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A CASE OF JUVENILE CHRONIC MYELOID LEUKEMIA WITH XX / XXX MOSAICISM*

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Cytogenetic abnormalities are rarely found in patients with juvenile chronic myelogenous leukemia (JCML). In patients with chromosomal abnormalities, chromosomes 7 and 8 are usually involved. A case of JCML with 47 XXX and a 46 XX karyotype is described and the literature is reviewed. To our knowledge, this is the first case ever to have been reported. *Key words: juvenile chronic myeloid leukemia, chromosome, XXX karyotype.*

Juvenile chronic myeloid leukemia (JCML) is a clonal panmyelopathy associated with an elevated white blood cell count, hepatosplenomegaly, and decreased leukocyte alkaline phosphatase and high fetal hemoglobin levels[1-7]. In cytogenetic studies, JCML is distinguished from the adult form of the disease because the leukemic cells lack the Philadelphia (Ph') chromosome marker[1,3,5,7,8]. The majority of patients have no cytogenetic abnormalities, but in cases where they are present, chromosomes 7 and 8 are the most commonly involved[1,7].

We present a case of JCML with the 46 XX/47 XXX mosaic karyotype, that to our knowledge, has not been previously reported in the literature.

Case Report

A seven-year-old girl was admitted to our clinic with a history of pallor, cough, lassitude, and loss of appetite. Physical examination revealed bilateral otitis media, chronic tonsillitis, polymicrolymphadenopathy (one right axillary lymph node exceeded 3 x 1 x 1.5 cm in size). The liver was enlarged 4 cm and the spleen 6 cm below the costal margins. Ecchymoses and petechial skin lesions were observed on both extremities.

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Laboratory studies revealed hemoglobin 6.5 g/dl, white blood cell count 26,000/mm^3, and hematocrit value 21%. The peripheral blood smear showed a decreased thrombocyte count, and 13% blasts, 1% promyelocytes, 2% myelocytes, 6% metamyelocytes, 45% PMN band forms, 15% lymphocytes, 18% monocytes, and 12 normoblasts per 100 white blood cells, some of which were in a very early stage of differentiation. Bone marrow aspiration demonstrated hypercellularity with 11.5% blast cells, 7.5% promyelocytes, 5.5% myelocytes, 15% metamyelocytes, 15% PMN band forms, 2% pronormoblasts, 27.5% normoblasts, 2% lymphocytes, 14% monocytes, and no megakaryocytes. Hemoglobin electrophoresis revealed hemoglobin F 30.7%, hemoglobin A_2 0.2%, and hemoglobin A_1 69%. The heterophile antibody test was negative, while the direct Coombs test was initially positive, but after three weeks, was found to be negative. Hemoglobin A_2 levels were normal in both parents.

Cytogenetic analysis was carried out using the direct bone marrow technique, and chromosomes were banded by GTG[9,10]. In accordance with the normal 46 XX karyotype, the 47 XXX configuration was observed in 35 out of 100 cells examined (Fig. 1).

