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Haematologica 1994; 79:191-193

ACUTE NON LYMPHOID-LEUKEMIA WITH UNUSUAL STAINING OF BLASTS

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Clinical and laboratory findings

A 54-year-old man was admitted because of fatigue, headache, dyspnea and fever. At physical examination pallor, cutaneous purpura on both legs, hepatomegaly and splenomegaly were found.

A blood count showed anemia (Hb 9.4 g/dL), thrombocytopenia (P 23×10^9/L) and leukopenia (WBC 2×10^9/L) with 18% neutrophils, 8% eosinophils, 55% lymphocytes, 2% monocytes, 3% eosinophilic metamyelocytes, 2% eosinophilic myelocytes and 9% blasts. Bone marrow was hypercellular with a monomorphic picture; there were 70% blasts.

Morphology

At low magnification blast cells showed an unusual greyish staining of the cytoplasm; at higher magnification they presented eccentric nucleolated nuclei, low N-C ratio, abundant cytoplasm containing granular grey material, located inside and around the Golgi area and often superimposed on the nucleus (Figure 1). In some blasts large vacuolar structures, sometimes including granules, were present (Figure 2, 3). A few cells were maturing and showed evidence of eosinophilic differentiation with anomalous staining of granules. Megakaryocytes and erythroid cells did not show dysplastic features.

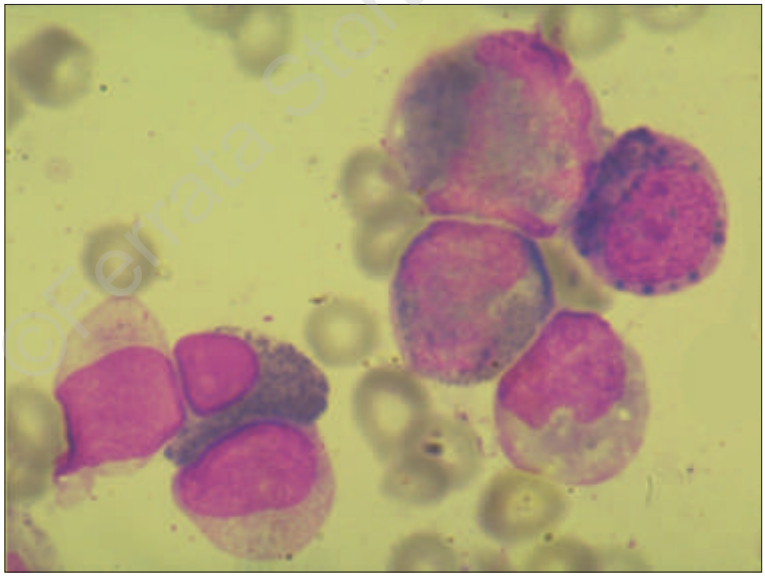

Figure 1. Bone marrow smear showing leukemic cells with abundant cytoplasm filled with granular greyish material and two eosinophilic cells in an advanced stage of differentiation with abnormal staining of granules. MGG x1200

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Received January 19, 1994; accepted February 23, 1994.

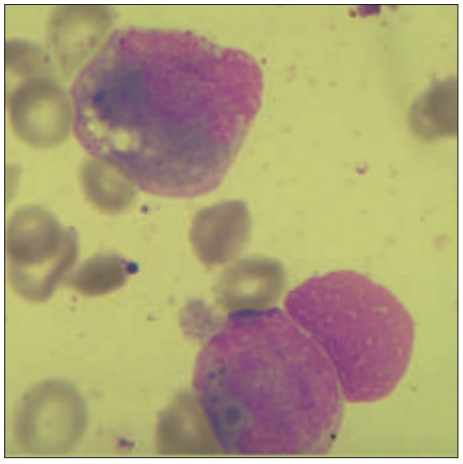

Figure 2. Blasts with fine and coarse granules and vacuoles in the cytoplasm. MGG x1200.

