

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Hematology Quiz – Case 56

A 15-year-old boy presented with a few years' history of normochromic, normocytic anemia. The anemia was symptomatic and required regular transfusions. His brother had the same problem, too.

His hematological tests revealed: Ht 24%, Hb 7.8 g/dL, RBC $2.5 \times 10^{12}/L$, WBC $8.5 \times 10^9/L$ (the differential leukocyte cell counting was normal), and reticulocytes 7%. Anisocytosis, poikilocytosis and abnormal dyserythropoietic erythroblasts observed on routine blood smears (figures 1 to 3). Hemoglobin electrophoresis was normal, and his biochemical profile was within normal limits, with the exception of an increased bilirubin level (total 4.2 mg/dL, unconjugated 2.9 mg/dL).

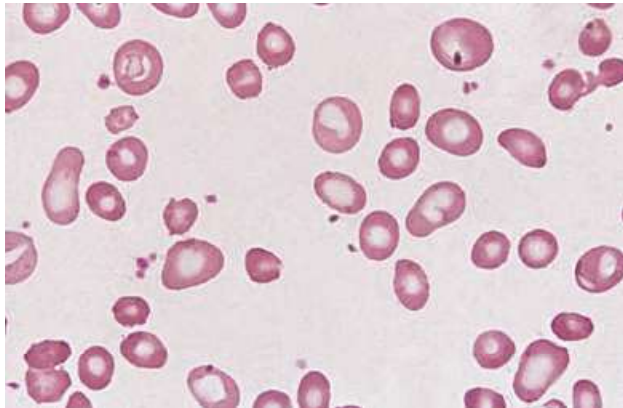


Figure 1

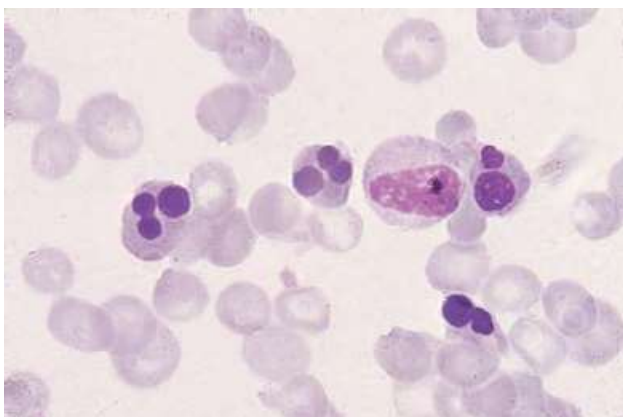


Figure 2

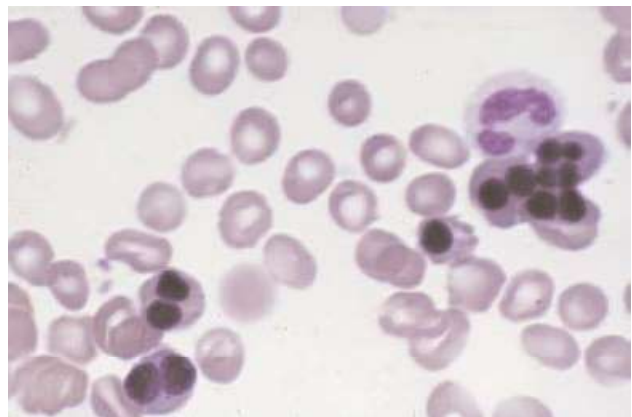


Figure 3

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2017, 34(6):844–847

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The bone marrow aspiration revealed normoblastic hyperplasia with 30% of binucleated erythroblasts without megaloblastoid changes. Bizarre nuclear abnormalities in the red cell precursors of the bone marrow, with few polychromatophilic and acidophilic multinucleated erythroblasts containing pluripolar mitoses and

karyorrhexis of some nuclei were present in the bone marrow too (figures 4 to 10).

Serum iron and ferritin levels were slightly increased, bone marrow iron was normal and the iron kinetic tests revealed ineffective erythropoiesis. The erythrocyte survival, as measured with ⁵¹Cr, was 16 days and the acidified serum lysis test was positive.

