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A Comparison of WBC Differential Counts between CellaVision DM96, Sysmex and Manual Count in Samples with Low Leukocytes

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Background

Manual differential count of White Blood Cells (WBC) requires highly trained staff and is time consuming, especially in samples with low leukocyte counts. The automated image recognition systems CellaVision DM96 (Lund, Sweden) enables rapid morphological analysis of peripheral blood films including pre-classification of the WBC.

Aim

The aim of the study was to investigate the usefulness of the differential count by CellaVision in samples with low leukocyte counts compared to manual microscopy and Sysmex XE-2100.

Materials and Methods

- Seventy-one blood samples with WBC < 4.0x10^9/L, (mean 1.95, range 0.13-3.96x10^9/L) initially analysed by Sysmex were included.
- Manual differential counts were performed in two blood smears prepared from each sample.
- After the pre-classification of the two samples by CellaVision, the results were validated by one observer and either reclassified or confirmed.
- The mean of the two samples was used.

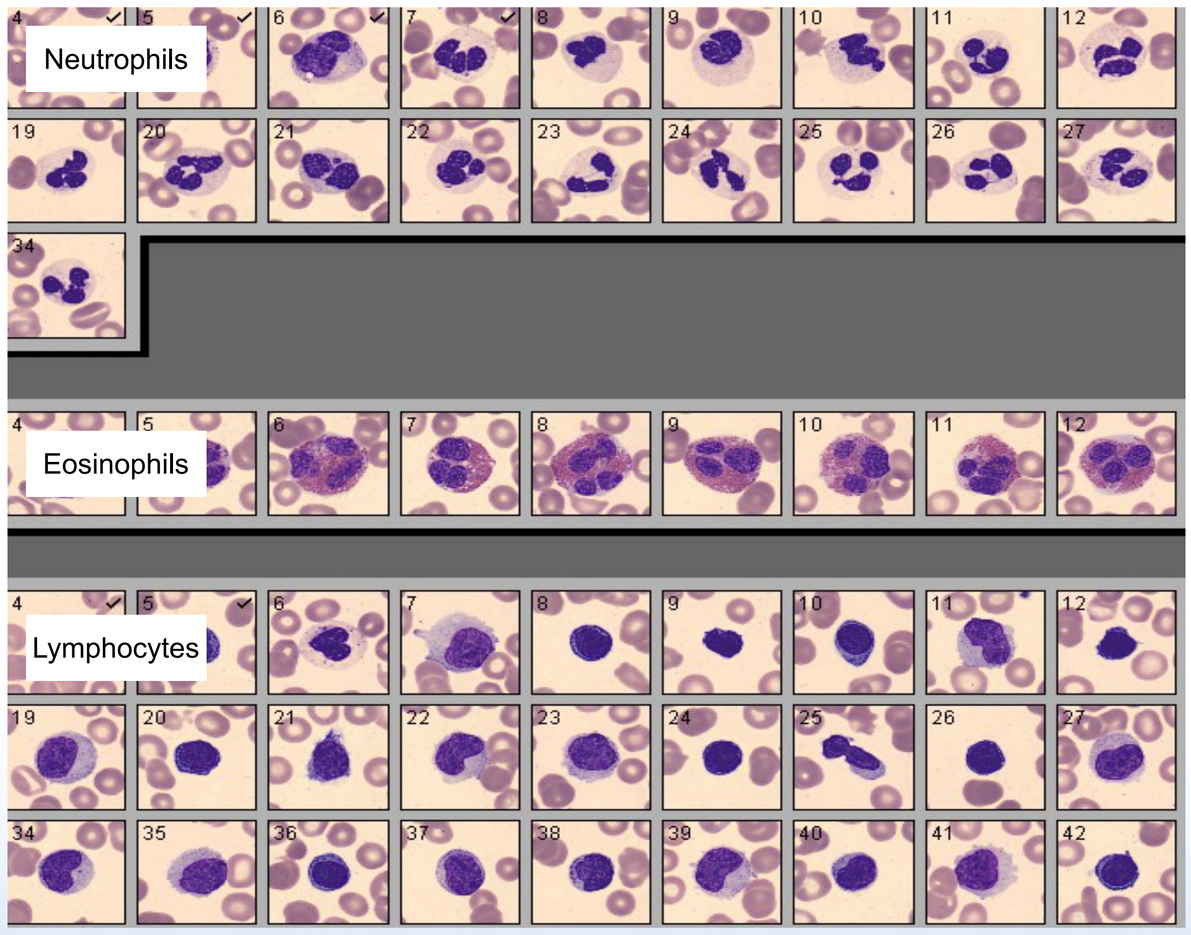

Figure 1 *Typical presentation of cells in CellaVision*

Results

Spearman's correlation was used to assess the relationship between the variables. The correlation coefficients between the three differential counts (CellaVision, Sysmex and manual) were good (Table 1), with (r) ranging from 0.91 to 0.98, except for CellaVision basophil count vs. manual review (r=0.59), most probably due to low percentage of basophils in the samples. Regression analysis (Passing Bablok) was used, and the results showed good agreements between the three methods except for a high systematic difference in the monocyte count between CellaVision and Sysmex (Fig. 2).

