Case Report ISSN (O):2395-2822; ISSN (P):2395-2814

Hematogones- A Diagnostic Challenge for A Pathologist.

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Received: September 2017
Accepted: September 2017

ABSTRACT

Hematogones are the normal bone marrow constituents in children and their number decreases with age. The increased number of hematogones are present in the bone marrow of children recovering from chemotherapy, aplastic conditions, other forms of bone marrow injury, infections like cytomegalovirus, HIV and immune thrombocytopenia disorders .Bone marrow hematogones (B-lymphocyte precursors) may cause problems in diagnosis because of their morphologic and immunophenotypic similarities to neoplastic lymphoblasts thus an accurate distinction of hematogone-rich lymphoid regeneration from leukemic lymphoblasts is critical for patient care. We describe here a case of two years old female child with leucocytosis associated with increased hematogones in the bone marrow.

Keywords: Hematogones, chemotherapy, immunophenotype.

INTRODUCTION

Hematogones (B-lymphocyte progenitor cells) along with mature B lymphocytes are the normal bone marrow constituents of pediatric bone marrow and their number decreases with age.[1] They show a spectrum of maturation bridging those of mature lymphocytes and neoplastic lymphoblasts.[2] Hematogones can resemble malignant lymphoblasts by their morphologic features and by expression of an immature B-cell phenotype, an accurate distinction of hematogone-rich lymphoid regeneration from leukemic lymphoblasts is hence critical for patient care. The increased number of hematogones had been reported in the bone marrow of children recovering from chemotherapy, aplastic conditions, other forms of bone marrow injury, infections like Cytomegalovirus, HIV and immune thrombocytopenic disorders.[2-5]

CASE REPORT

A 2 yr old female child was admitted to Rajindra hospital Patiala with complaint of fever since 15 days. On examination child was anaemic and cervical , axillary and inguinal lymph nodes were palpable. A hematological profile was carried out which showed Haemoglobin (Hb) - 5.2 g/ dl, Total leucocyte count (TLC) -30,000/ul Platelet count (PC)- 6,00,000/ul. Since patient had severe anaemia, leucocytosis, and to rule out leukemia, a peripheral blood smear and bone marrow was advised. Peripheral blood smear showed microcytic hypochromic picture with leucocytosis. Differential leucocyte count (DLC)- Myelocytes- 04%, Metamyelocytes-02%, Neutrophils- 25%, Lymphocytes- 65%, Eosinophils- 04%. Bone marrow smears were hypercellular with lymphoid series of cells constituting about 50% of the marrow cellularity in which 30% of the cells showed immature morphology and rest were mature lymphocytes. These Immature cells were 2-3 times the size of a small mature lymphocyte with scant agranular pale blue cytoplasm, round nucleus with high nucleo - cytoplasmic ratio, condensed to finely opened up chromatin with indistinct nucleoli (hematogones). Erythroid series showed mildly megaloblastic reaction.

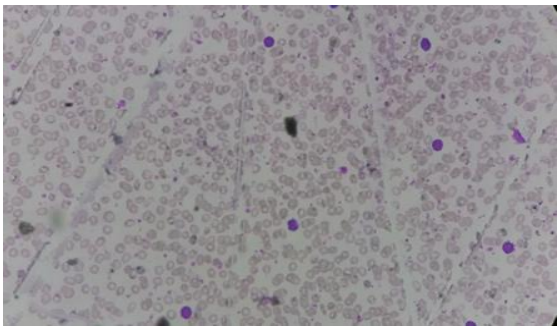

Figure 1: PBF- Leishman stain (400x) showing increased number of lymphocytes

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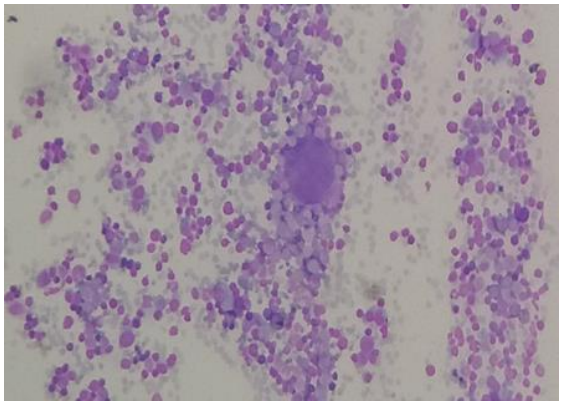

Figure 2: Photomicrograph 100x Bone marrow aspirate smears showing hypercellularity.

