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CONTINUING MEDICAL EDUCATION
ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Hematology-Cell Morphology – Case 26

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2024, 41(6):862–864

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85% of acute lymphoblastic leukemia (ALL)

- Lymphoblast predominance, for the most part, having a small quantity of cytoplasm and not a well visible nucleoli
- Mash of periodic acid-Schiff (PAS) positive material in the cytoplasm. In many cases, there is positivity in acid phosphatase staining (T-ALL)
- Cytogenetics: Hyperdiploidy, t(1;19), t(1;14), t4(4;11), t(9;22).

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).

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

Morphologically the L1 type blasts are of the same size with a round or oval nucleus with coarse homogeneous chromatin appearance and regular network, containing one and rarely more non-well visible nucleoli and hyperbasophilic a granular cytoplasm rarely with vacuoles formation (abnormal glucogen accumulation). In atypical cases, blasts may be of larger size with low nuclear/cytoplasmic ratio, of irregular shape or cleaved nucleus and absent or not well visible nucleoli (figures 1 to 14).

PAS staining: Increased amount of cytoplasmic glucogen content (large mash PAS positive around the nucleus), non-specific

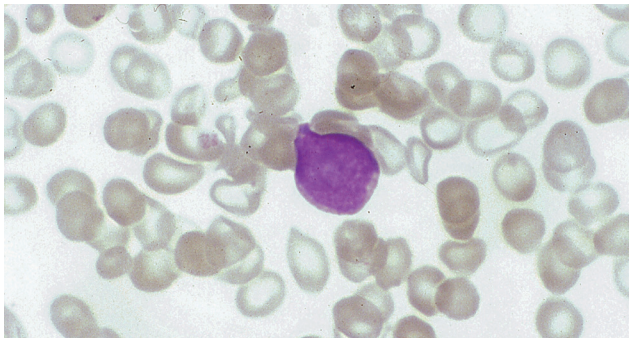


Figure 1

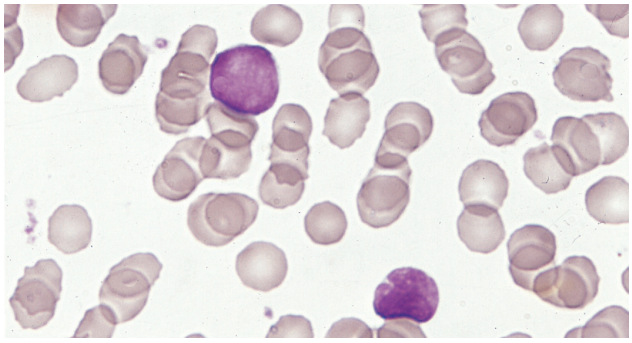
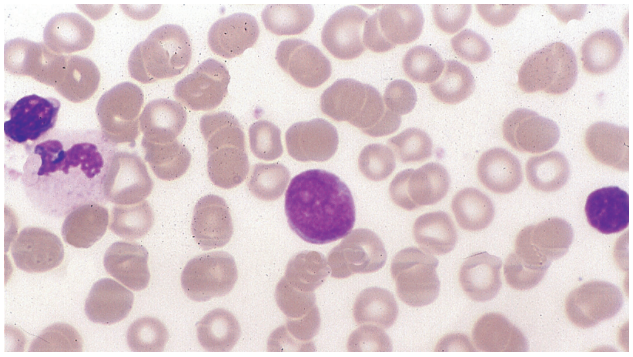


Figure 2



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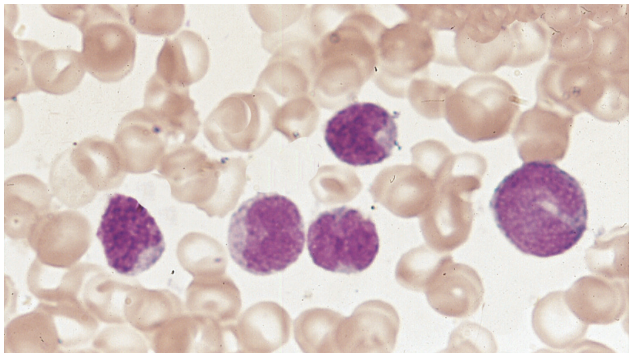

