CORRESPONDENCE

Leukocyte Cell Population Data Provide Clues for Myelodysplastic Syndrome in a 79-Year-old Male

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Sir,

A 79-year-old male was referred for a complete blood count without the clinical history. His peripheral blood sample revealed hemoglobin—12.1 g/dL, MCV 89.1 fL, MCH—29.4 pg, MCHC—33.1 g/dL, RDW-CV—17.5%, total leucocyte count— $5.87 \times 10^9/L$, absolute neutrophil count— $3.30 \times 10^9/L$, absolute lymphocyte count $1.27 \times 10^9/L$, absolute monocyte count $1.20 \times 10^9/L$, platelet count $36 \times 10^9/L$ and Immature Platelet Fraction (IPF)—38% (XN-3000, Sysmex Corporation, Kobe, Japan). The scatter plot and cell population data showed decreased neutrophil side scatter (NE-SSC/NEUT-X) and side fluorescence (NE-SFL/NEUT-Y) values of 108.1 and 32.8 respectively (Fig. 1) (calculated laboratory-derived normal reference ranges being 144.67–159.52 and 40.89–52.04 respectively). Neutrophils on the corresponding peripheral blood smear were hypogranular with many pseudo-Pelger Huet cells, giant platelets (Fig. 2) and occasional atypical cells (5% of manual differential count).

On enquiry, we learnt that the patient was receiving oral iron supplements and intermittent blood transfusions for refractory anemia for over a year. The clinical background and morphology, supplemented by the cell population data, urged us to advise bone marrow studies and karyotyping. The hypercellular marrow aspirate showed 15% myeloblasts, 4% promyelocytes, 18% myelocytes, 6% metamyelocytes, 10% neutrophils, 40% erythroid cells, 1%

plasma cells, 3% lymphocytes and 3% megakaryocytes. Significant dysmyelopoiesis was noted in the form of cytoplasmic hypogranularity and nuclear hyposegmentation, pseudo-Pelger Huet cells and pseudo-Chediak Higashi inclusions. Erythroid and megakaryocytic hyperplasia and dysplasia were also seen; including hypolobated and monolobated megakaryocytes, and erythroblasts with nuclear budding and multinucleation. Iron stain (Perls' Prussian blue) showed increased iron stores with occasional (<5%) ringed sideroblasts. Based on the morphology, a diagnosis of myelodysplastic syndrome with excess blasts (RAEB) was rendered [1]. Karyotyping on the bone marrow aspirate revealed a hypotriploid clone [59, XY, add (1) (p33)].

Myelodysplastic syndromes are a group of clonal hematopoietic stem cell diseases characterized by ineffective erythropoiesis and dysplasia of one or more major myeloid cell lines, often clinically suspected in cases of refractory anemia or pancytopenia, especially in the elderly [1]. Clinical and diagnostic overlaps may exist in MDS and megaloblastic anemia or multiple nutritional deficiencies. A combination of bone marrow examination with cytogenetics remains the gold standard for MDS diagnosis. Diagnostic challenges in MDS may arise due to the diversity in morphological presentations (subtle changes being particularly troublesome), subjectivity and inter-observer variability in recognizing dysplasia, and the fact that karyotyping is normal in ~50% cases [2].

The XN 3000 automated five-part analyzer applies the principle of flow cytometry using a semiconductor laser for leukocyte analysis. Special surfactants and fluorescent dye in the reagents distinguish the cells using side scatter light (NE-SSC/NEUT-X) and side fluorescence (NE-SFL/NEUT-Y) [3]. These constitute the cell population data, analysis of which helps to differentiate and count various

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Fig. 1 Decreased Neut X and Neut Y values (highlighted in **bold box**); scatter plot showing decreased side scatter and side fluorescence (*arrow*)

Fig. 2 Peripheral smear showing abnormally large platelets (*left*) and pseudo Pelger Huet cell (*right*) [May Grunwald Giemsa stain (×40)]

cells and flag abnormal cells. In MDS, the dysplastic neutrophils show reduced side scatter and side fluorescence due to hypogranularity and dysfunction respectively, findings validated by prior large studies [4].

In conclusion, our experience with this case suggests that leucocyte population data analysis could be a useful and objective screening tool for MDS. However, studies on temporal stability of these parameters, interanalyzer variations, non-neoplastic mimics, and establishment of age-specific reference ranges are likely to be necessary for their clinical implementation on a large scale.

Compliance with Ethical Standards

Conflict of interest Authors declare that they have no conflict of interest.

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