Acute Leukemia with M3 Morphology Without Cytogenetic Abnormalities Related to Acute Promyelocytic Leukemia: Description of a Refractory Pediatric Case

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Abstract

Acute promyelocytic leukemia (APL) is a distinct subtype of acute myeloid leukemia (AML). APL is characterized by specific genetic abnormality t(15;17), which results in fusion between the promyelocytic leukemia (*PML*) gene and the retinoic acid receptor-α (*RARα*). We describe the case of a 4-year-old boy who was admitted to hospital with severe infection of the oropharynx due to a peritonsillar abscess, along with hepatomegaly and splenomegaly. The initial laboratory tests showed a condition compatible with AML. The cytologic morphology, cytochemistry, and immunophenotyping were compatible with the AML M3 variant but with normal karyotype, fluorescence in situ hybridization and polymerase chain reaction (PCR) negative for t(15;17), and PCR negative for t(11;17). There was resistance to the initial chemotherapy, but the patient experienced an excellent result from nonrelative umbilical cord transplantation. The case represents an atypical situation of AML with promyelocytic characteristics and normal cytogenetics showing a poor prognosis that responded only to bone marrow transplantation.

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Introduction

Acute promyelocytic leukemia (APL) is a distinct subtype of acute myeloid leukemia (AML). APL is characterized by specific genetic abnormality t(15;17), which results in fusion between the promyelocytic leukemia (*PML*) gene and retinoic acid receptor-α (*RARα*). Variations in this chromosomal translocation (for example, t[11;17], t[5;17]) can be found in < 5% of cases of promyelocytic leukemia. In addition to its characteristic morphology, APL is associated with severe hemorrhagic syndrome.[1]

The incidence of APL accounts for approximately 10% of all acute leukemia cases, although there are reports of increased incidence of up to 25% in populations of Latin American origin. In pediatric populations, its incidence is between 4% and 11% of children with AML.[2] Compared with adults, APL in children is more frequently associated with a high rate of hyperleukocytosis (> 10×10^9/L), together with the AML-M3 microgranular morphologic subtype.[2,3]

Because of the characteristic cytogenetic abnormality of AML-M3, it presents sensitivity to cell-differentiating retinoid agents, such as all-*trans*-retinoic acid (ATRA) and to new agents like arsenic trioxide (AS_2O_3).[4-7] Therefore, it can evolve from a fatal disease to a potentially curable one.[1]

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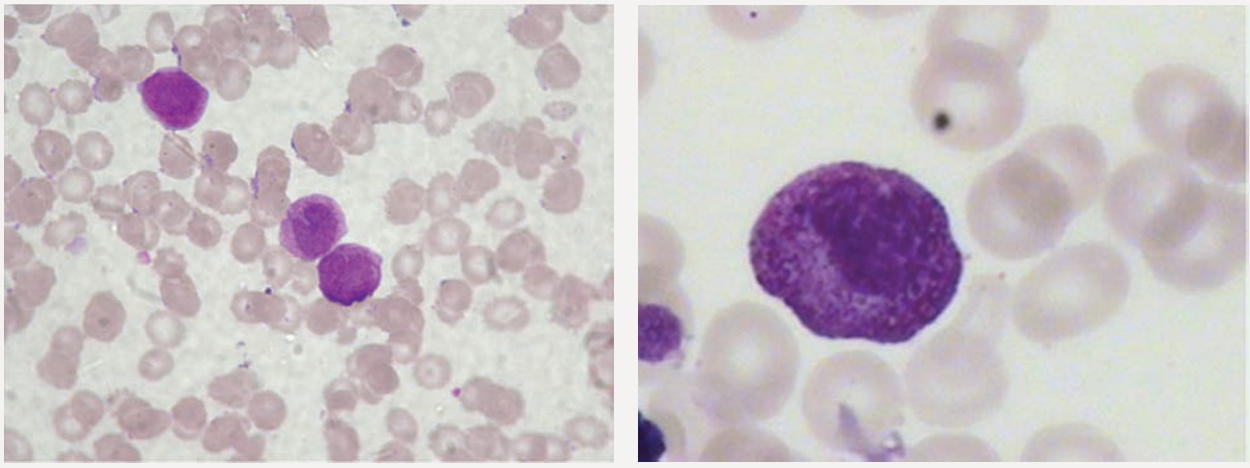
Figure 1