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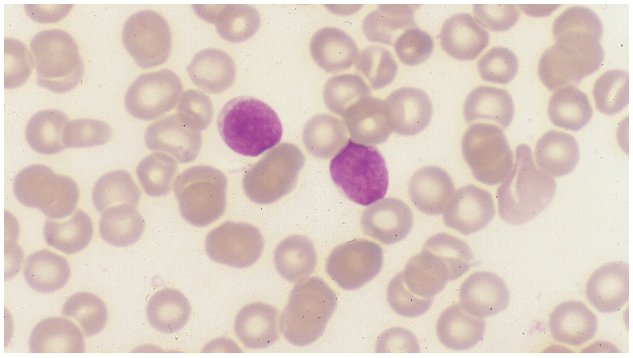
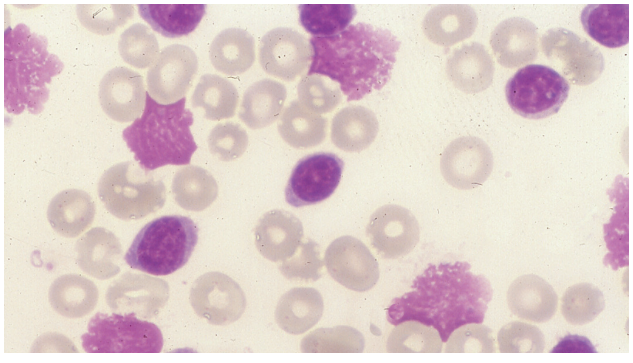


Figure 5



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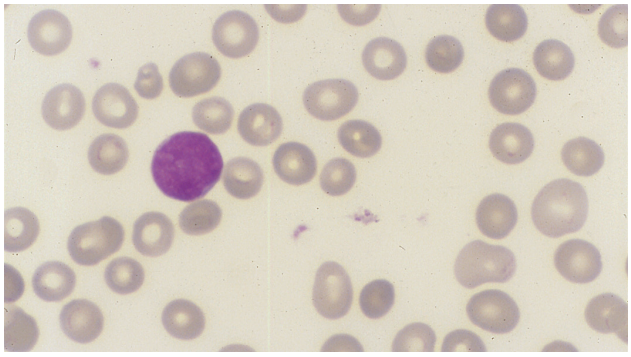

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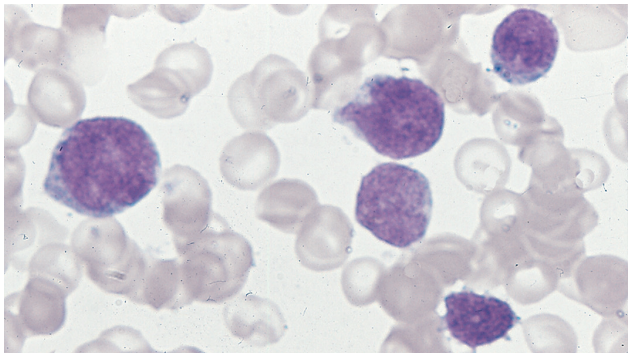

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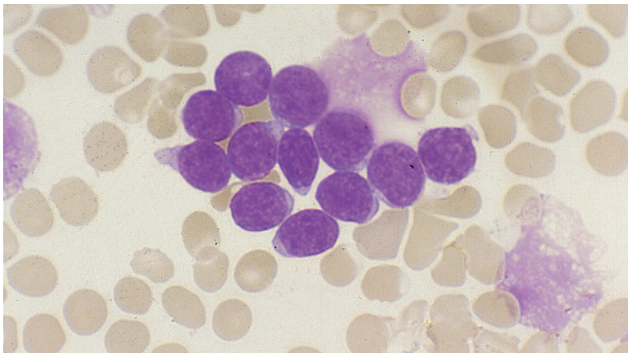

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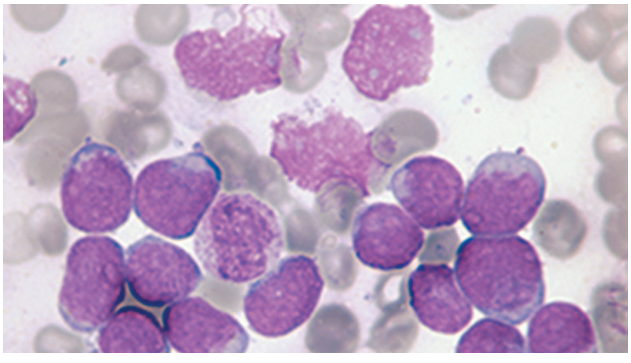

