29-year-old man with an 8-year history of chronic myeloid leukemia (CML) was referred to our institution for marked leukocytosis and 3% blasts (white blood cells [WBC], 338.7 × 10^9/L; neutrophils, 159.2 × 10^9/L; myelocytes, 88.1 × 10^9/L; basophils, 47.4 × 10^9/L) (panel A). Cytogenetic studies showed t(9;22)(q34;q11.2), and the diagnosis of CML, chronic phase, was confirmed. The treatment history included imatinib (Gleevec) (not well tolerated), followed by dasatinib and hydroxyurea (Hydrea). Treatment with dasatinib failed due to poor compliance. Molecular studies identified a T315I mutation, and the patient was started on ponatinib. Ten months later, he presented with fevers and leukocytosis (WBC, 109.7 × 10^9/L), with >20% blasts. The blasts were moderate in size and had fine chromatin and a moderate amount of granular cytoplasm (panel B). In addition, both the peripheral blood and bone marrow showed absolute basophilia (98.7 × 10^9/L), including numerous basophilic precursors such as myelocytes and metamyelocytes. These cells comprised ~90% of the white cells by flow cytometry and expressed CD7, CD13, CD25, CD33, CD38, CD117, CD123, and CD 203c markers, confirming their basophilic differentiation. Cytogenetic studies revealed additional abnormalities [50,XY,+8,+8, t(9;22), +17, and +19].

Taken together, these findings support the diagnosis of basophilic blast phase of CML, a very rare manifestation of myeloid blast crisis.
Basophilic blast phase of chronic myelogenous leukemia

Hani M. Babiker and Maria Proytcheva