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Commentary

Near-haploid B Lymphoblastic Leukemia with Atypical Blast Morphology

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A 7-year-old girl presented with fever and headache for 3 days. Complete blood count (CBC) showed marked lymphocytosis (WBC 55,600/µl, 97% lymphocytes), severe normocytic normochromic anemia (Hemoglobin 2.9 g/dL, hematocrit 9.0) and thrombocytopenia (platelet 80,000/µl). Peripheral blood smear showed numerous monotonous intermediate-sized lymphocytes (A, Wright-Giemsa stain, 100x objective) with features suggestive of mature lymphoma cells or reactive lymphocytes. These cells had moderate to abundant pale gray cytoplasm with a deep blue peripheral rim. Many contained varied number of small cytoplasmic vacuoles. They have partially open chromatin and some had prominent nucleoli. By flow cytometry, they are positive for CD19, CD34, heterogeneous CD10, CD38, dim CD45, cytoplasmic CD79a, CD123, HLA-DR and negative for CD20, kappa and lambda light chains and all T, myeloid markers (B, red), consistent with B lymphoblasts. The blasts were hypodiploid with a DNA index of 0.61. Karyotype is 27,X,+X,+10,+18,+21[7, two w/nonclonal abnormalities]/46;XX[1]. She was diagnosed as B lymphoblastic leukemia (B-ALL) with hypodiploidy.

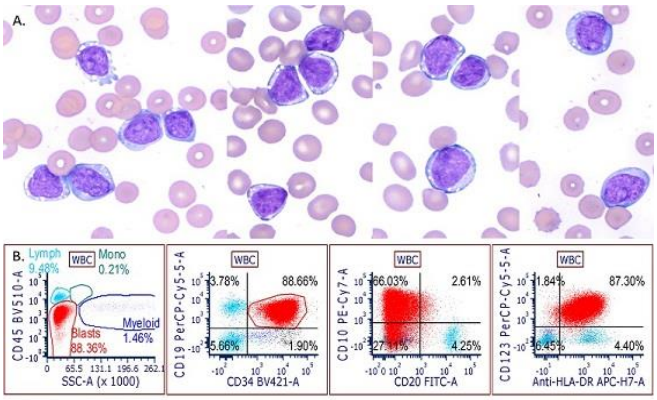

Figure (1): Morphology and immunophenotype of B lymphoblasts. A. Peripheral blood smear (Wright-Giemsa stain, 100x objective) show monotonous intermediate-sized lymphocytes with moderate to abundant pale gray cytoplasm with a deep blue peripheral rim, small cytoplasmic vacuoles, partially open chromatin and some with prominent nucleoli. B. Flow cytometric immunophenotyping shows the cells (red) were positive for CD19, CD34, heterogeneous CD10, CD38, dim CD45, cytoplasmic CD79a, CD123, HLA-DR and negative for CD20, kappa and lambda light chains and all T, myeloid markers, consistent with B lymphoblasts.

B-ALL with hypodiploidy includes 3 subtypes: near-haploid (23-31 chromosomes), low hypodiploid (33-39 chromosomes) and high hypodiploid (40-43 chromosomes)[1,2]. The near-haploid ALL is rare and occurs in children only with the worst prognosis. This case demonstrates uncommon morphological features for B lymphoblasts, resembling mature lymphocytes. Flow cytometric analysis and cytogenetic studies are imperative for correct diagnosis and classification.

Author contribution

Dr. Huifei Liu made the diagnosis. Dr. Huifei Liu wrote the manuscript and prepared the photos and did the flow cytometry analysis.

Conflict of interest disclosure

None.

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