ASCP Specialist in Hematology (SH) Practice Exam (Sample)

Study Guide

BY EXAMZIFY

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Questions

1. **Why is a drop of albumin added to the cerebrospinal fluid sample before cytocentrifugation?**
   - A. Enhance staining of the elements
   - B. Preserve the integrity of the cells
   - C. Increases the fluid volume for a monolayer
   - D. Dilute the sample

2. **What hematological condition is associated with excessive clot formation and can lead to venous thromboembolism?**
   - A. Factor V Leiden mutation
   - B. Thrombocytopenia
   - C. Aplastic anemia
   - D. Sideroblastic anemia

3. **What is one common cause of an elevated platelet count?**
   - A. Chronic inflammation
   - B. Liver failure
   - C. Vitamin K deficiency
   - D. Bone marrow failure

4. **In terms of coagulation, what does DIC stand for?**
   - A. Defective Inhibitory Coagulation
   - B. Disseminated Intravascular Coagulation
   - C. Delayed Inactive Coagulation
   - D. Dissolved Intravascular Coaguation

5. **Which method is commonly used to perform a hemoglobin electrophoresis?**
   - A. Paper chromatography
   - B. Alkaline starch gel electrophoresis
   - C. Gel filtration chromatography
   - D. Capillary electrophoresis

6. Which condition can lead to a higher risk of bleeding due to coagulation issues?

A. Thrombophilia

B. Disseminated Intravascular Coagulation (DIC)

C. Polycythemia vera

D. Iron-deficiency anemia

7. Which of the following substances does NOT induce platelet aggregation?

A. Epinephrine

B. ADP

C. Aspirin

D. Collagen

8. What is the typical platelet count range for healthy adults?

A. 100,000 to 350,000 platelets per microliter of blood

B. 150,000 to 450,000 platelets per microliter of blood

C. 200,000 to 500,000 platelets per microliter of blood

D. 250,000 to 600,000 platelets per microliter of blood

9. Which laboratory findings are suggestive of megaloblastic anemia?

A. Low mean corpuscular volume (MCV)

B. Normal red blood cell size

C. Increased mean corpuscular volume (MCV)

D. Presence of microcytic red blood cells

10. Howell-Jolly bodies are most frequently seen in patients who have?

A. Had their spleen removed

B. Sickle cell disease

C. Iron deficiency anemia

D. Vitamin B12 deficiency anemia

Answers

1. B
2. A
3. A
4. B
5. B
6. B
7. C
8. B
9. C
10. A

Explanations

1. **Why is a drop of albumin added to the cerebrospinal fluid sample before cytocentrifugation?**

   A. Enhance staining of the elements

   B. Preserve the integrity of the cells

   C. Increases the fluid volume for a monolayer

   D. Dilute the sample

Adding a drop of albumin to the cerebrospinal fluid (CSF) sample before cytocentrifugation primarily serves to preserve the integrity of the cells. The presence of albumin helps to create a protective environment for the cellular components during the processing of the CSF. This is particularly important because CSF is often low in cellularity, making it crucial to maintain the viability and morphology of any cells present. When centrifuged, albumin contributes to minimizing damage to the cells by preventing them from sticking to one another or to the slides, allowing for clearer visualization and analysis post-centrifugation. The other options, while they touch on related concepts, do not accurately describe the primary reason for the inclusion of albumin in this context. While enhancing staining or increasing fluid volume might seem relevant to processing samples, they do not reflect the fundamental protective role that albumin plays in preserving cell integrity during cytocentrifugation. Likewise, dilution of the sample does not align with the purpose of maintaining cell morphology and viability, as dilution could potentially compromise the concentration and visibility of cells necessary for accurate assessment.

2. **What hematological condition is associated with excessive clot formation and can lead to venous thromboembolism?**

   A. Factor V Leiden mutation

   B. Thrombocytopenia

   C. Aplastic anemia

   D. Sideroblastic anemia

The hematological condition associated with excessive clot formation leading to venous thromboembolism is the Factor V Leiden mutation. This mutation involves a specific genetic alteration in the Factor V gene, which plays an essential role in the coagulation cascade. The mutation causes resistance to activated protein C, a natural anticoagulant that typically helps regulate blood clot formation. As a result, individuals with the Factor V Leiden mutation are at an increased risk of developing abnormal blood clots, including deep vein thrombosis and pulmonary embolism, which are types of venous thromboembolism. The other conditions listed, such as thrombocytopenia, aplastic anemia, and sideroblastic anemia, do not generally lead to excessive clot formation. Thrombocytopenia, for instance, is characterized by a low platelet count, which typically increases the risk of bleeding rather than clotting. Aplastic anemia involves the failure of bone marrow to produce sufficient blood cells, leading to various complications but not an increased risk of clotting. Sideroblastic anemia is primarily related to issues with hemoglobin production and iron metabolism, with no direct connection to enhanced clotting activity.