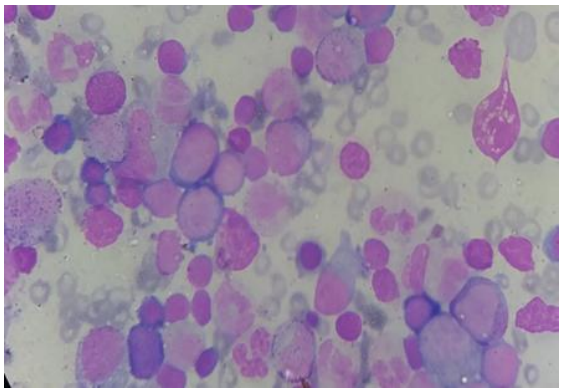

Figure 3: Photomicrograph 1000x Bone marrow aspirate showing hematogones(arrow head) along with nucleated RBC's and myeloid series cells.

Myeloid series showed normal differentiation and maturation. Megakaryocytic series was adequate and functional forms were seen. Myelogram was Myelocytes-24%, Metamyelocytes- 14%, Neutrophils-10%, Immature Lymphocytes-30%, mature Lymphocytes- 20%. Impression of hyperplastic marrow with increased hematogones was given.

After a follow up period of 6 months, clinical as well as hematological picture of the patient improved.

DISCUSSION

On morphology, Hematogones vary in shape from 10 to 20 µ in diameter . The nucleus is round or oval and exhibits one or more indentations or shallow clefts. The nuclear chromatin is condensed but homogeneous. Nucleoli are absent or small and indistinct. Cytoplasm is generally scant but when present, is moderately to deeply basophilic and devoid of inclusions, granules, or vacuoles.[6] In this case immature lymphoid cells were 30% resembling blasts suggesting a neoplastic process. On immunophenotyping , these cells show heterogeneity which confirmed that these cells are hematogones. Hematogones may resemble malignant lymphoblasts by their morphologic features and by expression of an immature B-cell phenotype.[4,7] According to a study, there is an increase in the bone marrow hematogones in ITP cases. This could be the sequence of an immunological response to the cause which determined the disease, or the regeneration of the stem cell compartment following transient damage.[8] In another study hematogones were seen in adults with absence of cytologic atypia or abnormal localization of lymphoid cells. These findings demonstrate the clinical, morphologic, and immunophenotypic features of Hematogones and emphasize the difficulty in distinguishing these cells from residual marrow blasts after chemotherapy.[9] Cytomegalovirus (CMV)-induced immune thrombocytopenia and excessive hematogones in the bone marrow mimicking an acute B-precursor lymphoblastic leukemia has also been observed. Thus, morphological and immunophenotypic features of hematogones require a careful differential diagnosis to rule out ALL.[10]

CONCLUSION

Hematogones have close resemblance to the leukemic cells so a careful morphologic detailing by the pathologist is required to make a correct diagnosis. It is a diagnostic challenge for a pathologist especially in case of children, whereby all the causes for hematogones should be thoroughly investigated before labeling a patient as leukemic.

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How to cite this article: Aradhna, Mittal A, Kaur M, Bodal VK, Goyal N. Hematogones- A Diagnostic Challenge for A Pathologist. Ann. Int. Med. Den. Res. 2017; 3(6):PT15-PT17.

Source of Support: Nil, **Conflict of Interest:** None declared