PathMD™: Board Review Letter

Author: Philip Ferguson, M.D. **Hematopathology - Part 5** Volume 1, Number 46

Case #1 A patient presents with an elevated WBC count, and flow cytometry is performed. Based on the dot plots shown on the website images for this case, what is the best diagnosis?

A. Mantle cell lymphoma
B. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma
C. Peripheralized Marginal Zone Lymphoma
D. T-cell ALL
E. B-cell ALL

Answer: B. CLL/SLL is characterized by weak CD20 and surface light chain positivity with coexpression of CD5 and CD23. In this case the CD20 is moderately expressed. Mantle cell lymphoma, in contrast, is negative for CD23. In addition, the CD20 is usually moderate to bright, usually with FMC7 positivity. FMC7 is an epitope of the CD20 antigen, and is usually not expressed in CLL/SLL because of the weak expression of the CD20. Acute lymphoblastic lymphoma/leukemia will normally have a weaker CD45 expression and sit in the blast area of the CD45 versus side scatter plot.

Case #2 A patient presents with an elevated WBC count, and flow cytometry is performed. Based on the dot plots shown the website images for this case, what is the best diagnosis?

A. Mantle cell lymphoma
B. Chronic Lymphocytic Leukemia/Small Lymphocytic Lymphoma
C. Peripheralized Marginal Zone Lymphoma
D. T-cell ALL
E. B-cell ALL

Answer: E. B-cell ALL is characterized on flow cytometry by weaker CD45 positivity, which places a cell population in the "blast gate." In addition, a B-cell marker will be positive, which gives lineage specificity. CD19 is usually positive because it is an earlier when each specific marker compared to CD20. Tdt is also a helpful marker, although nonspecific, to identify immature cell populations.

Case #3 A 40 year old woman presents with an elevated WBC count (25K) with abnormal immature cells noted by the hematology technologist (see case images). Flow cytometry demonstrated the cells to be positive for CD13 and CD33 and negative for CD34 and HLA-DR. What is the best diagnosis?

A. B-ALL
B. AML-M0
C. AML-M2
D. AML-M4
E. APL

Answer: E. This case represents an AML-M3 (a.k.a. Acute Promyelocytic Leukemia, APL). It is characterized usually by a lower presenting WBC count compared to other leukemias and exhibits maturity just past the myeloblast stage, which is why CD34 and HLA-DR are often negative. Note the intense staining of the blasts with myeloperoxidase. It is important to identify these patients early because they are at risk for DIC and can be treated with ATRA.

Case #4 A 36 year old Hispanic male with a CD4 count of 20 presents to the emergency department complaining of chronic headaches for several months. A routine CBC showed pancytopenia, and a bone marrow biopsy was performed. Based on the findings, what is the most likely diagnosis?

A. Histoplasmosis
B. Blastomycosis
C. Coccidiomycosis
D. Cryptococcus
E. Mycobacterium avium

Answer: D. This case represents disseminated cryptococcal infection with bone marrow involvement. Note the clearing around the organisms on the H&E sections, which represents the organism's capsule. Mucicarmine will highlight this capsule (not shown). GMS stain shows multiple organisms of different sizes, which is also characteristic of cryptococcus. Histoplasmosis organisms are typically uniform in size (~3-4μm), and Blastomycosis are large organisms (bigger than a RBC) with broad based budding (this case showed narrow based budding characteristic of cryptococcus).

Case #5 A patient with a history of acute leukemia undergoes a bone marrow aspiration. Part of the specimen is sent for cytogenetic analysis. Results of the karyotype are shown in the image for this case. Based on the findings (which are highlighted by red arrows), what is the best diagnosis?

A. AML-M2
B. AML-M3
C. AML-M4Eo
D. AML M5a
E. ALL

Answer: B. This example illustrates a t(15;17), which is characteristic of AML-M3. This is one of the four genetic translocations are classified in the WHO classification system as AML with recurring genetic abnormalities (Know these).

Case #6 A 12 year old boy presents with a WBC of 233K. The bone marrow aspirate with a myeloperoxidase stain are shown. Flow cytometry demonstrated CD19 positivity. What is the best diagnosis?

A. Pre B-ALL
B. Pre T-ALL
C. AML-M2 with t(8;21)
D. APL
E. AML-M4

Answer: A. This case represents Precursor B Acute Lymphoblastic Leukemia/Lymphoma (B-ALL). The absence of myeloperoxidase activity puts this in either an AML-M0 or ALL category. CD19 is a B-cell marker found early in B-cell differentiation, but is also often aberrantly expressed in cases of AML-M2 with t(8;21). An AML-M2 will show differentiation in >10% of myeloid cells and will be myeloperoxidase positive.

Question #1 All of the following are true with respect to MALT/marginal zone lymphomas EXCEPT:

A. Trisomy 3 in a majority of MALT cases
B. t(11;18) is associated with lower response to H. pylori therapy
C. Are typically indolent disease processes
D. Not present in primary large B-cell gastric lymphoma
E. None of the above

Answer: E. A through D are all characteristic of MALT lymphomas.

Question #2 Which of the following are associated with a worse prognosis in CLL/SLL:

A. Trisomy 12
B. Del 13q14
C. CD38 expression on flow cytometry
D. Both A and C are correct
E. All of the above are correct

Answer: D. Trisomy 12 is present in ~20% of cases and is associated with a worse prognosis. CD38 expression and increased ZAP-70 are both associated with a more aggressive course.

Question #3 Mantle Cell Lymphoma is associated with which of the following:

A. t(11;14)
B. t(8;14)
C. t(2;5)
D. t(11;18)
E. t(14;18)

Answer: A. Mantle cell lymphoma is associated with translocation of the cyclin D1 (bcl-1) located on ch. 11q13 with the heavy chain immunoglobulin gene located on ch. 14q32. Other translocation associations to remember:

t(14;18) – bcl2-IgH → Follicular lymphoma
t(2;5) – ALK-NPM → Anaplastic Large Cell Lymphoma
t(11;18) – API2-MLT → Extranodal marginal zone lymphoma
t(8;14) – c-myc-IgH → Burkitt lymphoma

Question #4 Which of the following chromosomal abnormalities is commonly found in multiple myeloma:

A. +3
B. 13q14 or monosomy 13
C. del 8
D. del 14
E. +5

Answer: B. Abnormalities in chromosome 13 are the most common (15-40% of cases).

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)