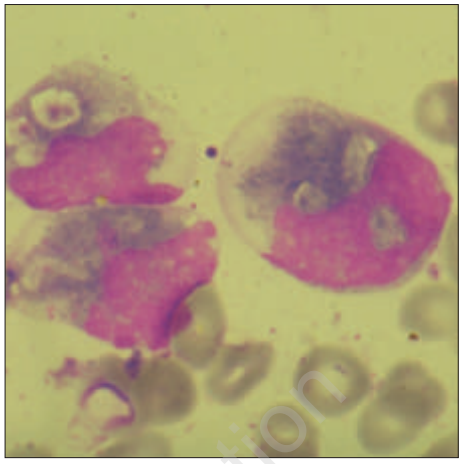

Figure 3. In these leukemic cells large vacuoles containing granules are present. MGG x1200

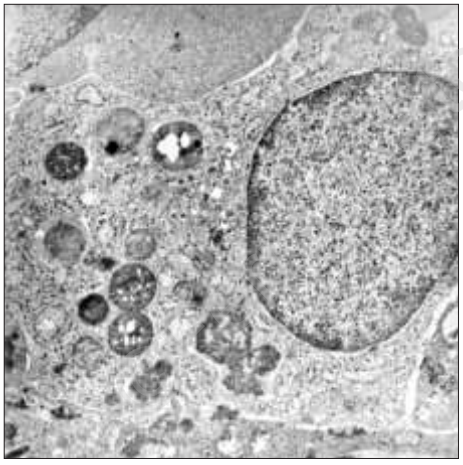

Figure 4. Electron microscopic photograph of an eosinophil precursor with many spherical granules containing heterogeneous material. x14400

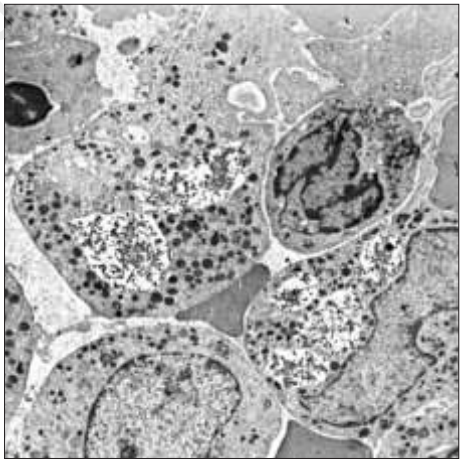

Figure 5. Electron microscopic photograph of a cell with large vacuoles partially filled with flocculent material. x7450

Cytochemistry

Blasts were PAS and non-specific esterase negative, strongly positive to Sudan black and peroxidase reactions, peroxidase activity being cyanide-resistant; most cells were positive also to chloro-acetate-esterase.

Electron microscopy

In the majority of the cells nuclei had diffuse chromatin and prominent nucleoli. In the cytoplasm there were numerous dilated cisterna of the endoplasmic reticulum, prominent Golgi zone and membrane-limited granules of different sizes filled with heterogeneous electron-dense material (Figure 4). In some cells also large vacuoles partially filled with flocculent electron-dense material were evident (Figure 5). Granules with crystalline cores were seen only in mature cells.

Immunophenotype

Leukemic cells were CD13 and CD33 positive, CD14 negative, TdT negative and negative to other lymphoid markers.

Cytogenetics

Cytogenetic study showed a normal karyotype.

Conclusions

As cyanide-resistant-peroxidase positivity is specific for eosinophilic cells,[1,2] a diagnosis of acute nonlymphocytic leukemia (ANLL) (M2) with eosinophilic differentiation was made.

De novo acute eosinophilic leukemia or eosinophiloblastic leukemia is a distinct entity, very rare, difficult to recognize and often misdiagnosed.[3] It is characterized by blasts or promyelocytes maturing toward the eosinophilic lineage, with anomalous staining properties, that usually can be identified only by cytochemical studies; they may present the same cytogenetic abnormalities as other ANLL subtypes. This variant has to be differentiated from other forms of ANLL with marrow hypereosinophilia, such as M2Eo and M4Eo, characterized by specific chromosome anomalies.[4]

The main clinical features of acute eosinophilic leukemia are hepatomegaly, splenomegaly, possible bronchospastic signs and heart failure. Response to treatment, however, as well as prognosis, is the same as in other types of ANLL.

References

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