Morphology and flow cytometry of atypical basophils
Christopher A. Tormey and Alexa J. Siddon, Yale School of Medicine

A 74-year-old man was admitted following a syncopal episode and was incidentally found to have leukocytosis with basophilia. A peripheral smear evaluation revealed basophils with atypical nuclear lobation and decreased granularity (panel A; modified Wright’s stain, original magnification ×100). A bone marrow biopsy revealed a hypercellular, myeloid-predominant marrow with megakaryocyte clustering and dysplasia but no increase in blasts. Flow cytometry of both the blood and marrow revealed an increased population of CD45\textsuperscript{mod+}, atypical-immunophenotype basophils that were dimly positive for CD33 (atypically decreased) and CD117 (atypically increased) and negative for CD34 (panel B). Molecular studies were notable for a JAK2 V617F mutation and negative for BCR-ABL. Next-generation sequencing identified oncogenic variants in IDH2, SRSF2, and ASXL1. Karyotype was normal, as were fluorescence in situ hybridization studies. The patient was ultimately diagnosed with a myelodysplastic/myeloproliferative neoplasm.

This case is an illustrative example of atypical basophilia in myeloid neoplasms. Classically, chronic myeloid leukemia with t(9;22) presents with basophilia; notably, however, it can be seen in other myeloproliferative and myelodysplastic/myeloproliferative neoplasms. Normal basophils have segmented nuclei (often obscured by coarse basophilic granules) and are CD45\textsuperscript{mod}/CD34\textsuperscript{2}/CD33\textsuperscript{1}/CD117\textsuperscript{2}/CD38\textsuperscript{11}/HLA-DR\textsuperscript{2}/CD64\textsuperscript{2}/CD123\textsuperscript{11}. It has been shown that in myeloid neoplasms, basophils are increased and often have decreased CD38 expression and variable expression of CD34/HLA-DR/CD117/CD64/CD123, which can be easily mistaken for blasts.