Letter to the Editor

Translocation t(2;14)(p13;q32) in a case of Ph+ acute lymphoblastic leukemia

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Sir,

Acute lymphoblastic leukemia (ALL) is a malignant (clonal) disease of the bone marrow in which early lymphoid precursors proliferate and replace the normal hematopoietic cells of the marrow. At least two-third of ALL cases show clonal chromosomal abnormalities. In ALL the most common chromosomal changes are t(12;21),t(9;22),t(4; 11), del(6q) followed by t(8;14), t(1;19), and del (9p).[1] The t(9;22)(q34;q11) or Ph' chromosome is found in 17% of adult cases of ALL and 6% of childhood ALL.[2] Various additional chromosomal abnormalities have been reported in Ph'-positive ALL.[3] Here we report a rare association of t(2;14)(p13;q32) in a case of Ph'-positive ALL. A 26-year-old female, a mother of two children, presented with fever and cough for 1 month and progressive weakness and fatigability. She had a history of arthralgia, with pain in both upper and lower limbs and low-grade backache. On examination, the patient had pallor, sternal tenderness, and massive splenomegaly; she had no liver enlargement or lymphadenopathy. Peripheral blood examination showed hemoglobin 7.4 g/dl; white blood cells $7.3 \times 10^3/\mu l$; and platelets $1.5 \times 10^3/\mu L$. The bone marrow (BM) was normocytic and normchromic. BM smear showed infiltration by leukemic blasts (78%). The blasts showed high nuclear nucleoli and Auer rods. The vitamin B_{12} and folate levels were within the normal range. Tests for antinuclear factors and HIV antibody were negative.

Immunophenotyping of leukemic blasts was done using fluorescein isothiocyanate and phycoerythrin-conjugated monoclonal antibodies (Becton Dickinson, Franklin Lakes, NJ). Antibodies against the following antigens were used: CD2, CD3, CD7, CD8, CD10, CD13, CD19, CD20, CD22, cCD7qq, CD19, CD14, CD15, CD33, CD34, CD45, CMPo, and HLA-DR. Less than 20% positivity was considered a negative result. The blasts showed positivity with CD10 (95%), CD19 (98%), cCD22 (90%), CD13 (98%), CD 34(98%), and HLA-DR (997%). Based on these findings, and using the criteria of the European Group for the Immunological Characterization of Acute Leukemia (EGIC), the patient was diagnosed as having common precursor B-cell acute lymphoblastic leukemia. Cytogenetic analysis of unstimulated BM cells was performed at the time of diagnosis using direct harvest and harvest after 24-h culture. Metaphase chromosomes were GTG-banded and karyotyped according to ISCN (2005). Chromosomal analysis revealed a mosaic karyotype with 46, XX, t(9;22)(q34;q11),t(2;4)(p13;q32) [22], and 46, XX (8) [Figure 1A, B].

The t(2;14)(p13;q32) was a rare but recurrent chromosomal abnormality reported in chronic lymphocytic leukemia (CLL).[4,5] However, t(2;14) is reported to be uncommon in ALL cases and other lymphoid malignancies.[6] The t(2;14) has been detected as a secondary chromosomal abnormality in Ph'-positive CML cases.[7] In case of ALL, t(2;14) was detected along with other chromosomal aberrations.[7] To the best of our knowledge, our case is the second case where t(2;14) was present as a primary clone along with Ph[1] chromosome in ALL patient. Inaba *et al.*[8] have reported a similar chromosome abnormality in ALL patients.

In case of t(2:14)(p13; q32), the 14q32 band has been known to contain at least two regions of preferential breakage in leukemia patients. One is the immunoglobulin heavy-chain (Ig H) region and the other, located 15-20 million base pairs centromeric to the Ig H locus at q32-1,[9] has been identified in T-cell malignancies of

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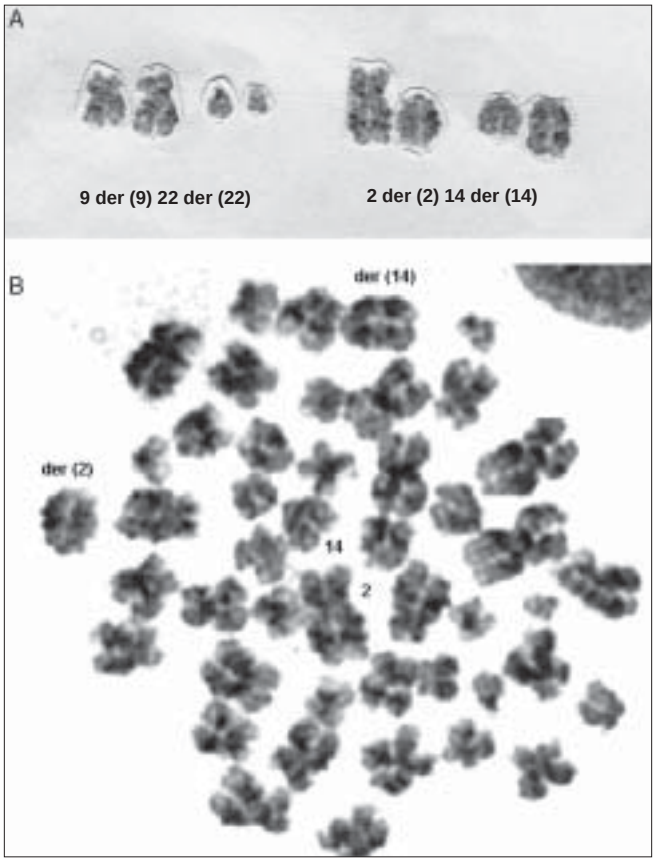

Figure 1: (A) Metaphase showing der(2), (14), der(9), der(22), (B) Partial karyotype showing t(9;22)(q34;q11) and t(2;14)(p13;q32)

patients with ataxia telangiectasia (AT). It was suggested that a break in this site appears to confer a proliferative advantage to the cells.[10] Chromosomal translocation t(2;14)(p13;q32) occurs as the sole cytogenetics abnormality in a rare but clinically aggressive subset of CLL/immunocytoma, suggesting that deregulated expression of BCL II A may play a major and primary role in the pathogenesis of the disease. In our case, two cytogenetic abnormalities, i.e., t(9;22)(q34;q11),t(2;14)(p 13;q32) originated together and shown lymphatic marker CD10 and myeloid marker CD13 expression, which is a rare event. The patient was not responding to the standard chemotherapy protocols and the cytogenetic investigation after two months revealed the same chromosome abnormality that was detected at the time of diagnosis. Hence, the t(2;14) along with the Ph chromosome is a poor prognostic factor in ALL patients.

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