600CS and Cell-Dyn 3500SL were obtained.

The Cell-Dyn 1800 has proven to be a reliable system in more than one year of routine use. It operates quietly and is easy to use due to its large, colour LCD display and a handheld barcode reader for sample ID input. The system requires only a minimal daily user maintenance.

Based on the results we conclude that this new generation hematology instrument is an ideal choice for the primary analyser in a small size clinical laboratory or as a backup/stat instrument in a medium to large size clinical laboratory.

REFERENCES