

A 7-year-old Caucasian boy is brought to your office for a routine check-up. He underwent splenectomy one year ago for persistent anemia and jaundice. He has received pneumococcal vaccination and takes penicillin prophylaxis. His uncle underwent splenectomy for "some blood disorder" in his childhood. His blood hemoglobin level is 11.5 mg/dL and MCV is 90 fL. Blood smear demonstrates occasional red blood cells with single, round, blue inclusions on Wright stain. The latter finding is most likely related to:

- ☐ A. Hemoglobin precipitation
- ☐ B. Low reticulocyte count
- ☐ C. Penicillin therapy
- ☐ D. Mechanical RBC damage
- ☐ E. Splenectomy

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- ☐ A. Hemoglobin precipitation [23%]
- ☐ B. Low reticulocyte count [3%]
- ☐ C. Penicillin therapy [2%]
- ☐ D. Mechanical RBC damage [4%]
- ☒ E. Splenectomy [69%]

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Explanation:

User Id: [REDACTED]

This patient has Howell-Jolly bodies on his peripheral blood smear. These bodies are nuclear remnants within red blood cells (RBCs) that are typically removed by the spleen. They are evident on peripheral blood smear as single, round, blue inclusions on Wright stain. The presence of Howell-Jolly bodies usually indicates physical absence of the spleen or functional hyposplenism due to splenic autoinfarction, infiltrative disorders of the spleen, or splenic congestion. This patient's surgical splenectomy was most likely performed as treatment for hereditary spherocytosis.

(Choice A) Hemoglobin precipitation is seen in glucose-6-phosphate dehydrogenase (G6PD) deficiency. In this disease, hemoglobin becomes oxidized and forms insoluble precipitants called Heinz bodies. They appear in RBCs on peripheral smear after staining with a dye such as crystal violet.

(Choice B) A low reticulocyte count indicates decreased production of RBCs. This can be due to a number of causes, including iron deficiency, folate or B12 deficiencies,

✓ ☐ E. Splenectomy [69%]

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(Choice A) Hemoglobin precipitation is seen in glucose-6-phosphate dehydrogenase (G6PD) deficiency. In this disease, hemoglobin becomes oxidized and forms insoluble precipitants called Heinz bodies. They appear in RBCs on peripheral smear after staining with a dye such as crystal violet.

(Choice B) A low reticulocyte count indicates decreased production of RBCs. This can be due to a number of causes, including iron deficiency, folate or B12 deficiencies, cancer chemotherapy, infection, or aplastic anemia. On peripheral smear, reticulocytes have a slightly bluish tint and stain with methylene blue. This patient's blood smear does not suggest decreased reticulocyte production.

(Choice C) The main side effect of penicillin administration is allergic reaction. Penicillin and other beta-lactam antibiotics have been associated with autoimmune hemolytic anemia, but Howell-Jolly bodies are not seen with immune-mediated hemolysis.

(Choice D) Mechanical red blood cell damage occurs when RBCs shear on a foreign object within the vascular system. The classic example is RBC shearing on artificial heart valves, but mechanical RBC damage can occur with catheters and other intravascular devices. Schistocytes (fragmented RBCs) will be seen on the peripheral blood smear.

Educational Objective:

Howell-Jolly bodies are nuclear remnants within red blood cells typically removed by the spleen. Their presence strongly suggests physical or functional hyposplenism.

Time Spent: 2 seconds

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