3. What is one common cause of an elevated platelet count?

A. Chronic inflammation

B. Liver failure

C. Vitamin K deficiency

D. Bone marrow failure

An elevated platelet count, known as thrombocytosis, can commonly occur due to chronic inflammation. Inflammatory conditions lead to the release of various cytokines, which stimulate the bone marrow to produce more platelets. This response can be a part of the body's attempt to repair tissue or combat infection, as platelets play a crucial role in hemostasis and inflammation. Chronic inflammatory diseases, such as rheumatoid arthritis, inflammatory bowel disease, or chronic infections, often result in elevated levels of inflammatory markers that can influence platelet production. Therefore, recognizing chronic inflammation as a cause of elevated platelet counts is crucial in clinical hematology. The other options, while they can affect blood cell production in various ways, are not typically associated with elevated platelet counts when evaluated in the context of their commonality. For instance, liver failure can lead to thrombocytopenia (a decrease in platelet count) due to splenomegaly and other factors. Vitamin K deficiency primarily affects coagulation factors and does not generally lead to elevated platelet levels. Bone marrow failure results in reduced production of all blood cells, including platelets, thus causing low counts rather than high.

4. In terms of coagulation, what does DIC stand for?

A. Defective Inhibitory Coagulation

B. Disseminated Intravascular Coagulation

C. Delayed Inactive Coagulation

D. Dissolved Intravascular Coaguation

Disseminated Intravascular Coagulation (DIC) is a complex disorder characterized by the widespread activation of the coagulation cascade, leading to the formation of blood clots throughout the small blood vessels. This condition can result in multiple organ dysfunction due to the consumption of clotting factors and platelets, ultimately leading to a higher risk of significant bleeding. In DIC, the activation of coagulation can be triggered by various factors such as sepsis, trauma, or other underlying medical conditions, which cause the release of pro-coagulant substances into the circulation. This systemic activation of coagulation not only increases the risk of thrombosis but also depletes platelets and clotting factors, resulting in a paradoxical increased risk of hemorrhage. The other phrases offered in the question do not concisely define the condition and lack the specific terminology used in hematology and coagulation studies. Thus, "Disseminated Intravascular Coagulation" is the accurate and accepted term for this serious medical condition.

5. Which method is commonly used to perform a hemoglobin electrophoresis?

A. Paper chromatography

B. Alkaline starch gel electrophoresis

C. Gel filtration chromatography

D. Capillary electrophoresis

The method commonly used to perform hemoglobin electrophoresis is alkaline starch gel electrophoresis. This technique is particularly effective for separating different types of hemoglobin based on their charge at alkaline pH levels. Hemoglobin molecules carry different charges depending on their structure, and during electrophoresis, they migrate through a gel matrix in response to an electrical current. In alkaline conditions, variants of hemoglobin such as hemoglobin A, S, and C can be distinctly separated, allowing for identification and quantification. The starch gel acts as a medium that hinders the movement of hemoglobin molecules, providing a way to visualize the differences in migration distances that correlate with the type of hemoglobin present in a sample. While other methods, such as capillary electrophoresis, also offer effective ways to perform hemoglobin analysis, alkaline starch gel electrophoresis has a long-standing role in clinical laboratories due to its simplicity, cost-effectiveness, and reliable results for distinguishing abnormal hemoglobin variants.

6. Which condition can lead to a higher risk of bleeding due to coagulation issues?

A. Thrombophilia

B. Disseminated Intravascular Coagulation (DIC)

C. Polycythemia vera

D. Iron-deficiency anemia

Disseminated Intravascular Coagulation (DIC) is a serious condition that leads to a higher risk of bleeding due to its impact on the coagulation system. In DIC, there is widespread activation of the coagulation cascade, which initially causes the formation of numerous small blood clots throughout the small blood vessels. This extensive clotting consumes clotting factors and platelets, leading to a paradoxical increase in the risk of bleeding. As clotting factors become depleted from the excessive use during the formation of microclots, the body is left with insufficient components to initiate normal coagulation in the event of injury or bleeding, contributing to a potentially severe bleeding tendency. Other conditions such as thrombophilia can actually increase the risk of clotting rather than bleeding, and conditions like polycythemia vera are associated with increased blood viscosity and thrombotic events rather than bleeding issues. While iron-deficiency anemia may have some effects on hemostasis, it does not directly result in a coagulation alteration of the magnitude seen in DIC that leads to severe bleeding risks.

