Importance of bone marrow examination in a case of pancytopenia with non-contributory clinical features

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Abstract:
In India, over 10,000 cases of childhood leukemia are reported annually, with Acute Lymphoblastic Leukemia (ALL) being the cause behind majority of the cases diagnosed. Common clinical features of ALL include fever, bone pain, hemorrhagic manifestations, infections, lymphadenopathy and hepatosplenomegaly. Circulating lymphoblasts are seen on peripheral blood smears in the majority of cases. To confirm the diagnosis of ALL, more than 20% of all cells should be leukemic lymphoblast in a bone marrow biopsy specimen.

A child with aleukemic lymphoblastic leukemia who presented with non-contributory clinical features is reported here and the importance of bone marrow examination for confirmation of diagnosis in such cases is highlighted.

Keywords: Acute Lymphoblastic Leukemia, aleukemic lymphoblastic leukemia, bone marrow examination

Introduction
Acute Lymphoblastic Leukemia (ALL) is the most common hematological malignancy in childhood. Common presentations of ALL include fever, bone pain, hemorrhagic manifestations, infections, lymphadenopathy and hepatosplenomegaly. Though blast cells are seen on peripheral blood smears in the majority of cases, aleukemic lymphoblastic leukemia may present without any blast cells in peripheral blood. In such cases, demonstration of blast cells in bone marrow examination is needed to confirm the diagnosis of leukemia.

A child with aleukemic lymphoblastic leukemia who presented with non-contributory clinical features is reported here.

Case Report
A 4 year old boy was admitted in Pediatrics Ward with complaints of a right-sided groin swelling for last one year, pain in the abdomen for last one month and fever for last two weeks. The abdominal pain was mild, dull and persistent in nature and generalized over the entire abdomen. Fever, persisting for last two weeks, was of low grade and intermittent in nature, accompanied with night sweats.

On examination, the child was afibrile, active and alert. General physical examination was unremarkable except for mild pallor and a right-sided reducible inguinal swelling. There was no bony tenderness, arthalgia/arthritis, ecchymotic spots, gum hypertrophy, lymphadenopathy, hepatosplenomegaly or any other palpable mass. Respiratory, cardiovascular and neurological examinations were within normal limits.

A provisional diagnosis of malaria was made because of the complaints of fever and mild pallor. Ultrasonography of abdomen confirmed the groin swelling to be an inguinal hernia.

Complete hemogram revealed moderate normocytic normochromic anemia (Hb 8.4 g/dL), leucopenia (WBC count 2.16 x 103/cumm) and thrombocytopenia (platelet count 0.34 x 103/cumm). Peripheral blood smear examination showed pancytopenia without any abnormal cells (Figure 1).

![Figure 1: Peripheral blood smear examination showing pancytopenia without any abnormal cell.](image)

Bone marrow examination was done. The aspirate showed hypercellular marrow with more than 90% blast cells. One population of blast cells were large with high nucleus: cytoplasmic (N:C) ratio and scanty cytoplasm, clumped chromatin with 1-2 prominent nucleoli. Another population of blast cells were intermediate in size with high N:C ratio, very scanty cytoplasm and inconspicuous nucleoli with few immature forms. No hemoparasite was seen. Auer rods were not found in any cell (Figure 2 and Figure 3).

A final diagnosis of acute lymphoblastic leukemia (ALL), morphologically L2 type (FAB classification) was made.

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According to FAB classification, ALL L2 subtype, representing 70% of cases (most common), is constituted by large and heterogeneous cells, heterogeneous chromatin, irregular nuclear shape and often large nucleolus. In the present case, bone marrow examination findings are morphologically suggestive of ALL L2 variety (FAB), confirming the diagnosis of aleukemic leukemia of the lymphoblastic type, where abnormal (leukemic or blast) cells are absent in the peripheral blood smear. Timely diagnosis is important as pediatric ALL cases generally carry good prognosis. With aggressive chemotherapy, about 95% of children with ALL obtain a complete remission, and 75% to 85% are cured.

Conclusions
In this case, the patient did not have majority of the clinical features commonly found in ALL and the peripheral blood smear showed pancytopenia without any abnormal cells. The diagnosis of ALL (aleukemic type) was possible due to timely bone marrow examination, highlighting its importance even in a resource-poor set up where facilities for sophisticated investigations are not available.

Declaration of consent
Written informed consent was obtained from parents/care-givers before publication. The parents/care-givers understand that no identifying information will be published and identity of the patient will be completely concealed.

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Conflict of interest
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