

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Hematology-Cell Morphology – Case 28

Increase of a different degree of white blood cells (WBC) (normal, increased or decreased in relation with the neutrophil severity and blasts passage in the peripheral blood), but the differential leukocyte type is abnormal: [Low neutrophil percentage (persistent neutropenia) and fluctuating (usually increased) blast percentage]. Normochromic, normocytic anemia with decreased reticulocytes number. Thrombocytopenia (in proportion with severity of bone marrow insufficiency).

Diagnosis may be easy (anemia + thrombocytopenia + leucocytosis with circulating blasts in the peripheral blood) or uncertain usually with the existence of bone marrow failure (e.g. isolated thrombocytopenia) without the presence of blast cells in the peripheral blood (diagnosis by bone marrow examination) (figures 1 to 8).

Myelogramme: Usually the bone marrow smears are hypercellular, with a high bone marrow infiltration by blast cells of the

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J.V. Asimakopoulos,
L. Papageorgiou,
J. Drandakis,
I. Vasilopoulos,
D. Kopsaftopoulou,
A. Piperidou,
A. Machairas,
A. Georgopoulou,
A. Karapaschalidis,
M.A. Lefaki,
A. Liaskas,
C. Zerzi,
E. Plata,
P. Tsaftaridis,
M.P. Siakantaris,
T.P. Vassilakopoulos,
M.K. Angelopoulos,
J. Meletis

School of Medicine, National and
Kapodistrian University of Athens,
"Laiko" General Hospital, Athens, Greece

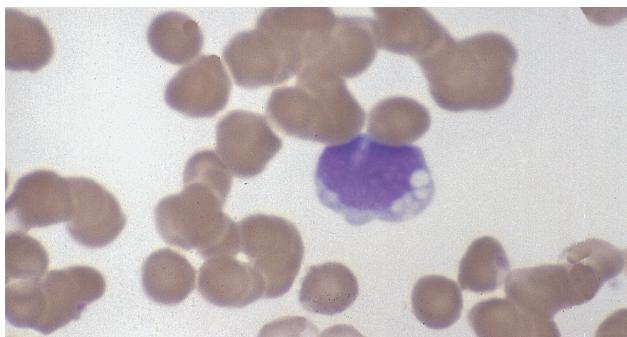


Figure 1

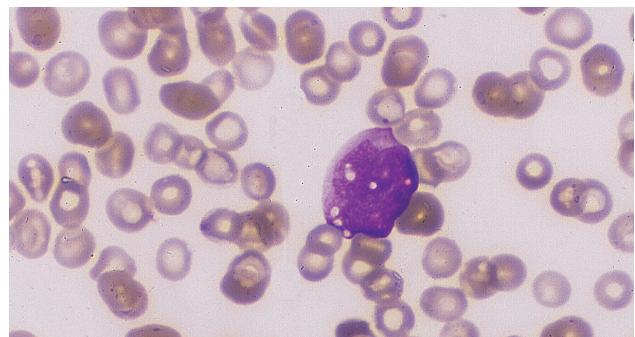


Figure 3

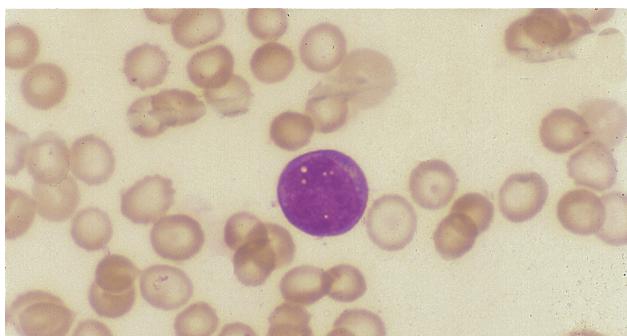


Figure 2



Figure 4

same morphological features (50% to 90%) and a small percentage of erythroid, granulocytic and megakaryocytic series cells. It is necessary that the blasts in the bone marrow should surpass at a rate of 30% in order to establish a diagnosis of acute leukemia; the bone marrow smears are rarely poor (focal development of blasts or the presence of fibrosis which constitutes bone marrow biopsy necessary). The myelogram determines the cytological type of leukemia (morphology, histochemistry, immunophenotype of lymphoblasts) with synchronous genetic tests.