7. Which of the following substances does NOT induce platelet aggregation?

A. Epinephrine

B. ADP

C. Aspirin

D. Collagen

Aspirin is known for its role as an antiplatelet agent. It works by irreversibly inhibiting the enzyme cyclooxygenase (COX), which leads to a reduction in the production of thromboxane A2, a potent promoter of platelet aggregation. By decreasing thromboxane levels, aspirin ultimately inhibits the ability of platelets to aggregate in response to various stimuli. In contrast, substances such as epinephrine, ADP, and collagen are all known to promote platelet aggregation. Epinephrine can enhance platelet aggregation under certain conditions, ADP is a powerful aggregator that activates platelets, and collagen, which is found in the extracellular matrix, directly interacts with platelet receptors to promote aggregation when blood vessels are damaged. Therefore, aspirin's unique function makes it the substance among the options that does not induce platelet aggregation.

8. What is the typical platelet count range for healthy adults?

A. 100,000 to 350,000 platelets per microliter of blood

B. 150,000 to 450,000 platelets per microliter of blood

C. 200,000 to 500,000 platelets per microliter of blood

D. 250,000 to 600,000 platelets per microliter of blood

The typical platelet count range for healthy adults is confirmed to be between 150,000 to 450,000 platelets per microliter of blood. This range is considered the reference interval for normal hematological function concerning platelet production and function. It reflects the balance necessary for adequate hemostasis, which involves stopping bleeding and maintaining proper blood flow. Platelets, or thrombocytes, play a crucial role in the blood clotting process, and maintaining their count within this range ensures that the body can respond effectively to vascular injury. When platelet levels fall below this range, it can lead to issues such as increased bleeding or bruising, while levels above this range may increase the risk of thrombosis or clot-related complications. Understanding this reference range is important for clinical practice, as deviations can indicate various underlying conditions that require further investigation or treatment.

9. Which laboratory findings are suggestive of megaloblastic anemia?

A. Low mean corpuscular volume (MCV)

B. Normal red blood cell size

C. Increased mean corpuscular volume (MCV)

D. Presence of microcytic red blood cells

Megaloblastic anemia is characterized by the presence of large, immature red blood cells (RBCs) in the bone marrow and peripheral blood. When examining laboratory findings, an increased mean corpuscular volume (MCV) is a hallmark indicator of this condition. This increase in MCV occurs because the erythrocytes are larger than normal due to impaired DNA synthesis, which is often a result of vitamin B12 or folate deficiency. In megaloblastic anemia, the maturation process of red blood cells in the bone marrow is disrupted, leading to the production of macrocytic (larger) red blood cells. This is why an elevated MCV is a key laboratory finding for diagnosing megaloblastic anemia. In contrast, low mean corpuscular volume or normal red blood cell size would not be consistent with megaloblastic anemia, which is defined by the presence of larger-than-normal red blood cells. Additionally, the presence of microcytic red blood cells is typically associated with other types of anemia, such as iron deficiency anemia, rather than megaloblastic anemia. Thus, the finding of increased MCV directly supports the diagnosis of megaloblastic anemia.

10. Howell-Jolly bodies are most frequently seen in patients who have?

A. Had their spleen removed

B. Sickle cell disease

C. Iron deficiency anemia

D. Vitamin B12 deficiency anemia

Howell-Jolly bodies are small, round inclusions that can be found within red blood cells and are essentially remnants of nuclear material. They are typically formed due to the lack of splenic filtering. The spleen plays a crucial role in removing old, damaged, or abnormal red blood cells and these remnants from circulation. When the spleen is removed, a condition known as splenectomy, there is a decreased ability to filter out these inclusions, leading to their increased presence in the bloodstream. In patients who have undergone splenectomy, Howell-Jolly bodies are more commonly observed due to the spleen's absence, which results in the retention of these nuclear remnants in the red blood cells. This finding can serve as a clinical indicator of splenic function and is often utilized in the diagnosis of conditions where splenic activity is lost. While Howell-Jolly bodies may also be seen in some other hematologic conditions like sickle cell disease, in those cases, the primary concern would be related to different mechanisms rather than the lack of splenic filtration. Iron deficiency anemia and vitamin B12 deficiency anemia are not directly linked to the presence of Howell-Jolly bodies in the same way as splenectomy. Thus, the association of Howell-Jolly bodies