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LETTER TO THE EDITOR

Differentiation of leucocytes in peripheral blood in remote clinical practice: precise or good enough?

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Dear Editor

During the past century leucocyte differentiation was carried out on stained slides with a Romanowsky dye to highlight the different leukocyte properties of nucleic acids, acid mucopolysaccharides and proteins. There were many mechanical problems in smear preparation, including staining variability and the random distribution of cells on each slide[1]. The drop of blood on a slide was distributed by a spreader slide and the technologist would count 100 leukocytes to report respective values. Such enumerations on a very limited number of cells were inaccurate and non-reproducible[2]. Nevertheless, such results have been important guides for clinicians in patient care.

The introduction of machines to count blood cells was a progressive innovation. Rather than counts made on approximate volumes, a precise amount of blood was used. Currently auto-analyzers work to a calibrated blood volume, calculating percentages and absolute values per ML of blood. For example, the Coulter 5-diff analyzers (Beckman; Brea, CA, USA) aspirate 53 µL volumes with 25 µL processed to lyse red cells whole preserving the shape of the leukocytes. Leukocyte differentiation is based on differential light absorption[3]. Different generations of automated analyzers are available for a precise quantification of leukocytes in peripheral blood, and blood centers depend on their processes for the quality control of differing blood components[4].

In resource-poor healthcare centers, financial restraints may prohibit use of the latest generation analyzers. Limited funds

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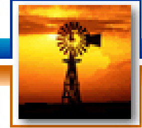

might may only allow purchase of basic models; however, even in such circumstances the aim of hematological investigators should always to acquire precise quantitative and qualitative knowledge of leukocyte, erythrocyte and platelet characteristics.

A reasonable compromise is in purchasing three- rather than five-diff analyzers, which are approximately one-quarter the cost of five-diff analyzers. Three-diff analyzers enumerate neutrophils and lymphocytes precisely and give pooled values for monocytes and eosinophils. With any three-diff analyzer, patients with non-polymorph, non-lymphocyte counts of $\geq 0.5 \times 10^9$ cells/L will require a peripheral blood smear examination, and this would address the profile of patients with visceral leishmaniasis, malaria and hematological monocytosis with $>0.95 \times 10^9$ cells/L. Furthermore, cases of invasive helminthes infections, bronchial asthma and cutaneous allergy show eosinophilia with counts of $\geq 0.4 \times 1010^9$ cells/L. For example, for travelers returning to Israel from countries endemic for parasitic diseases, eosinophilia screening was executed with a cut-off value of ≥500 cells/µL[5].

Therefore, clinicians in resource-poor or remote-health centers can provide better clinical care using less sophisticated analyzers, knowing the performance of the three-diff analyzers practically equals that of five-diff analyzers[6].

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