PathMD™: Board Review Letter

Author: Philip Ferguson, M.D. **Peripheral Blood – Part 2** Volume 1, Number 14

1. The peripheral blood smear illustrated in Case #1 on the website is from a young girl with recurrent infections. What is the most likely diagnosis:
    A. Chediak-Higashi

Answer: A. Chediak-Higashi. This is a rare autosomal recessive disorder characterized by neutrophil inclusions secondary to the fusion of lysosomes. These tend to be round to irregular granules and vary in color from red to blue to greenish-gray. Platelets and megakaryocytes are unaffected, but all other leukocytes may have inclusions. (*Color Atlas of Hematology*, EF Glassy, Editor. College of American Pathologists. 1998. p.304-305)

2. A 44 y/o male presents to the ED with fever and shortness of breath. The peripheral blood smear illustrated in Case #2 on the website represents which of the following:

    B. Cold agglutinins

Answer: B. CAs are characterized by irregular clumping and overlapping of RBCs. These can be seen in patients with CA hemolytic anemia, PCH, lymphomas with IgM production, and plasma cell dysrasias with IgM paraproteins. (*Color Atlas of Hematology*, EF Glassy, Editor. College of American Pathologists. 1998. p. 146-147)

3. Which of the following is the most likely explanation of the findings in the previous question:
    A. Anti-I secondary to *mycoplasma pneumoniae*

Answer: A. The peripheral blood smear findings combined with the history suggest *mycoplasma* pneumonia with resultant Anti-I with cold agglutinins. EBV is associated with anti-i. Rouleaux formation would most likely be secondary to a plasma cell dyscrasia.

4. Which of the following is the best description of “Bart’s hemoglobin”?

    D. --/--

Answer: D. Bart’s hemoglobin is composed entirely of γ(gamma) chain tetramers, and is a common cause of stillbirth in Southeast Asia. Answers A & B are characteristic of α-thalassemia trait, which is usually expressed as a microcytic, hypochromic anemia. Answer E has 3 of the four α-chains and would not likely be recognized clinically. Answer C is known as HbH disease. (*Color Atlas of Hematology*, EF Glassy, Editor. College of American Pathologists. 1998. p. 126)

5. The blood smear illustrated in Case #3 on the website is from a 13 y/o African American patient. Which of the following is the best diagnosis:
    A. HbSS

Answer: A. This is a case of sickle cell disease. When evaluating cases of sickle cell disease (although not necessarily on the website images) note the sickle forms, increased polychromasia, and Howell-Jolley bodies (remnants of DNA material left in the RBC after extrusion of the nucleus – usually seen in patients without a spleen or with a non-functioning spleen). (*Color Atlas of Hematology*, EF Glassy, Editor. College of American Pathologists. 1998. p. 138-139)

6. The cell illustrated in the image for Case #4 on the website is best characterized as:

    C. Myelocyte

Answer: C. This cell is best characterized as a myelocyte. Note the presence of cytoplasmic granules and lack of immaturity of the nuclear chromatin.

7. The cell illustrated in the image for Case #5 on the website is best characterized as:
   A. Myeloblast

Answer: A. This cell is best characterized as a myeloblast. Note the lack of cytoplasmic granules and immaturity of the nuclear chromatin.

8. What is the approximate frequency of the sickle cell gene among the African American population?

   B. 9%

Answer: B. The HbS trait is found in approximately 9% of African Americans. The HbC gene is found in ~ 3%, and the β-thalassemia gene in 1%.

9. A 35 y/o black woman with a Hb-5.2, MCV-63, and MCHC-28.2. A peripheral smear is reviewed and representative images are illustrated in Case #6 on the website. The best diagnosis is:

   B. Iron Deficiency Anemia

Answer: B. This illustrates a classic case of iron deficiency anemia. Note the severe anisopoikiocytosis, microcytes, and hypochromasia. In iron deficiency, the central pallor is greater than 1/3 of the RBC diameter. Microcytes can also be found in thalassemia and lead poisoning. (*Color Atlas of Hematology*, EF Glassy, Editor. College of American Pathologists. 1998. p. 88-89)

10. A test using brilliant crystal blue and then evaluating blood smears at 10 minutes, 1 hour, and then 4 hours is used to evaluate for which of the following?

    E. HbH

Answer: E. This is the test for HbH inclusion bodies. At 1 hour more than 50% of the cells are often positive. The smear made at 10 minutes serves as the reticulocyte control. (*Practical Diagnosis of Hematologic Disorders*. CR Kjeldsberg, ASCP 2006. p. 138)

11. All of the following are associated with a heterogeneous staining pattern in an acid elution test for fetal hemoglobin EXCEPT:

    D. Hereditary persistence of HbF

Answer: D. The acid elution test for fetal hemoglobin uses citric acid to dissolve all hemoglobins except HbF, which is resistant. A homogeneous staining pattern is only found in hereditary persistence of fetal hemoglobin. All other disorders/situations involving HbF will have a heterogeneous distribution. (*Practical Diagnosis of Hematologic Disorders*. CR Kjeldsberg, ASCP 2006. p. 137)

Notes for question set:[1]

[1] PathMD strives for the highest quality and accuracy. However, the *PathMD: Board Review Letter* is for review purposes and not meant for clinical decision making. It should not be used in place of review of primary reference texts and the current medical literature. If inaccuracies are identified, please notify us so that a correction may be published. (info@PathMD.com)

