Evaluation of the Body Fluid Cycle of the Yumizen®H2500 Analyzer (Horiba Medical SAS)

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INTRODUCTION

Automated analysis of biological fluids is now required to ensure the robustness and reliability of results reporting.

In this study, we evaluated the performance of the body fluid cycle of the Yumizen®H2500.

METHODS

98 samples including cerebro-spinal (6), pleural (18), ascitic (5), synovial (54), pericardic (2) and bronchoalveolar liquid (BAL, 13) were collected over 10 weeks in a prospective study at Nantes University Hospital, France (figure 1). The samples were analyzed in duplicate by the Yumizen® H2500 to determine the number of leukocytes and erythrocytes, the partial formula (% of mononuclear cells (%MN) and % of polymorphonuclear cells (%PN)) and to detect abnormal cells. Results were compared to a conventional microscopic count and to the XN10 (Sysmex®) reference analyzer in body fluid mode. Both instruments were calibrated prior to the samples analysis using external calibrators. Passing-Bablok regression was used to analyze results.

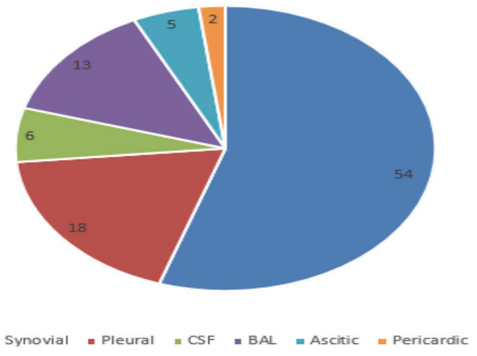

Figure 1 : Distribution of samples type

RESULTS

Leukocyte and Erythrocyte count

74 out of 98 samples were used to compare leukocyte and erythrocyte count.
11 samples were excluded because they were outside the range of linearity of the analyzers and the BAL were excluded due to viscosity related flags.
The correlation coefficient between the 2 analyzers was 0.991 for leukocyte (figure 2) and 0.955 between Yumizen®H2500 and the conventional chamber counting method (figure 3).
Discrepant results were observed in lipemic samples and samples containing crystals.
For erythrocyte counts, the correlation coefficient was 0.996 between both analyzers.

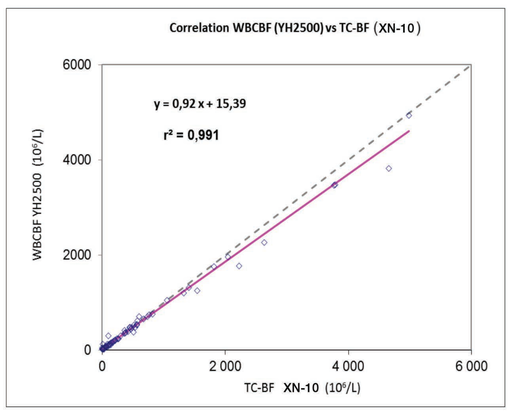

Figure 2 : Leukocyte Correlation between Yumizen®H2500 and Sysmex XN10® analyzer

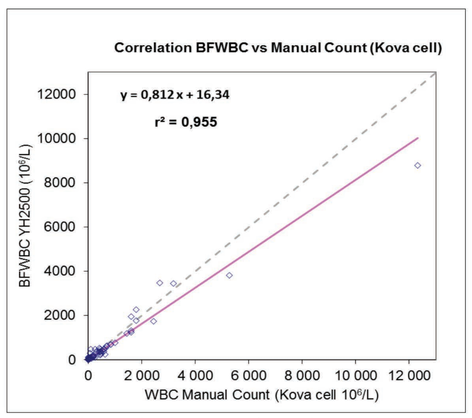

Figure 3 : Leukocyte Correlation between Yumizen®H2500 and Conventional Manual Count

