Case 205

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History

61 year-old Caucasian male with cough, night sweats, generalized weakness, and low-grade fever. He is a heavy smoker and drinks alcohol regularly. His complete blood count was: Hemoglobin, 9.4 gm/dl, white cell count 71.1 K/uL and platelet count of 135,000/uL. His peripheral blood smear showed leukocytosis with 79% blasts.

Details

Bone marrow aspirate: Hypercellular bone marrow with approximately 87% blasts. The blasts varied from intermediate with scant cytoplasm, condensed nuclear chromatin and indistinct nucleoli to large cells with moderate light blue cytoplasm with a cytoplasmic pseudopod (hand mirror cells), irregular/convoluted nuclei, dispersed chromatin and multiple prominent nucleoli.

Differential count of aspirate smear:

Blast	87%
Myelocyte	1%
Erythroids	3%
Lymphocyte	8%
PMN:	1%

Bone marrow biopsy: Cellularity >95%. Diffuse infiltration by blasts with histomorphology as seen on bone marrow aspirate and peripheral blood smear. Megakaryocytes were of normal morphology and in adequate numbers with a reduction in normal erythropoietic elements.

Immunohistochemistry and Flow Cytometry

Flow cytometry: Predominance of blasts (93% of the flow sample), with a composite:
Positive antigen profile of: CD2 (bright), CD7 (bright), CD13 (bright), CD15 (dim/subset), CD34 (bright), CD117 (bright), HLA-DR, cytoplasmic CD3 (dim), cytoplasmic TdT (partial; dim);
Negative antigen profile of: CD3, CD5, CD10, CD11b, CD14, CD16, CD33, CD56,CD61, CD235a, cytoplasmic CD79a and cytoplasmic MPO.

Cytogenetic Findings

Chromosomal analysis of bone marrow aspirate showed a karyotype of 46, XY, del (16)(q13)[6]/46,XY[14].

Fluorescent in situ hybridization (FISH) analysis showed no genetic abnormalities involving MYC (8q24), BCL6 (3q27), IGH-BCL2 (14:18), API2-MALT1 t(11;18), BCR-ABL t(9;22), or inv(16).

Interesting Features/Discussion

While this case clearly meets criteria for T-cell lineage, the question of additional myeloid lineage is not straightforward. According to the 2008 WHO criteria for defining lineage in acute leukemia of ambiguous lineage, expression of myeloperoxidase or monocytic differentiation is required for assigning myeloid lineage. However in contrast with the European Group for immunologic characterization of Leukemia (EGIL) scoring system for biphenotypic Acute Leukemias, 1998 version, this case will be designated Acute Leukemia of T-cell lineage with aberrant myeloid differentiation if you assume that it does show dim CD15 expression, which was difficult to determine. This case illustrates the need for consensus in this classification system in order to provide appropriate treatment and prognostication for these patients.

Proposed Diagnosis

Mixed phenotype acute leukemia, favor T/myeloid, NOS

Consensus Diagnosis

T-acute lymphoblastic leukemia/lymphoma, with myeloid antigen expression