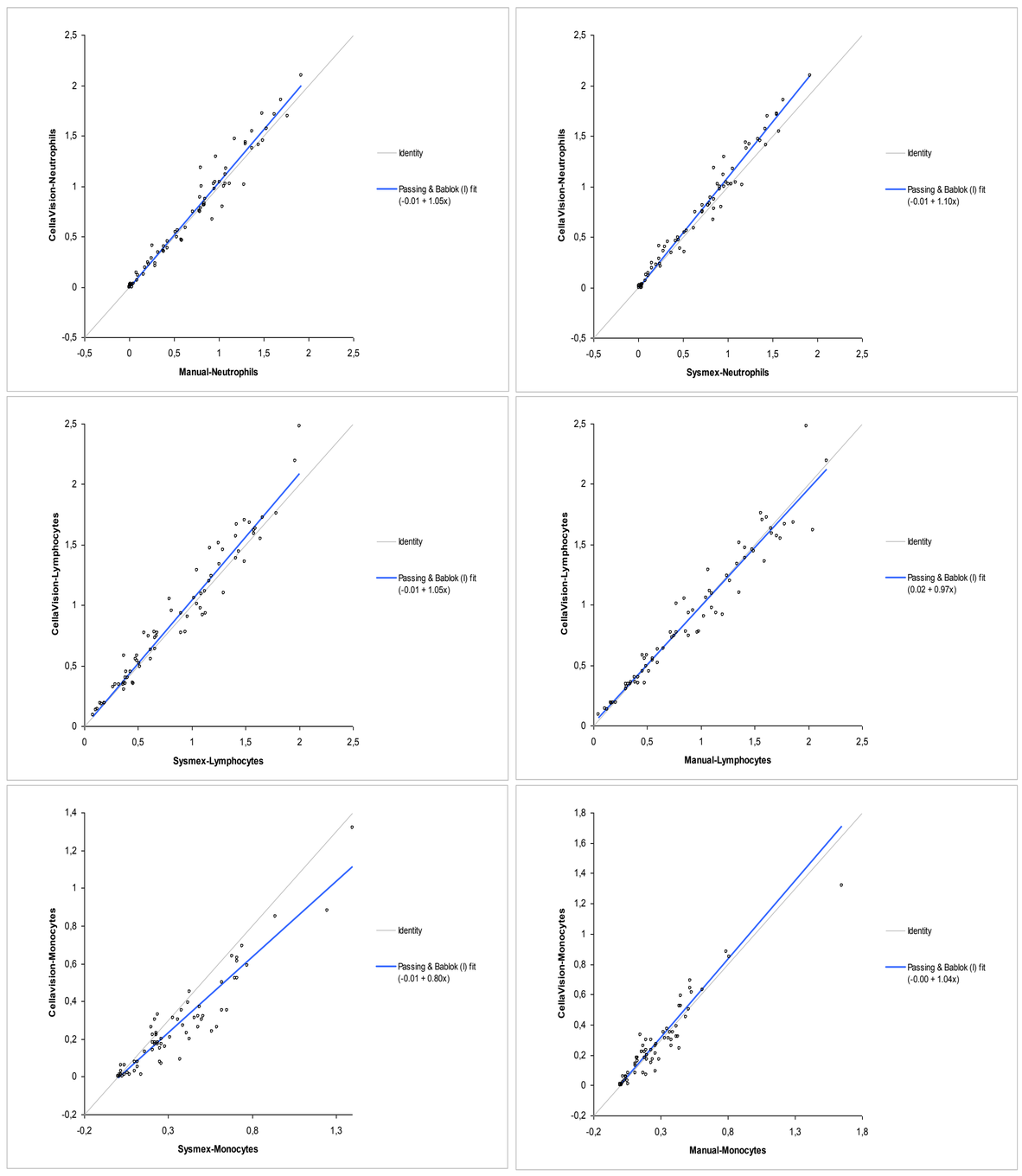

Figure 2 *Scatter plot with Passing & Bablok Fit*

	CellaVision Neutrophil	CellaVision Lymphocyte	CellaVision Monocyte	CellaVision Eosinophil	CellaVision Basophil
Sysmex	0.98	0.98	0.91	0.92	0.95
Manual	0.98	0.98	0.93	0.91	0.59
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Table 1 *Spearman's Correlation Coefficient (r) and p-values*

Conclusion

The study shows a good correlation and agreement between differential counts in leukopenic samples by CellaVision DM96 compared to Sysmex XE-2100 and manual count for neutrophils, lymphocytes, monocytes and eosinophils; while a weak correlation was found for CellaVision basohils count compared to manual count. Taken together, CellaVision is a reliable tool for differential counts in samples with low leukocyte counts and can be applied in the routine setting to reduce the time consumed for performing manual differential count.