COMPARISON OF YUMIZEN H2500 WBC DIFFERENTIAL WITH FLOW CYTOMETRY IN SUSPECTED MYELODYSPLASTIC SYNDROME

Julie Blanchi, Benoit Rucheton, Francoise Durrieu
INSTITUT BERGONIE, Comprehensive Cancer Center, BORDEAUX, France

INTRODUCTION

We evaluated the WBC differential results and accuracy of the HORIBA Medical Yumizen® H2500 (YH2500) as compared to flow cytometry (FCM) in 22 blood samples from patients with a suspicion of myelodysplastic syndrome (MDS). We aimed to identify parameters allowing to discriminate MDS from non-MDS related cytopenia.

SAMPLES, MATERIAL & METHODS

Blood samples from 22 patients with bone marrow analysis for a suspected diagnosis of MDS were analyzed on the YH2500 and by FCM. Ten (10) patients were confirmed with a MDS and 12 with inflammatory or immune disorder (non-MDS).
Thirteen (13) colors FCM was performed on a DxFlex cytometer (Beckman Coulter) to confirm differential and to study light side scatter (SSC) properties of WBC populations.
Results were analyzed according to the final diagnosis after bone marrow examination, cytogenetics and molecular biology results. ROC curve analysis allowed to define the thresholds of pertinent parameters that could be used to identify non-MDS related cytopenia from MDS.

RESULTS

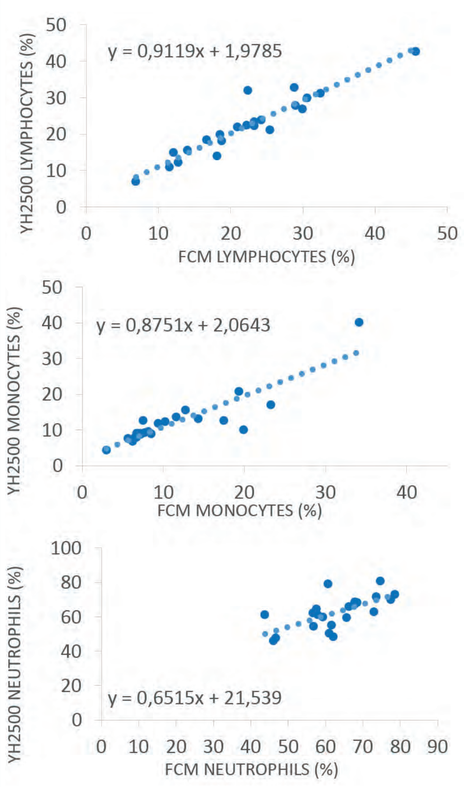

Figure 1 :
Comparison of YH2500 lymphocytes %, monocytes % and neutrophils %with FCM as the reference method.

