CASE REPORT

CD5-Positive Acute Lymphoblastic Leukemia

Dawood Ahmed[1], Tahir Aziz Ahmed[1], Suhaib Ahmed[2], Hamid Nawaz Tipu[1] and Muhammad Amin Wiqar[1]

ABSTRACT

CD5-positive B-ALL is a rare variant of Acute Lymphoblastic Leukemia (ALL). In literature, only three cases have been reported so far. This fourth case report describes a young lady who was diagnosed as ALL (L-2) on bone marrow examination and was found to be CD5 positive B-cell acute lymphoblastic leukemia on immunophenotyping. Cytogenetic analysis revealed translocation t(9:22).

Key words: *CD5. Immunophenotyping. Acute lymphoblastic leukemia.*

INTRODUCTION

CD5 is a 67-kd glycoprotein that is expressed by most T-cells and a subset of B-cells called B-1 cells. CD5-positive B-cells are found in fetal spleen, cord blood and peritoneal cavity of adults. Similar cells are also present in the marginal zones of lymphoid follicles in spleen. Only 5 to 10% of B-cells belong to this category in blood and lymphoid tissues.[1] These cells produce IgM antibodies (natural antibodies) against polysaccharide and lipid antigens. Role of CD5 molecule in production of IL-10 has been reported. It protects normal human B-cells from apoptosis and supports the survival of B-cells by stimulating IL-10 production.[2]

CD5 is expressed in several B-lymphocyte malignancies, including Chronic Lymphocytic Leukemia (CLL), Mantle Cell Lymphoma (MCL), and biphenotypic acute leukemia but CD5 positive B-cell ALL is extremely rare. To date, only three cases have been reported. First case was reported by Subira *et al.* in 1998[3] and two were reported by Peterson *et al.* in 2007.[4] This is the fourth case report of ALL, which was CD5-positive.

CASE REPORT

This young lady of 23 years age was suffering from fever, anorexia and generalized weakness for the last two months. She was initially treated as a patient of malaria and enteric fever by a general practitioner without any improvement. She was referred to a physician in Abbottabad who noticed pallor and hepatosplenomegaly and advised complete peripheral blood examination. On peripheral blood examination hemoglobin (Hb) was reported 7.6 g/dl, Total Leukocyte Count (TLC) 18,600/µl with 85% lymphocytes, 9% neutrophils, 4% eosinophils and 2% monocytes. Lymphocytes were described as atypical and abnormal cells and bone marrow aspiration was advised. Blood counts carried out at the time of bone marrow aspiration revealed ESR 120 mm after one hour, Hb 5.3 g/dl, TLC 26,900/µl with 82% lymphocytes and 18% neutrophils in the peripheral blood specimen. Platelets count was 67,000/µl. Smear of bone marrow aspiration was hypercellular due to infiltration by medium sized lymphoid cells having scanty cytoplasm and large open nuclei with 1-2 nucleoli. ALL, NHL and prolymphocytic leukemia were question marked. Patient was then referred to the Armed Forces Institute of Pathology (AFIP), Rawalpindi for immunophenotyping and examination of bone marrow aspirate. Bone marrow aspirate showed more than 80% blasts with lymphoid morphology. She was diagnosed as acute lymphoblastic leukemia (ALL-L2) after morphological examination.

Immunophenotyping was carried out by FACScalibur flowcytometer after staining the cells with FITC or PE conjugated antibodies (BD Biosciences, USA) against CD34, HLA DR, CD10, CD19, CD20, CD22, CD2, CD3, CD5, CD7, CD13, CD33, CD14 and CD45. Ten thousand events were counted and mononuclear cells were gated for analysis. The cells showed the expression of CD34 (89%), HLA DR (90%), CD19+5 (88%), CD20 (78%), CD10 (87%), and low CD45 (95%). Karyotyping was done and translocation of chromosomes 9 and 22 (Philadelphia chromosome) was observed.

Chemotherapy was initiated and complete remission was observed within two weeks of treatment. Blood counts carried out after ten days of therapy showed TLC 5,200/µl with 78% neutrophils and 15% lymphocytes. Platelets count was 1,12,000/µl. Immature cells were not seen.

Department of Immunology[1]/Haematology[2], Armed Forces Institute of Pathology, Rawalpindi.

Correspondence: *Dr. Tahir Aziz Ahmed, H. No. 76, Street. 3, Cobb's Lane, Gulnar Colony, Rawalpindi. E-mail: ctahir@isb.paknet.com.pk*

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DISCUSSION

Phenotypically the diagnosis was established as c-ALL with expression of CD5, a rare variant of ALL, on the basis of markers of prematurity and B lineage in immunophenotying and other laboratory data obtained after morphological examination. Other haematological malignancies which express CD5 are T-cell disorders, B- CLL, mantle cell lymphoma and biphenotypic acute leukemia. In this case, T-cell disorders were ruled out on the basis of negative expression for CD2, CD3 and CD7. On the other hand the cell expressed CD19 and CD20 are B lineage markers. In addition, CD10 expressed on immature B lymphocytes was detected on (87%) cells. B CLL and mantle cell lymphoma were ruled out on the basis of morphology and expression of CD34 and CD10.

Peterson *et al.* described the poor prognosis of this variant of ALL.[4] However, the small number of reported CD5-positive ALL cases makes it difficult to draw a conclusion about the natural behaviour of malignancy with this phenotype.

Genetic alteration t(9:22), Philadelphia chromosome was observed in this patient, which creates BCR-ABL fusion gene producing an activated protein tyrosine kinase. In this way t(9:22) results in cell proliferation and leukemogenesis.[5] Philadelphia chromosome (Ph/BCR-ABL) is reported to be present in 30% of adult ALL.[6] Although CD10+ subgroup of B-precursor ALL(c-ALL) has a favourable prognosis but adults and children with Philadelphia chromosome-positive c-ALL have an unfavourable prognosis.[6,7] In a study performed by Gleissner *et al.,* it was found that 68% of BCR-ABL positive adult ALL patients achieved complete remission compared to 85% of BCR-ABL negative patients, with a higher frequency of early relapses in BCR-ABL positive patients.[8] Gokbuget and Hoelzer in their review reported an overall survival of 46% for matched unrelated donor stem cell transplantation in Ph/BCR-ABL+ALL patients.[6]

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