Usefulness of XE-2100 Structural Parameters in the Diagnosis of Myelodysplastic Syndrome (MDS)

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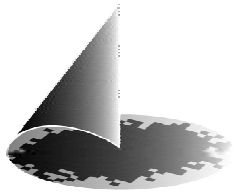
In front of an anemia, the automated analysis of blood cell count seldom brings any argument towards the diagnosis of myelodysplastic syndrome (MDS). Therefore, we investigated if some structural parameters of red and white blood cells and platelets, which are not routinely provided by blood analysis with Sysmex XE 2100 analyzer, could help the diagnosis of MDS. In addition to the usual parameters, we considered structural and maturation parameters including RET-Y and IRF for red cells, NEUT-X and NEUT-Y for neutrophils, P-MFV for platelets, and the presence of immature cells IMI. Sixty-four cases of MDS i.e. 33 RAEB, 11 RCMD-RS, 7 5q- syndrome, 7 RAS and 6 RCMD were studied on the Sysmex analyzer. In order to define the median normal values and standard deviation of these parameters, all the samples analysed in a general hospital over a week period were analysed: 1053 blood counts were considered as normal controls as the hemoglobin, the RDW, the MCV, the WBC, the neutrophils and the platelet counts were all in the normal range. When comparing all the studied parameters between normal controls and MDS cases, most of them (Hb, RDW, MCV, WBC, PLT, PN, monocytes, IMI, NEUT-X, NEUT-Y, reticulocytes, IRF) showed a highly discriminant value by univariate analysis using Wilcoxon test ($p<0,0001$). Considering that red cells parameters such as Hb, RDW and MCV may be influenced by transfusions, we excluded them from multivariate analysis. Logistic regression model identified the following parameters as being highly discriminant for diagnosis of MDS, $p < 0.0001$, *c* index =0.930

Variable	Coefficient (se)	P-value
PMFV	-0.062 (0.017)	0.0002
NEUT-Y	-0.013 (0.0018)	< 0.0001
IMI	0.0076 (0.0012)	< 0.0001
NEUT-X	-0.028 (0.0052)	< 0.0001

Introducing secondarily (because of a lower number of samples available) the structural reticulocyte parameter RET-Y slightly improved the prediction ability.

Abstract



NEUT-X seemed of particular interest because the standard deviation of control values was very low (3%) and its level proved independent of neutrophil count. Anemia of all origins is often encountered in a general hospital practice, as it is present in over 30% of the blood counts analysed. During the same period of collection as normal controls, 750 cases of unselected anemia were observed. In these anemia cases, we observed that NEUT-X was statistically different from what had been found in MDS, but strictly identical to normal controls. In the presence of an anemia, the combination of low neutrophil count and low NEUT-X was highly predictive of MDS, but low NEUT-X also proved of interest when neutrophil count was normal (40% MDS cases had a neutrophil count>2G/L). Similarly, preliminary results pointed to the interest of higher RET-Y and P-MFV values in the cases of MDS. Analysis of reticulocyte parameters on a larger series of anemia cases is warranted to confirm this result and will be presented at the meeting.

In conclusion, structural parameters provided by the Sysmex analyzer, are of great interest in the diagnosis of MDS. We propose to include NEUT-X in the parameters provided by the Sysmex analyser that could be used in the diagnostic procedure of an anemia.