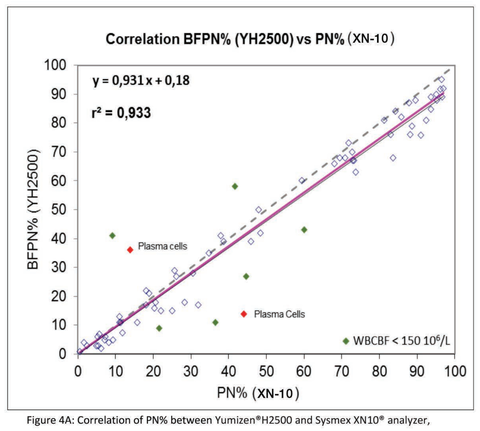

Figure 4A: Correlation of PN% between Yumizen®H2500 and Sysmex XN10® analyzer,

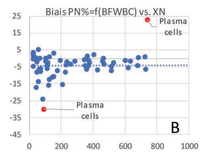

Figure 4B: Bias on PMN from Yumizen®H2500 and Sysmex XN10® analyzer

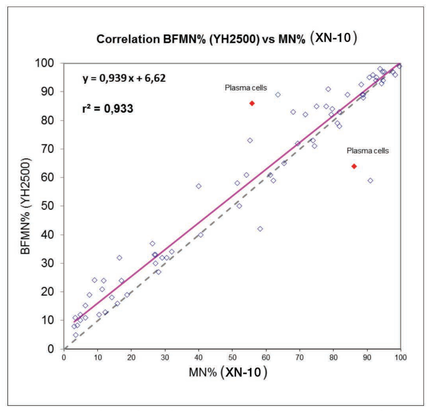

Figure 5 : Correlation of MN% between Yumizen®H2500 and Sysmex XN10® analyzer

Differential count

71 samples were retained. Comparison of the analyzers for the % of PN yielded a slope of 0.931, intercept of +0.18 and a correlation coefficient of 0.933 (figure 4A). The coefficient was 0.914 between the manual mode and Yumizen® H2500. The presence of abnormal plasma cells in the sample caused discrepant results between both analyzers (figure 4B, figure 6) and between the Yumizen®H2500 and manual count.
The %MN correlation coefficient between the 2 analyzers, and between the Yumizen® H2500 and the manual mode was respectively 0.933 (figure 5) and 0.917.

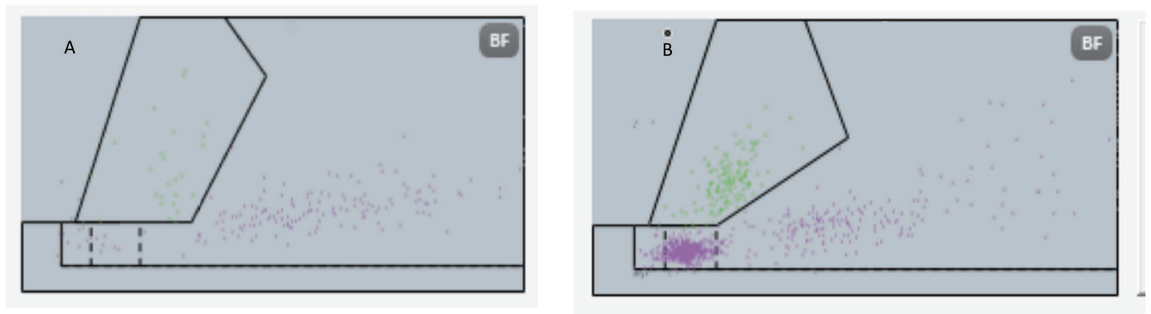

Figure 6 : Exemple of scattergramm of Yumizen®H2500 for BF containing atypical cells; A: Pleural effusion with 24% of plasma cells, B: Ascitic with 13% of mesothelial cells.

CONCLUSION

This study confirmed the good analytical performance of the Yumizen®H2500 in comparison with conventional microscopic count as well as with the XN10 analyzer. In addition, data from this study allowed the leukocyte count and the scattergram thresholds used for the differential to be optimized.