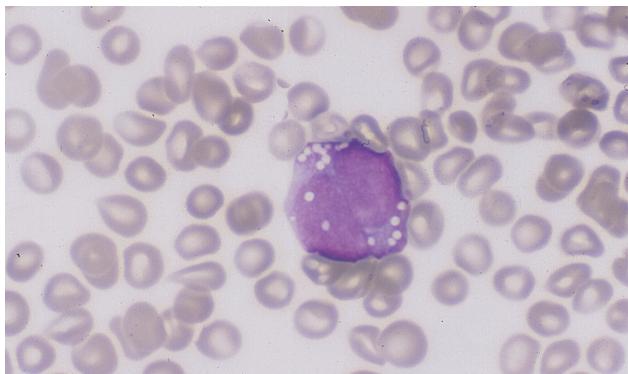


Figure 5

In L3 ALL blasts are usually of large size and are of a characteristically homogeneous morphology as compared to the other type blasts, the nucleus is round or ovaloid in shape with a dense granular chromatin appearance, one or more cystoid nucleoli and abundant hyperbasophilic cytoplasm with numerous vacuoles because of lipid content (Burkitt-like blasts). Usually the deep cytoplasmic basophilia and vacuolization is better seen in the peripheral blood blastic cells than in the bone marrow (figures 9 to 16). The high proliferation rate of cells accompanied by the

