

An Uncommon Morphology of Acute Undifferentiated Leukemia: Report of a Rare Case

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Acute Undifferentiated Leukemia (AUL) does not express any markers specific for either lineage. Before categorizing leukemia as undifferentiated, it is necessary to perform immunophenotyping with a comprehensive panel of monoclonal antibodies. As AUL is the diagnosis of exclusion and is very rare, the morphology of leukemic cells in AUL is also not specific [1].

A 53-year-old male presented with fever since 2 months, proptosis of the right eye and odynophagia since one week. The physical examination revealed mild pallor, purpuric spots over trunk and thighs. In addition, the patient had bilateral cervical lymphadenopathy, bilateral tonsillar enlargement and hepatosplenomegaly.

On admission, the hemogram findings were leucocytosis ($110.7 \times 10^9/L$) with 93% blasts in peripheral blood, anemia (6 gm/L), and thrombocytopenia ($13 \times 10^9/L$). The bone marrow aspirate was performed and that was hyper cellular with 95% blasts. The blasts were 3-4 times the size of a mature lymphocyte with regular nuclear membrane, opened up chromatin and one to two prominent nucleoli. The cells had mild to moderate amount of agranular cytoplasm. The unusual findings in these blasts were presence of multiple cytoplasmic vacuoles of varying sizes. The blasts as well as the vacuoles were negative for Myelo Peroxidase (MPO), Sudan Black B (SBB), Periodic-Acid Schiff (PAS), and oil red O (Figure 1). The flowcytometric analysis was done and blasts showed expression of CD117, CD34 and HLA-DR

(Figure 2). These CD34 positive cells did not display any expression of myeloid, erythroid, megakaryocytic, monocytic, lymphoid (Both B & T), plasmacytic and dendritic cells. Conventional cytogenetic did not reveal any chromosomal abnormality. RT-PCR was done for specific translocations in Acute Myeloid Leukemia (AML) and Acute Lymphoblastic Leukemia (ALL), however the sample did not reveal any abnormality. Hence keeping all findings altogether, the diagnosis of Acute Undifferentiated Leukemia (AUL) was made.

The detail of treatment and follow up of the case is not available as patient never reverts back to hospital after initial examination.

AULs arise presumably from clonal expansion from the most primitive hematopoietic cells or from the poorly differentiated hematopoietic cells and are referred to as AUL. The incidence of AUL is probably less than 0.5% [2]. Bassan et al. had described about the largest study of 6 cases of AUL in 1992 [3]. The light microscopy appearance of blast cells from these six cases varied from lymphoblastoid (2 cases), hand mirror-like appearance (1 case), prominent cytoplasmic vacuolization being a feature in one (1 case), and undifferentiated (2 cases) morphology. The cytochemical staining with Sudan black, myeloperoxidase, acid phosphatase, periodic acid-Schiff, and nonspecific esterase were performed in these cases and all cases were negative [3]. The morphology of the present case is similar to the case no 3 as described by Bassan et al. and cytochemical stains for MPO, PAS, SBB & Oil red O were also negative in the index case.

The immunophenotype of AUL as described in earlier reported cases show expression of CD7 and CD13 and HLA-DR [2,3]. The cells of index case express HLA-DR, CD34 and CD117 and are negative for CD 7 and CD13. CD 117 is more commonly expressed on Hematopoietic Stem Cells (HSC), Multi Potent Progenitors (MPP), and Common Myeloid Progenitors (CMP). CD117 has a high specificity however it is not as sensitive as CD13 or CD33 for detecting myeloid blasts [4]. Hence CD117 expression indicates towards early myeloid differentiation. But the cells are still undifferentiated and not showing expression of any lineage specific markers.

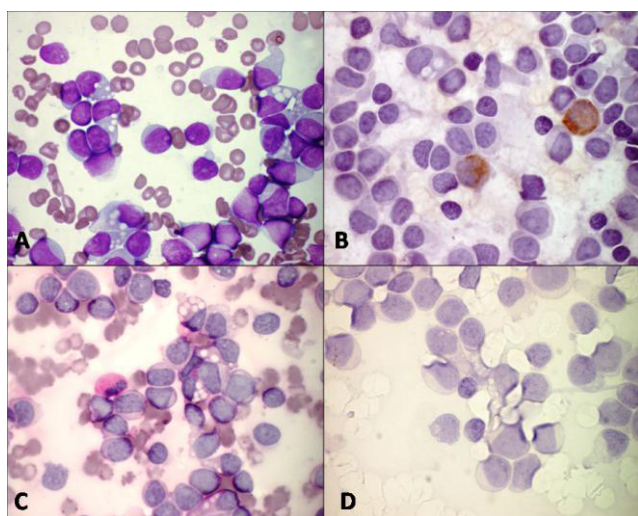


Figure 1: Cytomorphology of blasts in AUL. The cells have mild to moderate amount of cytoplasm with multiple cytoplasmic vacuoles (MGG-Giemsa stain 100X, A). These cytoplasmic vacuoles are negative for MPO, PAS & Oil red O (100 X, B, C & D).