Comment

Hereditary dyserythropoietic anemias

Type I

- *Inheritance: Autosomal recessive type*
- *Peripheral blood: Mild anemia (hemoglobin 8.5–11 g/dL), macrocytosis, anisocytosis, poikilocytosis, reticulocytes about*

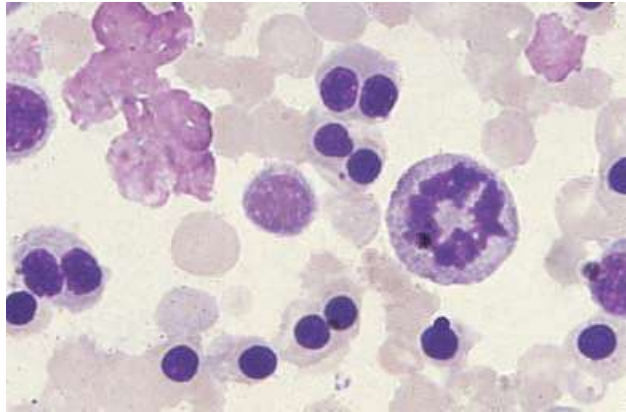


Figure 4

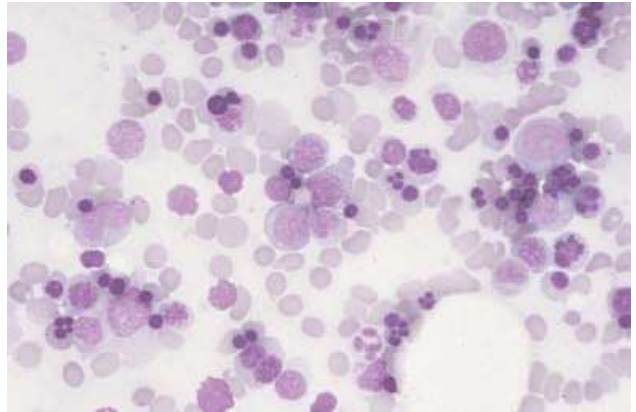


Figure 7

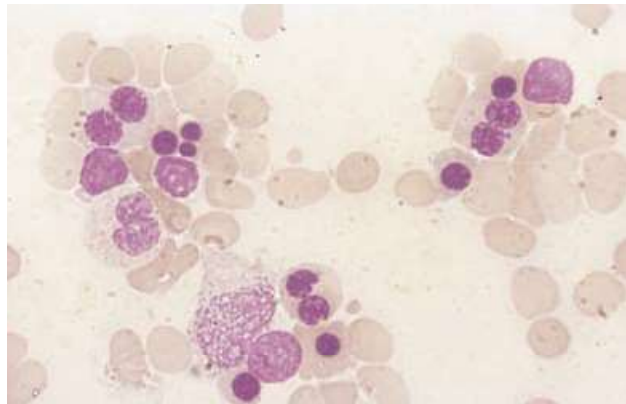


Figure 5

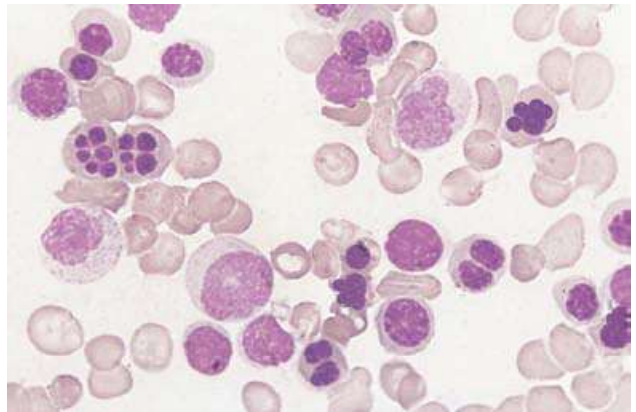


Figure 8

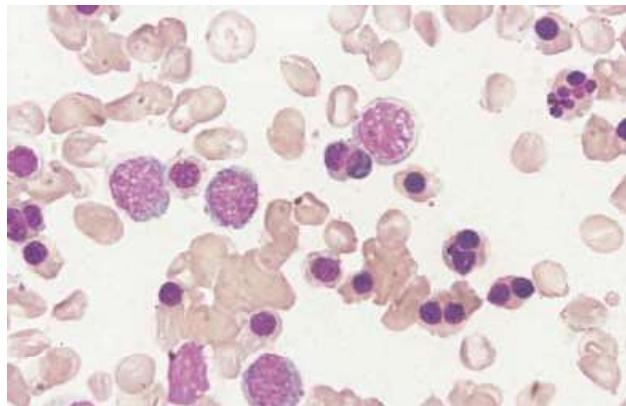


Figure 6

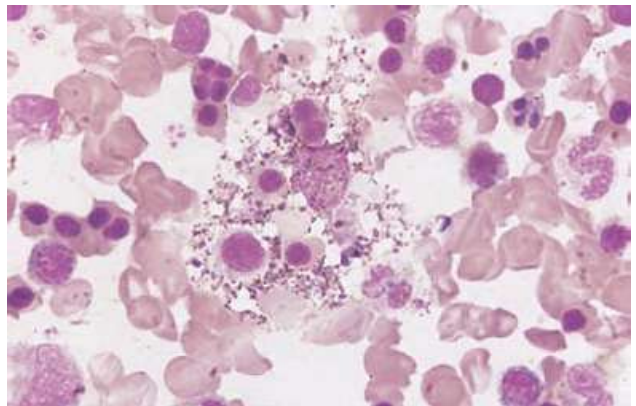


Figure 9

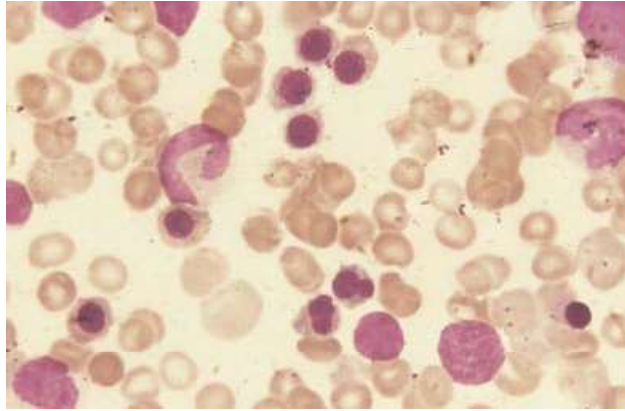


Figure 10

2%, low increase of indirect bilirubin

- Bone marrow: Binucleated erythroblasts, megaloblastic features, normal mitotic features, intranuclear chromatin bridges, nuclear chromatin condensation, spongy chromatin presentation, cytoplasmic connections among cells, enlarged nuclear pores with partial loss of nuclear envelope and cytoplasmic portions invaginating into the nucleus
- Red cell life span: Normal
- Bone marrow iron stores: Increased
- Iron turn over: Ineffective erythropoiesis
- Acidified serum test: Negative
- Anti-i test: Negative.

Type II

- Inheritance: Autosomal recessive type
- Peripheral blood: Mild normochromic, normocytic anemia (hemoglobin 7.5–10.5 g/dL), anisocytosis, poikilocytosis, reticulocytes 5–10%, increase of indirect bilirubin
- Bone marrow: High incidence of binucleated erythroblasts (10–40%), absence of megaloblastic features, no giant erythroblasts, mainly presence of acidophilic and more rarely of polychromatophilic erythroblasts, few multinucleated erythroblasts (up to 4 nuclei), presence of caryorrhesis, pluripolar mitoses, double nucleic membrane which may interfere with nuclear division or extraction
- Red cell life span: Decreased (12–18 days)
- Bone marrow iron stores: Normal
- Iron turn over: Ineffective erythropoiesis
- Acidified serum test: Positive (hereditary erythroblastic multinuclearity with positive acidified serum lysis test, "HEMPAS")
- Anti-i test: Positive.

Type III

- Inheritance: Dominant type
