

Evaluation of “smart” WPC reflex testing on Sysmex XN-9100 in a routine setting

Dedeene, L.¹; Boeckx, N.^{1,2}; Van Laer, C.^{1,3}

¹Clinical Department of Laboratory Medicine, University Hospitals Leuven, Leuven, Belgium

²Departement of Oncology, KU Leuven, Leuven, Belgium

³Department of Cardiovascular Sciences, Center for Molecular and Vascular Biology, KU Leuven, Leuven, Belgium

Objectives

The Sysmex XN-9100 system is an automated hematology analyzer using different measurement channels for the differentiation of white blood cells. The white differentiation (WDF) channel is able to suggest the presence of blasts and/or malignant lymphocytes indicated by a “Blasts/Abn Lympho?” flag in blood samples. These flagged samples can be further analyzed using the white progenitor cell (WPC) channel to reduce the number of false positive WDF flags or to specify the flag in either “Blasts?”, “Abn Lympho?”, “Blasts?” + “Abn Lympho?”, or “Atypical Lympho?”. Consequently, a reduction in smear review rate in up to 12-26% of the WDF-flagged samples may be reached. We previously suggested a workflow for “smart” WPC reflex testing to avoid unnecessary use of the WPC channel [1]. We made few minor adjustments to our previously published workflow and integrated this “smart” WPC reflex analysis in a routine setting. In this study, we evaluated the actual impact of “smart” WPC reflex testing in a routine clinical setting covering a broad range of hematological and non-hematological patients.

Methods

Blood samples for white blood cell differentiation receiving a “Blasts/Abn Lympho?” flag by the WDF channel were assigned to “smart” WPC testing. The adjusted “smart” workflow implies a WPC reflex test in WDF-flagged samples, except for two conditions: (i) samples from infants/children younger than 16 years and (ii) samples from patients with microscopically confirmed blasts or aberrant lymphocytes during the past seven days. These two conditions were immediately analyzed by smear review without WPC reflex testing.

Results

Retrospectively, 7085 routine blood samples over a period of 18 days were analyzed of which 624 (9%) were flagged by the WDF channel as suspicious for blasts/abnormal lymphocytes. Among these WDF-flagged samples, approximately two third (n=426/624) was assigned for WPC reflex testing, whereas one third (n=198/624) was immediately analyzed by smear review. The initial WDF flag was removed in 37% of the samples (156/426) that underwent WPC reflex testing. In the latter group, smear review was still triggered by other flags and rules in 55/156 samples. Nonetheless, a 24% (101/426 of the WPC-tested samples) reduction in smear review rate was reached.

Overall, “smart” WPC reflex testing resulted in a reduction in WPC reflex testing (32% (198/624) of the WDF-flagged samples) and a reduction in smear review rate (16% (101/624) of the WDF-flagged samples) in a routine setting, taking into account other flags and rules triggering smear review.

Conclusions

The implementation of the adapted “smart” WPC testing in a routine setting resulted in (i) a reduced sample load undergoing WPC reflex testing (i.e. optimal use of reagents) and (ii) a reduction in the number of manual smear reviews comparable to previous studies using “non-smart” WPC reflex

testing. This study highlights the importance of “smart” WPC testing in a routine clinical setting to efficiently make use of the WPC channel on the Sysmex XN-9100 system.

References

1. Blomme S, Boeckx N, Brusselmans C, Claerhout H, Van Laer C (2020) The integration of Sysmex XN-9100' WPC channel reflex testing in the detection of reactive versus malignant blood samples. Int J Lab Hematol (Online ahead of print).