Leukocytosis with left-shifted myeloid maturation in a peripheral blood specimen: a clue to the lymphoid blast phase of CML

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A 57-year-old woman with no known medical history presented with fatigue and weakness. Her complete blood count showed white blood cell count, 413.6 \times 10^9/L; hemoglobin level, 83 g/L; and platelet count, 244 \times 10^9/L. A review of the peripheral blood smear showed 37% blasts with irregular nuclear contours, fine chromatin, and scant agranular cytoplasm. Other prominent findings included leukocytosis with left shift, mild basophilia, and eosinophilia (panels A-F; original magnification, \times 1000).

Flow cytometry of a peripheral blood specimen showed 34% blasts with the following immunophenotype: CD19^-/CD10^-/cytoCD22^-/cytoCD79a^-/TdT^-/CD34partial^-/CD20partial^-/CD38(decreased^)/CD45 dim^-/cytoCD3^-/MPO^-/\kappa^-/\lambda^- (panel G), diagnostic of B-cell acute lymphoblastic leukemia (B-ALL). Concurrent cytogenetics analysis showed an abnormal karyotype: 46,XX,t(9;22)(q34.1;q11.2)[17]/47,idem,+der(22)t(9;22)(q34.1;q11.2)[3].

Fluorescence in situ hybridization with a tricolor, dual-fusion BCR/ABL1 probe set revealed 77.5% cells with dual-fusion signals (1R1G2F2A) and 16.5% with an abnormal pattern (1G3F1A). Molecular testing by reverse transcription polymerase chain reaction showed a p210 BCR-ABL1 fusion transcript. Subsequent bone marrow biopsy showed 90% to 100% cellularity predominantly involved by B-ALL.

The overall findings in this case were diagnostic of B-ALL. The clinical and laboratory features were highly suggestive of the B-lymphoid blast phase of chronic myeloid leukemia (CML). This case is an example of leukocytosis with myeloid left-shift maturation providing a clue for diagnosing the B-lymphoid blast phase in a patient with undiagnosed CML.

Figure edited by Amaris Shi, Clements High School, Sugar Land, TX.