Granular lymphoblast in a case of acute lymphoblastic leukemia: A rare morphology

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Mohamed Yassin**

ABSTRACT

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CASE REPORT

We report 19-year-old male presented to emergency room with seven days history of fever, sweating, fatigue. His clinical examination revealed pallor otherwise no abnormality detected.

Investigations showed hemoglobin 4 g/dl (12–15 g/dl) and thrombocytopenia 15000 U/L (150–450,000U/L), White blood counts 27,000 U/L (4–10,000 U/L) with 87% blast on peripheral blood.

The patient underwent bone marrow aspiration and biopsy. The smear showed hypercellular. Almost all the cells seen were blast cells comprising approximately 90% of the total element. Morphologically heterogeneous of variable size range from small to large, variable Nucleus to cytoplasm N/C ratio and chromatin pattern, some with one or more nucleoli. Many blast with irregular nuclear contour and some with cytoplasmic blebs or protrusions. Substantial number of the blasts showed multiple coarse dark cytoplasmic granules and/or large inclusions (Figures 1 and 2)

In the aspirate normal trilineage hematopoiesis is suppressed with some dysplastic forms. Flow cytometry (FCM) revealed approximately 80% blast cells expressing CD19 CD34, CD10, and cytoplasmic CD79a and HLA-DR with partial expression of CD9, Tdt, CD20 and cIgM with partial aberrant expression of CD36.

Bone marrow biopsy is remarkably hypercellular (almost 100% cellularity) and showed infiltration with blast cells, positive for PAX5, CD79a, CD10, CD34 and Tdt. Normal haemopoiesis was suppressed with some atypical megakaryocytes (Figure 3). Biopsy showed increased T cells as well.

Figure 1: Bone marrow aspirate smear: Blasts in case of acute lymphoblastic leukemia showing coarse basophilic cytoplasmic granulation, red arrow. Other blasts showing more fine cytoplasmic granules (black arrow) (H&E stain, x100).

Figure 2: Periodic acid–Schiff stain on bone marrow: Majority of the blasts showing positive coarse granules and globules (H&E stain, x1000).

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Figure 3: Immunohistochemistry stains on bone marrow biopsy. The blasts are positive for PAX5, CD79, CD10, CD20 (partial), cd34 and Tdt. (H&E stain, x200).

Overall peripheral blood and bone marrow findings were consistent with precursor B-acute lymphoblastic leukemia (B-ALL) with aberrant partial expression of CD36.

DISCUSSION

Despite the use of cytogenetics and molecular biology for diagnosis and prognosis of acute leukemia, morphology remains a very important clue for each case. In our case, we have found very interesting and rare morphological findings. Granular lymphoblast in patient with acute lymphoblastic leukemia (ALL). It is important to know about this morphology variant of acute lymphoblastic leukemia and put it in our mind to avoid confusion with acute myeloid leukemia and acute promyelocytic blasts. Sometimes some of the cell can stain Sudan black positive which make it more difficult to distinguish. [1]. It has been reported mainly with male gender, precursor B –ALL subtype same like our patient. The incidence according to literature is 2–7% and mainly during childhood [2, 3] and looks like it is connected with Down syndrome [1, 4]. One of the features is azurophilic cytoplasmic granules, and it is one of the defining criteria of Granular ALL. We need more than 1% of lymphoblast having at least three or more clearly defined azurophilic granules [5].

The etiology could be due to dysplastic organelles formation and degeneration [1]. It has been also associated with poor outcome, with remission rate of around 50%. [4]

CONCLUSION

This study showing rare morphological finding. It is still very important to use morphological finding in diagnosis of cases of acute leukemia. However it must be combined by cytochemical and immunohistochemical studies as morphology can be deceptive sometimes. Some morphological finding can be associated with specific presentation, diagnosis and outcome.

Keywords: Acute lymphoblastic leukemia (ALL), Granular lymphoblast, Azurophilic cytoplasmic granules

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Author Contributions

Shehab Fareed Mohamed – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Dina Soliman – Substantial contributions to conception and design, Acquisition of data, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Firyal Ibrahim – Substantial contributions to conception and design, Acquisition of data, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Mohamed Yassin – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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