CLINICAL AND LABORATORY DIAGNOSTICS FEATURES OF HEMOLYTIC ANEMIA

Kurbonova Z.Ch
Khashboqova G.O
Abdukhakimova M.A
Tashkent Medical Academy

Annotation: *This article discusses the characteristics of hemolytic anemia and its clinical laboratory diagnostics. It is emphasized that identifying the causes of hemolytic anemia is crucial for recommending appropriate treatment.*

Keywords: *Hemolytic anemia, anemia diagnostics, clinical laboratory diagnostics, medical examination.*

Hemolytic anemia is characterized by a shortened lifespan of red blood cells that contain hemoglobin. For many years, the medical community has debated whether to use the term "anemia" for this condition. However, it is now commonly used in disease classification.

In hemolytic anemia, there is a decrease in red blood cells and hemoglobin levels in the blood. This condition affects both adults and children. Some types of hemolytic anemia are caused by changes in the shape of red blood cells, which leads to a loss of their primary function.

There are also hereditary types of hemolytic anemia that depend on the resistance of red blood cells to various conditions. Hemolytic anemia can be classified into three types based on the cause of hemolysis:

1. Anemias caused by abnormalities in red blood cells.
2. Anemias caused by exposure to various toxic substances.
3. Anemias caused by anti-erythrocyte antibodies.

In some types of hemolytic anemia, hemolysis occurs inside macrophages, while in others, it occurs in the blood, leading to hemoglobinuria.

The pathogenesis of hemolytic anemia involves the products of hemolysis and erythropoiesis. All types of hemolytic anemia can be divided into two groups: hereditary and acquired. Hereditary hemolytic anemia is especially common among the population of Northern Europe. The initial symptoms are often mild in children, but if left untreated, the disease can have negative effects on the body.

The characteristic feature of all types of hemolytic anemia is jaundice syndrome, which manifests as yellowing of the skin and sclera. During hemolysis, a large amount of unconjugated bilirubin is released into the bloodstream, causing jaundice symptoms.

Other general symptoms of hemolytic anemia include anemic syndrome: headache, dizziness, general weakness, fatigue, tinnitus, lack of appetite, insomnia, and palpitations.

To diagnose hemolytic anemia, a physician conducts a thorough examination that includes taking a medical history and evaluating clinical symptoms. The medical history may reveal previous illnesses, any pathological conditions, hereditary predisposition to diseases, harmful habits, or exposure to toxic substances.

In some cases, a bone marrow biopsy may be ordered to diagnose hemolytic anemia, using special tools and medications. The disease progression of hemolytic anemia depends on the type and begins in childhood. However, the characteristic feature of all types is visible jaundice symptoms - yellowing of the skin and sclera. Therefore, they are often differentially diagnosed with liver diseases.

The most common types of hemolytic anemia are:

1. Thalassemia. In this disease, hemoglobin F predominates in the patient's red blood cells. It is characterized by progressive anemia, splenomegaly, and liver enlargement. The bone marrow in the skull and long bones increases because of erythroblastic proliferation.

2. Hemoglobin S. This type of hemolytic anemia is accompanied by hyperplasia of the spleen, bilirubinemia, and mild jaundice. Hemolytic crises are observed in this disease, which is considered a relatively mild form of hemolytic anemia.

3. Erythrocytopathy. In erythrocytopathy, the synthesis of membrane proteins in red blood cells is impaired, leading to changes in their shape and becoming spherocytic or microspherocytic. Normally, red blood cells move freely through capillaries and assume a biconcave disk shape. Microspherocytes have increased permeability to water due to membrane defects, causing them to change shape and become trapped and fragmented in the bloodstream. This disease progresses from generation to generation. In some cases, sick children are born to healthy parents. In this case, exposure to radiation, X-rays, heavy metal salts, drug addiction, nicotine use, virus infections can cause disease progression. Therefore, during pregnancy and before birth, it is necessary to protect the mother's body from harmful effects.

The main symptoms of hemolytic anemia are jaundice, anemia, splenomegaly, hypoxia, and intoxication.

The clinical appearance of the disease is primarily determined by the severity of the pathological process and the number of altered red blood cells. The first signs of the disease are often observed in children. During the remission period of the disease, symptoms of hypoxia are observed. Among them are skin pallor and yellowing of the skin and sclera. During a hemolytic crisis, clinical symptoms intensify: fever rises to 38 degrees, jaundice intensifies, blood becomes darker, nausea, vomiting, and sweating are observed.

In some cases, the disease is asymptomatic and is accidentally detected during routine medical examination.

Medical examination. If hemolytic anemia is suspected in a patient, it is necessary to consult a hematologist. At the same time, a number of hematological laboratory tests are performed:

• Urine test: color is pale yellow or red, hemoglobinuria, proteinuria, and an increase in urobilin.

• Biochemical blood test: increase of total and unconjugated bilirubin, cholesterol, lactic acid levels.

• Red blood cell analysis: osmotic resistance of erythrocytes decreases.

• Complete blood count: erythrocyte sedimentation rate increases, changes in erythrocyte shape: normocytic, macrocytic, microcytic, ovalocytic, etc. During crises, platelets and leukocytes increase, and the leukocyte formula shifts to the left.

Differential diagnosis. Hemolytic anemia in children can sometimes pose difficulties in diagnosis. It may be similar to other autoimmune diseases. The types of anemia and their differential diagnosis are listed in table 1.

Table 1.

Types and Symptoms of Anemia

Anemia type	Relationship to blood	Liver and spleen	Symptoms
Iron deficiency anemia	Pale color	Normal size	Weakness fatigue, shortness of breath
B_{12} deficiency anemia	Lemon color	Slightly enlarged	Anemia, glossitis, paresthesia, spinal cord damage
Folic acid deficiency anemia	Lemon color	Slightly enlarged	Anemia, depression, paresthesia, spinal cord damage
Aplastic anemia	Marbled pallor	Not enlarged	Anemia, hemorrhagic syndrome, infections
Hemolytic anemia	Yellowing	Enlarged	Yellowing, anemia, hepatosplenomegaly, intoxication.

Chronic disease anemia has long been a relevant issue in the world, as its etiology and pathogenesis are not well studied. One of the etiological factors of anemia is pathology of the thyroid gland, liver, kidneys, digestive system, and others. In diffuse toxic goiter with intensive hyperactivity of the thyroid gland, changes in peripheral blood are observed, such as anemia, lymphocytosis, eosinophilia, hypogranulocytosis, and thrombocytopenia, with a decrease in the osmotic resistance of erythrocytes.

The information provided above describes the clinical laboratory diagnosis of hemolytic anemia and highlights its many characteristics. It is important to emphasize that identifying the causes of hemolytic anemia is crucial in recommending appropriate treatment.

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