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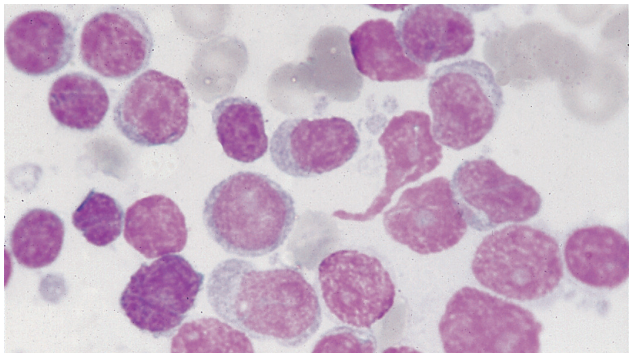

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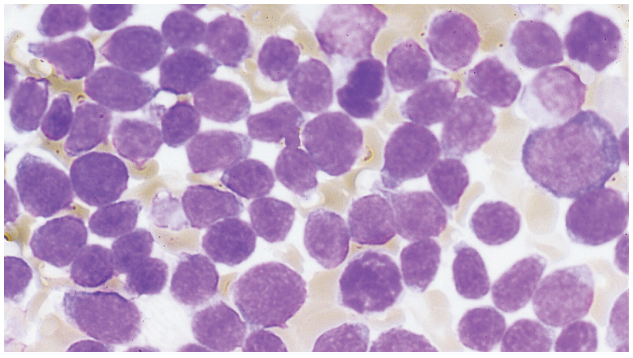

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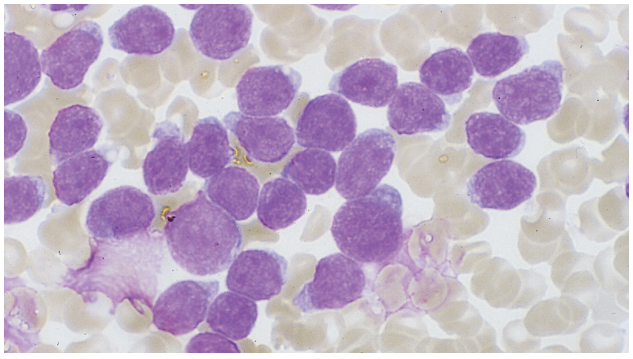

Figure 13

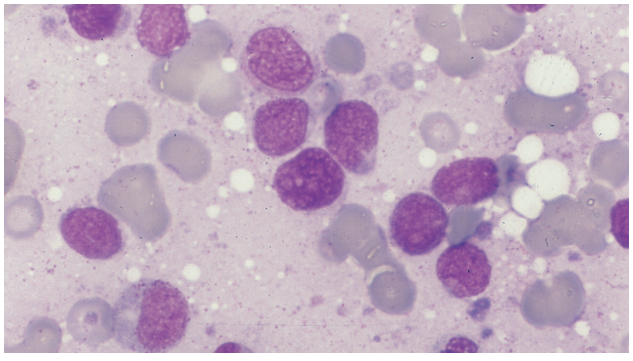

Figure 14

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 peroxidase and also Sudan black B staining are negative (figures 15, and 16) (rare ALL cases presenting Sudan black B positive blasts).

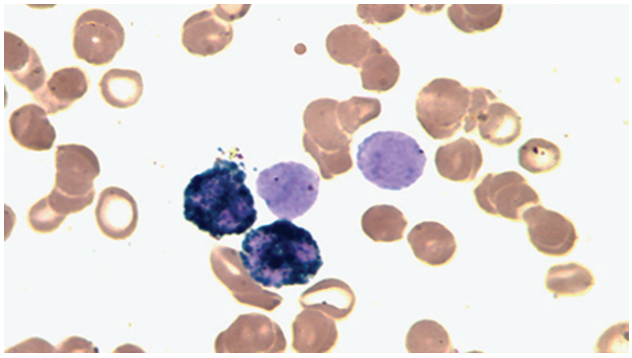

Figure 15

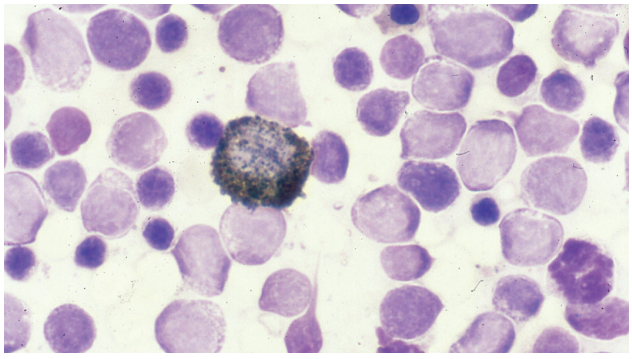

Figure 16

References

1. MELETIS J. *Atlas of hematology.* 3rd ed. Nireas Publ Inc, Athens, 2009:420–427

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