Benefits of a new generation of Pentra series: reliability and ergonomics

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Introduction
The Pentra DX Nexus (HORIBA Medical) is the new generation of the Pentra analytical systems able to perform CBC, 8-differential, reticulocytes, erythroblasts and the body fluids analysis (BSF). This new generation has been conceived to improve the reliability and the efficiency of the laboratory environment, in order to guarantee friendly and comfortable working conditions.

The two aims of the evaluation were to: (i) assess the comparison with the reference system in the context of the lab reference system XE-2100 (Sysmex) and to test the new ergonomics of the workstation and (ii) test the new generation of the Pentra DX Nexus.

Material and Methods
The workstation tested contained a Pentra DX Nexus, Slide Preparation System and ABX Pentra ML to manage the workflow. The blood samples were selected at the St.-Joseph St.-Luc Hospital in Lyon, France, from the workload of the laboratory always within 24 hours post-drawing. All tests conducting according to approved guidelines.

The performances were measured as follow: accuracy (50 normal and 100 abnormal samples); stability (4 samples for CBC-BSF; one sample for reticulocytes and one for erythroblasts); precision (4 normal samples: one with ALY, one with M4L, one with reticulocytes and one with erythroblasts). All CBF were analysed by the Pentra DX Nexus and compared with the manual method. The laboratory staff in charge of the routine of the lab evaluated practicability, traceability, interaction of the operator with the environment.

Results

Stability

Six samples were analysed in parallel at room temperature and at 2-6°C on the Pentra DX Nexus up to 48 h.

The table shows the results obtained during our test compared to the recommendations found on the literature (Babula et al., 2004).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean value</th>
<th>Expected CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>7.30 ± 4.14</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>RBC</td>
<td>4.13 ± 4.42</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>HGB</td>
<td>14.4 ± 3.24</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>MCV</td>
<td>20.3 ± 12.9</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>MDV</td>
<td>24.0 ± 14.9</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>NEU</td>
<td>6.6 ± 3.49</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>LYMP</td>
<td>6.7 ± 3.24</td>
<td>&lt;2%</td>
</tr>
</tbody>
</table>

To verify the precision of the new hematology analyzer, repeatability tests were conducted on six samples. Each sample was repeated 10 times. The table shows, for each parameter the mean and CV value obtained on the six repeatability tests, as well as the manufacturer specification.

The manufacturer defined the instrument specifications according to the Westgard recommendations based on the biologic variation described in the literature (Picco G., Piovaccari L., Gravina C., Serbellino C. Simon M., 1977). The laboratory performed the precision tests in agreement with the manufacturer specifications and medical needs.

Accuracy

The comparison between the Pentra DX Nexus and the XE-2100 was done on 50 normal and 100 abnormal samples.

The acceptable bias were defined on basis of the Westgard recommendations and the tests showed satisfying results (WBC R2=0.9904, HGB R2=0.9839, PLT R2=0.9315, RET R2=0.9474) as shown in the table.

The accuracy obtained on the WBC subpopulations (NEU and LYMP) may be related to the compilation of normal and abnormal samples and that two instruments employ different principles to count these subpopulations. Moreover the MCV results may also reflect the variation in measure principles and calculations of red blood cells volume used by the two manufacturers.

Reliability and ergonomics

The color touch screen of the Pentra DX Nexus offers a reliable and comforatable tool. A virtual keyboard allows to rapidly enter the data and the staff considered it more useful than a physical keyboard.

The new laser source dissipates less heat and consequently the noise is greatly reduced. Moreover, thanks also to its reduced size, the staff found the system friendly and comfortable for the laboratory environment and routine.

The new traceability function in the ABX Pentra ML station offers a complete information for each run. The new traceability function complies with quality norms and it is therefore indispensable for accreditation requirements.

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Conclusions

The new haematology workcell consists in a Pentra DX Nexus, a Slide Preparation System and ABX Pentra ML to manage the workflow. This study showed satisfying analytical performances.

The repeatability and stability were very good, as well as the correlation coefficients obtained with the XE-2100.

In the same way, the system offers significant improvements over previous generation of Pentra analyzers in traceability, ergonomics and environment.

His compact form and the new laser source require less space, reducing heat production and noise. Its features make the Pentra DX Nexus suitable to fit any laboratory complying with accreditation requirements.