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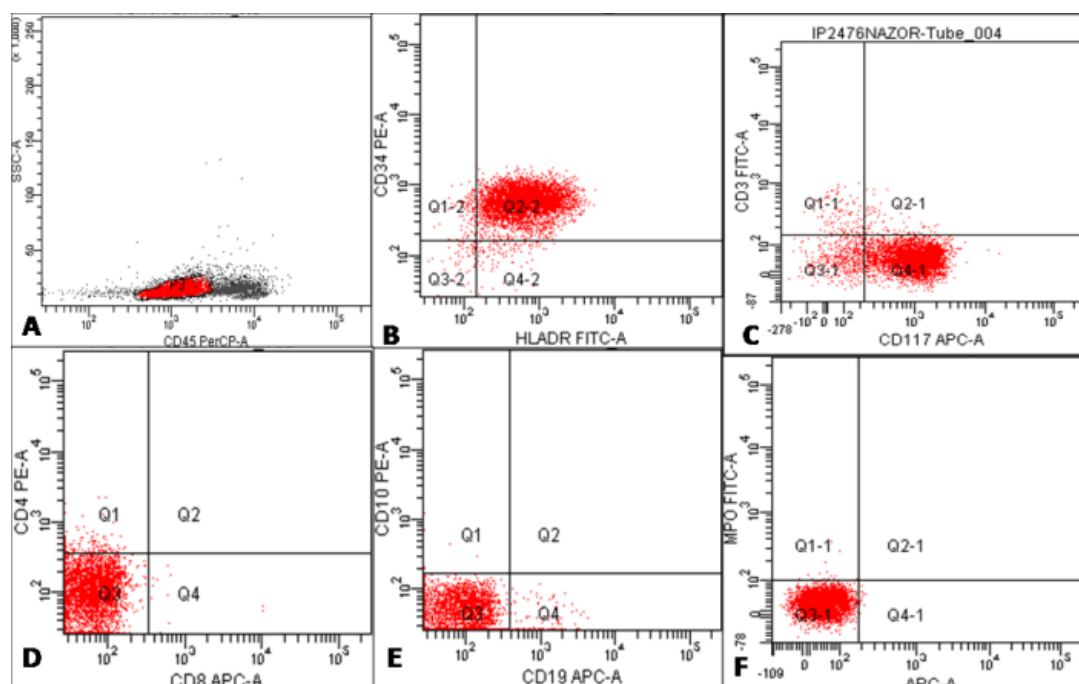


Figure 2: Scatter plots depict multicolor immune phenotyping on bone marrow aspirate by flow cytometry. The events are Seen on Side Scatter (SSC) versus CD45 plot. The cells in blastic region are gated as P3 and the same cells are analysed in subsequent plots (A). These cells show dual expression of CD34 and HLA-DR (B) along with dim expression of CD 117(C). The same cell populations did not show any expression CD3, CD4, CD8, CD10, CD19& MPO (C,D,E,F).

Here we report a rare case of AUL with an unusual morphology. This is most likely second case in which such morphology is described in AUL. The exact significance of this morphology is difficult to assess because only a few cases of AUL are reported in literature.

References

1. Borowitz MJ, Bene MC, Harris NL, Porwit A, Matutes E (2008) Acute undifferentiated leukemia (Acute leukemia of ambiguous lineage). In: WHO classification of tumours of haematopoietic and lymphoid tissues. Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, et al. (Eds.). International Agency for Research on Cancer (IARC), Lyon, France pp 151.
2. Shende AC, Bonagura VR, Cheah MS, Lanzkowsky P (1992) Acute undifferentiated leukemia (AUL): a case report and a proposed system of classification. *Am J Hematol* 40: 234-237.
3. Bassan R, Biondi A, Benvenuto S, Tini ML, Abbate M, et al. (1992) Acute undifferentiated leukemia with CD7⁺ and CD13⁺ immunophenotype. Lack of molecular lineage commitment and association with poor prognostic features. *Cancer* 69: 396-404.
4. Hans CP, Finn WG, Singleton TP, Schnitzer B, Ross CW, et al. (2002) Usefulness of anti-CD117 in the flow cytometric analysis of acute leukemia. *Am J Clin Pathol* 117: 301-305.