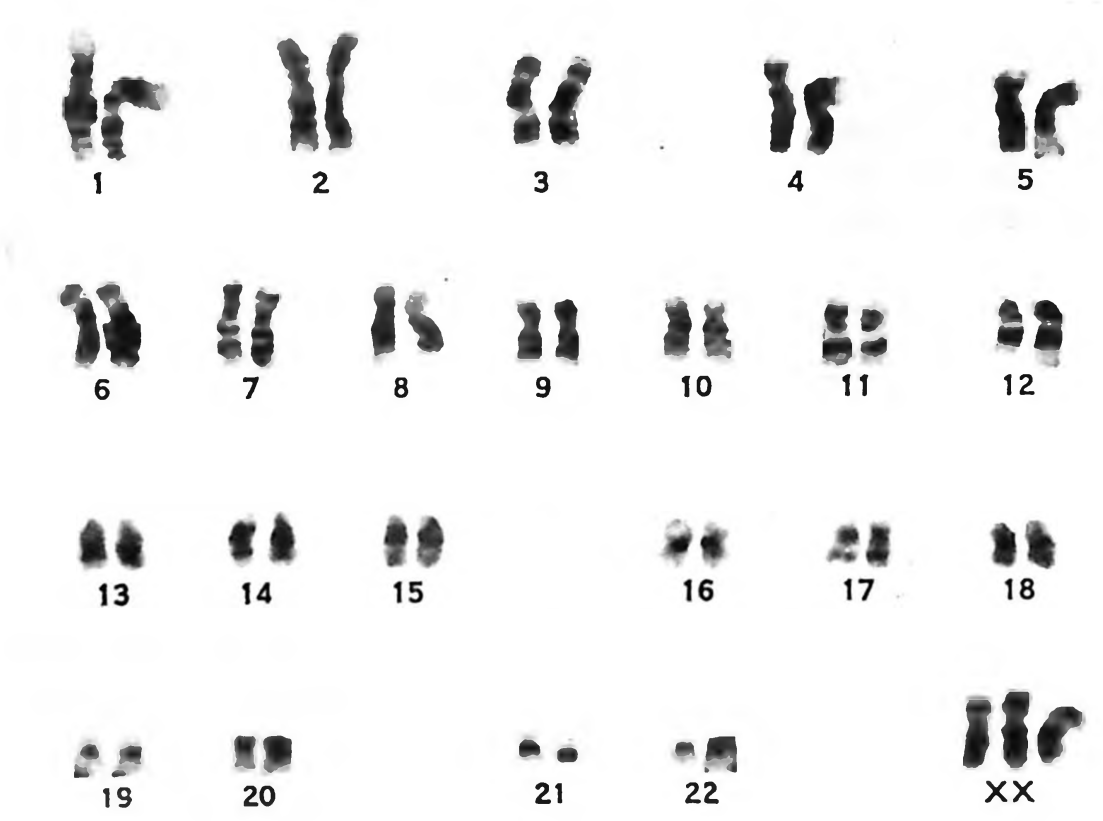

Fig. 1. Karyotype of the patient.

Discussion

Chronic myelocytic leukemia (CML) is a rare type of childhood leukemia. Three different forms of the disease have been described: the adult, juvenile, and congenital or infantile types[8].

JCML differs from the adult form of CML by its presentation in the first year of life, cutaneous manifestations, lymphadenopathy, hemoglobin level, immunologic deficiency, prominent involvement of the monocytic series, a relatively rapid course and absence of the Ph' chromosome[1,3,7]. Monocytosis and the presence of the early form of normoblasts are the most striking feature in peripheral blood smears[3,7]. These features confirm that JCML is a panmyelopathy which involves granulocytes, monocytes, erythrocytes and platelet precursors[1,5,11]. In addition, there are reports regarding the association between the pathogenesis of JCML, and neurofibromatosis and persistent Epstein-Barr virus infection[1,3,4,12]. An elevated fetal hemoglobin level is another characteristic of JCML[1,3,7]. Castro-Malaspina et al[3] found that fetal hemoglobin levels were increased in 53 percent of the patients they studied. We also observed a fetal hemoglobin level of 30.7 percent in our patient. JCML has a heterogenous cytogenetic pattern. Most patients have normal karyotypes and the Ph' chromosome is always missing.

In a minority of patients, chromosome abnormalities have been documented by cytogenetic studies of marrow cells including an extra-minute chromosome, condensed G-group chromosome, trisomy C, missing Y chromosome, and various translocations and deletions[3,5,11]. We found the 46 XX/47 XXX mosaic karyotype while making a cytogenetic analysis of the marrow cells of our patient. To the best of our knowledge, this assocaiton with JCML has not been previously reported, and it may be coincidental, therefore, it requires further investigation.

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