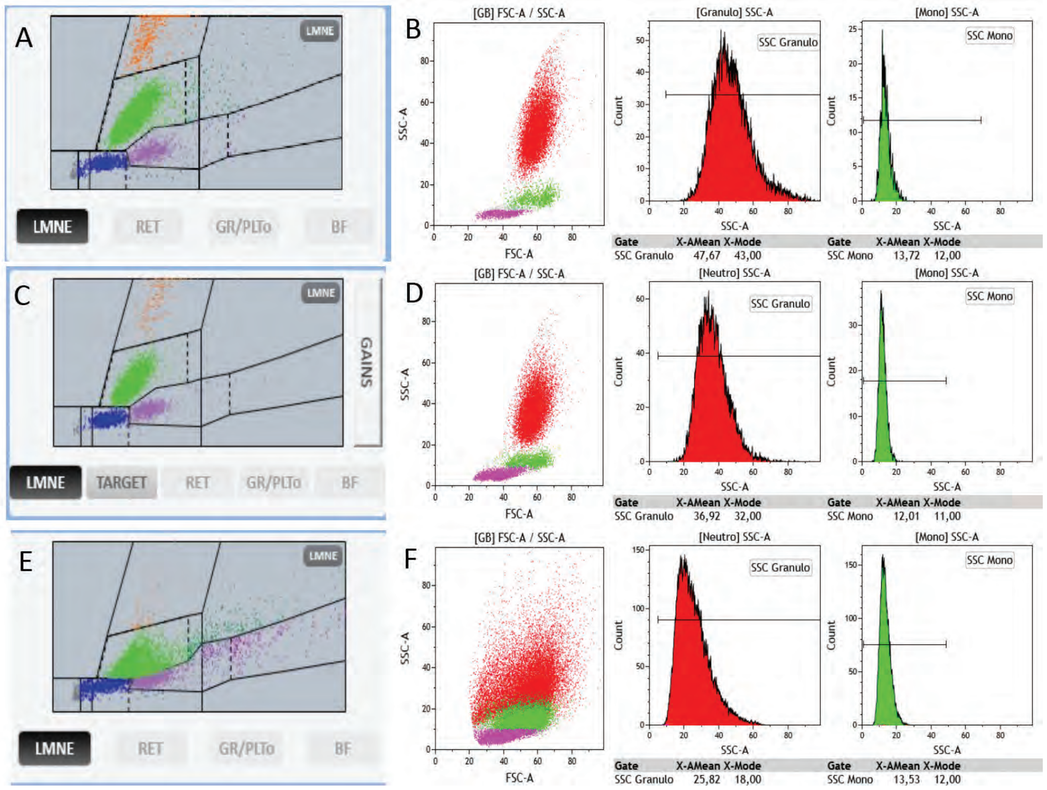

Figure 2 :
Illustration of neutrophils SSC signal alteration in MDS.
YH2500 WBC-differential and (B) FCM granulocytes and monocytes SSC signal in reactive cytopenia.
(C) and (E) represent YH2500 WBC-differential, and (D) and (F) FCM granulocytes and monocytes SSC signal in 2 cases of confirmed MDS.
YH2500 plot : green = granulocytes; purple = monocytes; blue = lymphocytes; orange = eosinophils.
FCM plot: red = granulocytes; green = monocytes; pink = lymphocytes.

Parameter	MDS Mean ± SD	Non-MDS Mean ± SD	p
WBC (G/L)	10.3 ± 7.4	9.3 ± 4.0	N.S.
HB (g/dL) F	11.7 ± 2.3	12.9 ± 1.7	N.S.
HB (g/dL) M	12.4 ± 2.0	15.1 ± 1.4	0.0033
MCV (fL)	99.7 ± 11.2	98.6 ± 4.3	N.S.
PLA (G/L)	175.8 ± 111.1	188.1 ± 116.5	N.S.
Neutro (%)	56.6 ± 18.8	60.3 ± 9.8	N.S.
Neutro (G/L)	6.01 ± 6.47	5.75 ± 2.85	N.S.
Lympho (%)	23.6 ± 11.7	26.0 ± 9.95	N.S.
Lympho (G/L)	2.12 ± 1.42	2.28 ± 1.23	N.S.
Mono (%)	15.3 ± 9.85	9.49 ± 2.07	< 0.0001
Mono (G/L)	1.88 ± 2.34	0.92 ± 0.39	N.S.
Gr/Ly SSC	2.65 ± 0.62	3.31 ± 0.52	0.0018
Gr/Mo SSC	6.52 ± 1.66	8.39 ± 0.27	0.027

Parameter	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Mono ≥ 10%	64.8	66.7	68.8	62.5
Gr/Mo SSC ≤ 3.0	76.5	66.7	72.1	71.6
Gr/Ly SSC ≤ 7.0	70.6	73.3	74.9	69.9
Gr/Mo SSC ≤ 3.0 and Gr/Ly SSC ≤ 7.0	88.9	90	88.9	90
Gr/Ly SSC ≤ 7.0 and Mono ≥ 10%	85.7	90	85.7	90
Gr/Mo SSC ≤ 3.0 and Gr/Ly SSC ≤ 7.0 and Mono ≥ 10%	100	87.5	85.7	100

Table 2 :
ROC curve analysis allowed to determine the thresholds with the best sensitivity and specificity to identify MDS from non-MDS: YH2500 Monocytes ≥ 10 % , SSC Gr/Mo ≤ 3.0 and SSC Gr/Ly ≤ 7,0. Using these thresholds in combination allowed to diagnose MDS with very good sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV).

CONCLUSION

In this preliminary study of blood parameters in patients with a suspicion of primary or secondary MDS, we confirmed by FCM that the YH2500 differential was accurate. FCM showed that light SSC property (SSC Gr/Mo and Gr/Ly ratio) associated with the % of monocytes, could be used to discriminate MDS from non-MDS disease. Our prospective is to confirm these data on a larger series and to develop the use of SSC light intensity of neutrophils, lymphocytes +/- monocytes in the YH2500 as a supplementary flagging parameter to help in the decisional algorithm and avoid unnecessary and expensive bone marrow exploration when possible.