Hemepath Case 16: 7-Month-Old Boy

HISTORY

A 7-month-old baby boy of Italian ancestry is brought in by his mother as he is not gaining adequate weight. Also, he is not rolling over on his own yet, and does not seem able to support his own head very well.

On physical exam, both liver and spleen are noted to be enlarged. Cardiac exam reveals moderate pedal edema and a systolic ejection murmur.

CBC

Hgb (g/L)	Low
MCV	High
Reticulocyte Count	N
WBC	N
Plt	N

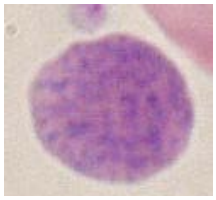
OTHER LABORATORY FINDINGS

Serum Fe	High
Serum Ferritin	High
Serum Bilirubin	Mild increase
Ham's Test	(+)
Sucrose Lysis Test	(-)

DESCRIPTION OF SLIDES

Peripheral Blood Smear (Slide 16a)

The peripheral smear shows anemia with moderate poikilocytosis: schistocytes (see rectangles), elliptocytes, teardrop cells (see arrows), and irregularly contracted cells can be seen. Coarse basophilic stippling is also present, but is difficult to identify on the digitized slide (see image below for an example of basophilic stippling). There are also numerous erythroblasts, some of which are dysplastic (see circles). Leukocytes and platelets are morphologically unremarkable.



Basophilic stippling

Bone Marrow Aspirate (Slide 16b)
The bone marrow aspirate is markedly erythroid dominant, with severe erythroid dysplasia (see circles) – binucleated and multi-nucleated forms are common. There is no evidence of intercytoplasmic chromatin bridges or gigantoblasts.

*** To see the slide annotations in Imagescope, click on VIEW, then ANNOTATIONS, and then on the "eye" icon adjacent to the word "Layers". In the "Layer Attributes" box, a brief description of the annotations is provided. You may also click on individual layer region (e.g. region 1) in the "Layer Regions" box to locate each annotation – this is especially helpful in identifying annotations when the slide is not zoomed in. ***

MORPHOLOGICAL DIAGNOSIS

Congenital dyserythropoietic anemia type II (CDA-2), a.k.a. "HEMPAS".

DISCUSSION

Congenital dyserythropoietic anemias (CDAs) are a group of hereditary disorders characterized by refractory anemia, ineffective erythropoiesis, and erythroid dysplasia in the bone marrow. It can be further divided into type I, II, or III (there are other types, but these others are vanishingly rare).

CDA-2, also known as HEMPAS (hereditary erythroblastic multinuclearity with a positive acidified serum test) is the most common subtype, and is the consequence of autosomal recessive genetic defects in complex carbohydrates (N-acetylglucosaminyl transferase II or α-mannosidase II) on the RBC membrane. Patients are usually diagnosed in childhood with presenting complaints of failure to thrive, anemia, jaundice, and hepatosplenomegaly. Laboratory investigations show a positive acid hemolysis test (Ham test) and a normal sucrose hemolysis test (in contrast to paroxysmal nocturnal hemoglobinuria, which would have positive results in both assays). CDA-2 can also generate a positive result in the eosin-5-maleimide test used to diagnose hereditary spherocytosis.

The other "common" types of CDA (I and III) are ruled out morphologically in this case by an absence of intercytoplasmic chromatin bridges (I) and an absence of gigantoblasts (III).