PathMD™: Board Review Letter

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Case #1 A 3 year old male is found to have "immature" cells in the peripheral blood that are myeloperoxidase negative. Flow cytometry is performed. Based on the findings, what is the best diagnosis?

A. Precursor T cell ALL
B. Precursor B cell ALL
C. Acute myelogenous leukemia with monocytic differentiation
D. Anaplastic Large Cell Lymphoma
E. None of the above

Answer: A. The cells are within the blast region of the side scatter vs. CD45 plot and express T-cell markers and immature markers (CD34). CD13 and CD33, which are myeloid markers can also be seen in T cell ALL. The cytoplasmic CD3 (c CD3) is lineage specific to T-cells.

Case #2 Abnormal lymphoid cells are identified in the blood of a 65 year old male. Flow cytometry is performed. Based on the findings, what is the best diagnosis?

A. Follicular Lymphoma – Peripheralized
B. CLL/SLL
C. Mantle Cell Lymphoma
D. Precursor B Cell ALL
E. Marginal zone lymphoma

Answer: E. This is an example of marginal zone lymphoma by flow cytometry, which has a non-specific immunophenotype (CD19/20 positive with light chain restriction). CLL/SLL and mantle cell lymphoma both have CD5 positivity, and follicular lymphoma will have CD10 positivity. Precursor B cell ALL will often have CD10 positivity like follicular lymphoma, but will usually be negative for CD20 and express immature cell markers (Tdt and/or CD34), which will also be in the blast region of the side scatter vs. CD45 plot.

Case #3 A 60 year old Japanese male presents with abnormal clover-leaf appearing lymphoid cells in the peripheral blood. Flow cytometry is performed. Based on the findings, what is the best diagnosis?

A. Precursor T cell ALL
B. Angioimmunoblastic T cell lymphoma
C. Anaplastic large cell lymphoma
D. Diffuse large B-cell lymphoma
E. Adult T cell leukemia/lymphoma

Answer: E. This is a case of adult T cell leukemia/lymphoma. These are HTLV-1 associated, and often express CD25 by flow cytometry. Morphologically, they are characterized by the flower or clover-leaf appearing nucleus. HTLV-1 serology is necessary to confirm the diagnosis.

Case #4 A 45 year old woman presents to the ED with shortness of breath. A CBC was performed and the peripheral blood smear is shown. Based on the findings, what will the patient most likely be found to have?

A. M-spike on SPEP
B. Anti-I antibody
C. Anti-i antibody
D. Positive DAT with IgG and complement
E. Positive monospot test

Answer: B. This case represents cold agglutinin disease, which is often due to an IgM against big "I," and is classically associated with mycoplasma pneumonia. In children the Ab is IgM against little "i," and is classically associated with EBV infection, which has a positive monospot test.

Case #5 The blood smear in this patient comes from a 21 year old male with a mother who has hereditary elliptocytosis. What is the most likely diagnosis?

A. Thermal injury
B. Hereditary pyropoikilocytosis
C. Microangiopathic hemolytic anemia
D. Disseminated intravascular coagulation
E. None of the above

Answer: B. Hereditary pyropoikilocytosis often occur in individuals who have one parent with hereditary elliptocytosis and the other parent with an unidentified quantitative/qualitative red cell membrane abnormality.

Case #6 The image shown is from a 40 year old female who had a routine CBC, which showed thrombocytopenia (60K). Which of the following best explains her abnormalities?

A. Bernard Soulier Disease
B. Chediak-Higashi
C. Acute infection
D. May Hegglin Anomaly
E. Erhlichia infection

Answer: May-Hegglin Anomaly. This is an autosomal dominant d/o with the findings of giant platelets and Dohle bodies in the granulocytic cells. These Dohle bodies (randomly distributed in the granulocyte) are larger and more defined (intensely blue staining) than what is usually seen in toxic granulation. Approximately 40% of patients may have a mild bleeding problem, but it should be noted that the platelet mass and survival is normal. (Glassy, p. 46-47)

Question #1 Tests for hemoglobin solubility are most useful in which of the following situations?

A. Distinguishing HbD from HbS
B. Distinguishing HbC_{Harlem} from HbS
C. Diagnosing sickle cell trait
D. Differentiating a thalassemia from a hemoglobinopathy
E. None of the above

Answer A. Hemoglobin solubility tests are most commonly used to differentiate HbD, which is soluble in its reduced state, from HbS, which is insoluble. In electrophoresis HbS and HbD migrate to the same area at alkaline pH. This question is not entirely fair in that solubility testing can also be used to identify sickle cell trait. This is usually done as a screening test, and is followed up by more diagnostic studies (HPLC, electrophoresis, etc.).

Question #2 When considering hemoglobin electrophoresis on cellulose acetate at pH 8.4, which of the following is the correct order of Hb migration from the cathode towards the anode?

A. A F S C
B. C S A F
C. S C A F
D. S C F A
E. C S F A

Answer: E. In alkaline pH, hemoglobin is negatively charged. The most negatively charged hemoglobin will move the fastest towards the anode (+ charge). The pneumonic A Fat Santa Claus is often used to remember the order from the anode to the cathode. (Kjeldsberg, Vol. 1, p. 131-134)

Reference:

Color Atlas of Hematology, EF Glassy, Editor. College of American Pathologists. 1998.

Practical Diagnosis of Hematologic Disorders. CR Kjeldsberg, ASCP 2006.