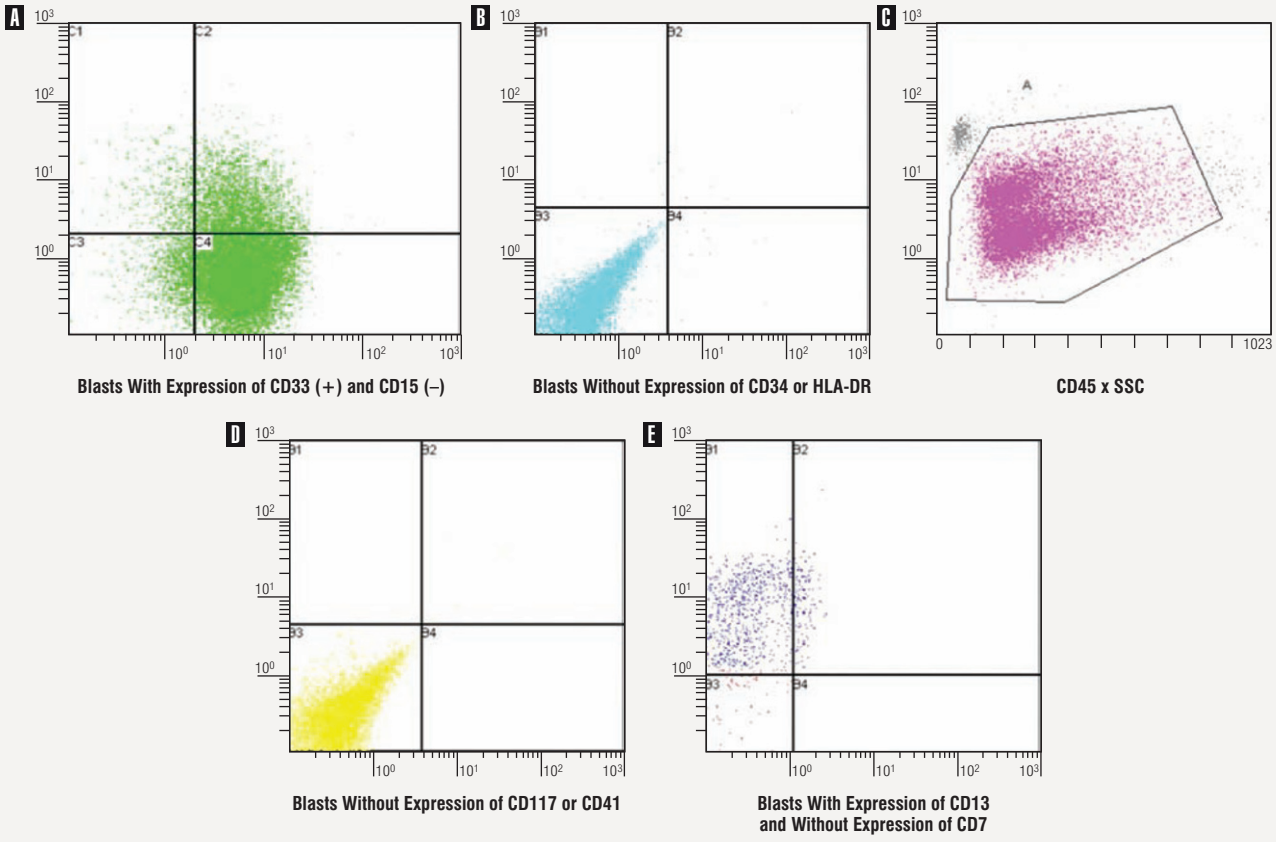
Morphologic Features Compatible With the Promyelocytic Variant of Acute Myeloid Leukemia in Blasts From Peripheral Blood and Bone Marrow



Hematoxylin and eosin stain. Magnification x 50 and x 100, respectively.

Figure 2

Immunophenotyping Histograms: Bone Marrow With Blasts Compatible With the Classical Promyelocytic Variant of Acute Leukemia



Case Report

We describe the case of a 4-year-old boy of Asian origin, previously healthy, who was admitted to hospital in March 2004 with a condition of severe infection of the oropharynx as a result of a peritonsillar abscess. He also presented with hepatomegaly and splenomegaly. In the initial assessment, his laboratory tests showed a condition compatible with AML: hemoglobin of 7.7 g/dL, leukocytes of 22,100/µL, with 72% of blast cells, platelets of 82,000/µL,