- Peripheral blood: Mild anemia (hemoglobin 7.3–8.5 g/dL), macrocytosis, anisocytosis, poikilocytosis, basophilic stippling,

reticulocytes 2–4%, Howell-Jolly bodies

- Bone marrow: Giant multinucleated erythroblasts, abundant caryorrhesis, nuclear blebs, anisochromia of mature nuclei in the same cell, nucleic membrane abnormalities
- Red cell life span: Mild decrease
- Bone marrow iron stores: Increased
- Iron turn over: Ineffective erythropoiesis
- Acidified serum test: Negative
- Anti-i test: Negative.

Other types

Type IV: Severe anemia, transfusion dependent, erythroid hyperplasia, absence of precipitated protein in erythroblasts

Type V: Near normal hemoglobin, normal or slightly elevated MCV, hyperbilirubinemia, slightly or pronounced normoblastic hyperplasia without dysplasia

Type VI: Near normal hemoglobin, elevated MCV, megaloblastic hyperplasia

Type VII: Severe anemia, erythroid hyperplasia, abnormal nuclei, intra-erythroblastic inclusions, (α , β -chain of globin).

Disease when erythroblasts can circulate in the peripheral blood

Severe stimulation of erythropoiesis

- Acute blood loss
- Hypoxia
- Hemolytic anemia
- Megaloblastic anemia

Bone Marrow Infiltration

- Metastatic neoplasms
- Essential hematological malignancies
- Myelofibrosis, primitive, secondary or drug related
- Bone marrow granulomas

Splenectomy

In case of numerous circulating erythroblasts, difficulties in leukocyte numbers (increased) may exist because the electronic counter is difficult to distinguish erythroblasts from white blood cells; good distinction by peripheral blood smear observation and proportional correction.

In the absence of any obvious etiology for the presence of erythroblasts in peripheral blood, a bone marrow biopsy is indicated.

Disorders accompanied by the presence of binucleated erythroblasts

- Hereditary spherocytosis
- Hemoglobin S disease
- Homozygous β -thalassemia
- Hemoglobin H disease

- *Megaloblastic anemia*
- *Sideroblastic anemia*
- *Erythroleukemia*
- *Acute hemolytic anemias*
- **DYSERYTHROPOIETIC ANEMIAS**
- *Myelodysplastic syndromes.*

References

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