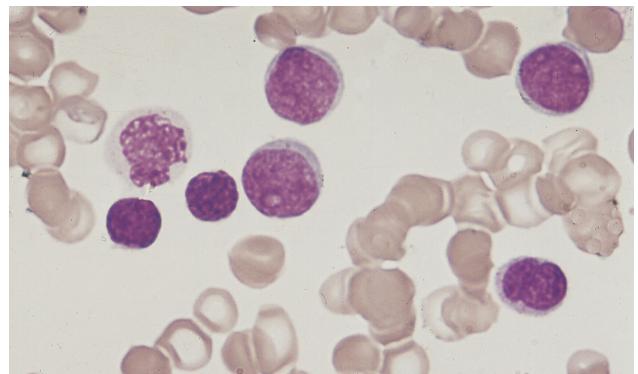


Figure 8

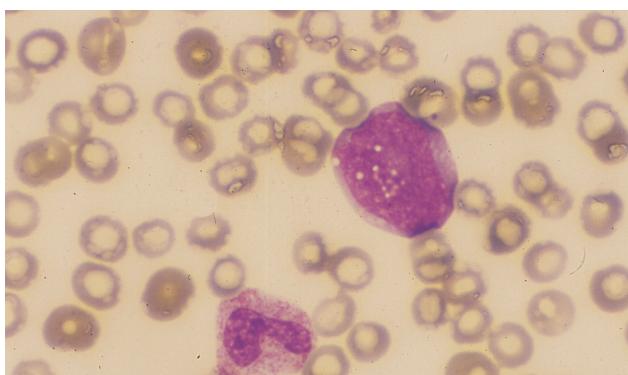


Figure 6

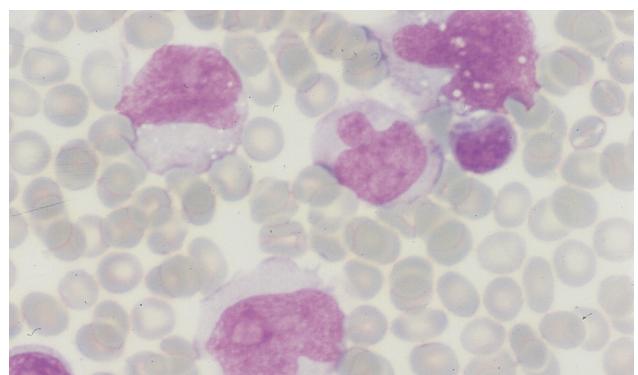


Figure 9

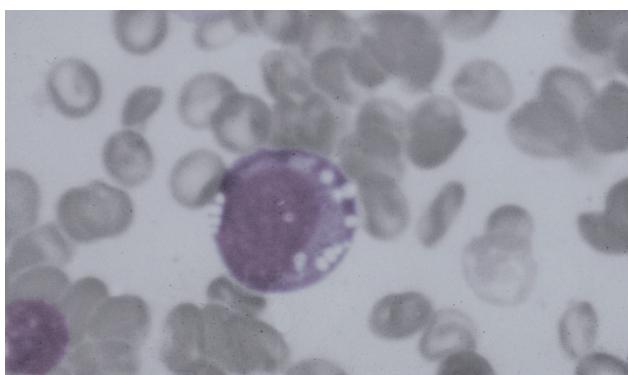


Figure 7

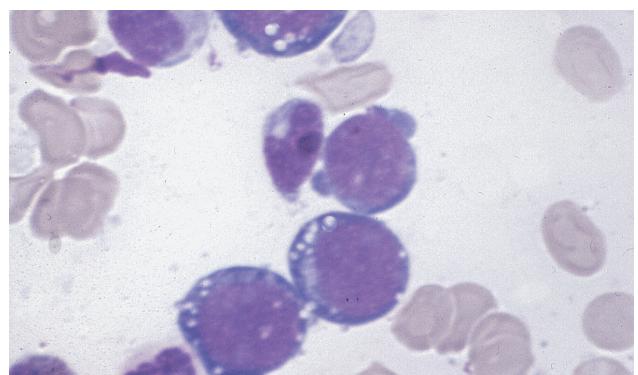


Figure 10

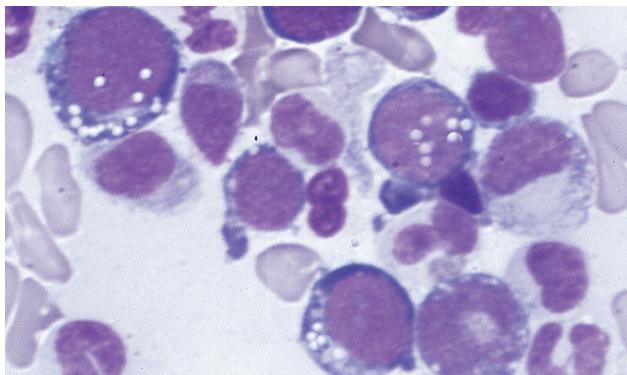


Figure 11

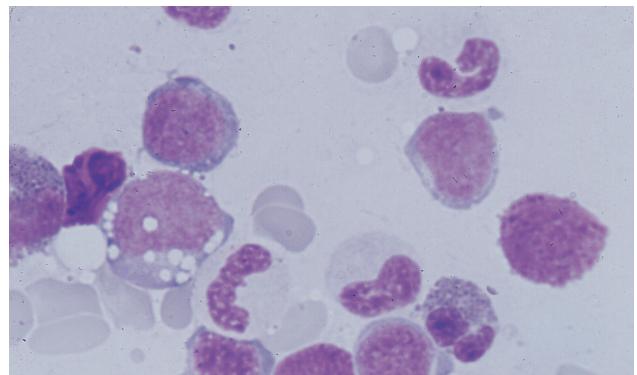


Figure 14

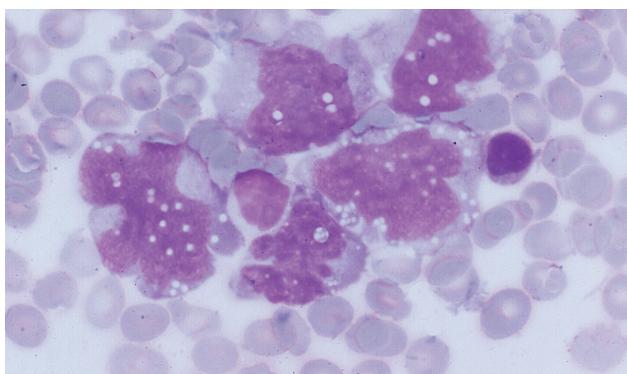


Figure 12

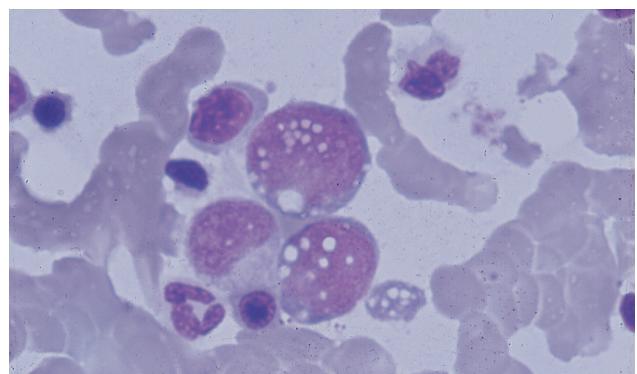


Figure 15

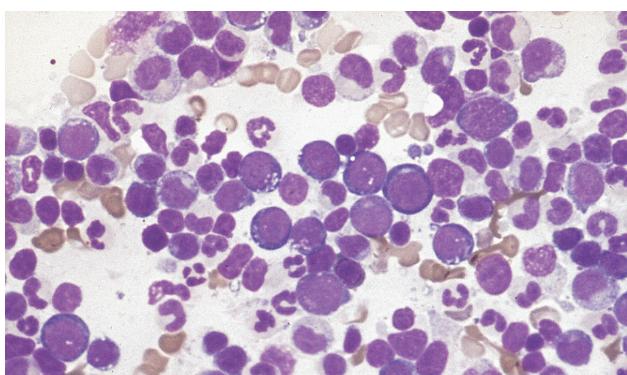


Figure 13

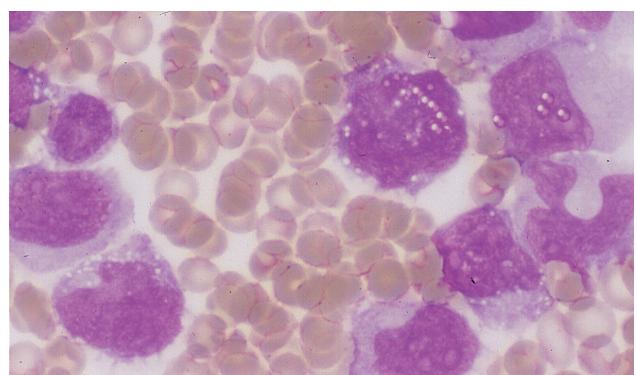


Figure 16

characteristic existence or different numbers of activated macrophages in the bone marrow and lymph nodes. In most cases the cells express indices of mature B lymphocytic cell series.

PAS staining: Increased amount of cytoplasmic glycogen content (large mesh PAS positive around the nucleus), non-specific finding (ALL cases are similar with negative PAS reaction, many acute myeloid leukemia [AML] cases with PAS positive blasts).

Together with the morphologic and immunological criteria, the characteristic PAS staining may be diagnostical.

Acid phosphatase staining: T-blasts with cleaved nucleus present a polar positivity (Golgi apparatus area). In atypical lymphoblasts, with azurophilic granulation, the peroxidase, specific esterase, non-specific esterase and Sudan black B staining are negative (rare ALL cases presenting Sudan black B positive blasts).

L3 (<1% of ALL)

Blasts with hyperbasophilic cytoplasm with numerous vacuoles and round nucleus containing 2–5 nucleoli.

The cytoplasmic vacuoles are oil red O positive and the cytoplasm has a positive methyl green-pyronine reaction.

Cytogenetics: t(8;14).

References

1. MELETIS J. *Atlas of hematology*. 3rd ed. NireasPublInc, Athens, 2009:420–423, 435–441

Corresponding author:

J. Meletis, School of Medicine, National and Kapodistrian University of Athens, "Laiko" General Hospital, 115 27 Athens, Greece

e-mail: imeletis@med.uoa.gr