DIAGNOSTICS OF ACUTE LEUKEMIA AT ACUTE LEUKEMIA CLINIC-LABORATORY

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Acute leukemia is a blood system malignancy, and the substrates of the disease are immature blast or undifferentiated cells. The types of acute leukemia are named after the simple predecessors of blast cells: myeloblasts, erythroblasts, lymphoblasts, and others. Acute leukemia without differential diagnosis of blast cells that cannot be determined morphologically is called undifferentiated acute leukemia.

The onset of acute leukemia can be different. Four variants of this period can be distinguished.

- The acute onset of the disease is observed in approximately 50% of patients. This is characterized by high fever, significant intoxication, and pain in the bones, joints, and muscles. This condition is usually attributed to the flu, tonsillitis, acute rheumatism, or appendicitis. The correct diagnosis is usually made 2-3 weeks after the onset of the first symptoms.

- The onset of the disease with a severe hemorrhagic syndrome is observed in approximately 10% of patients. Various bleeding is observed: from the nose, gums, tongue, urine, feces, and skin.

- The onset of the disease with a slow progression is observed in approximately 35-37% of patients. This is characterized by a set of non-specific symptoms: progressive weakness, decreased work capacity, weight loss, muscle and bone pain, lymph node enlargement, and small skin hemorrhages. The correct diagnosis is usually made 4-6 weeks after the onset of the first symptoms.

- Asymptomatic onset of the disease is rare. In this case, the general condition may not deteriorate, and the health condition may remain satisfactory. Objective examination may reveal slight enlargement of the lymph nodes, liver, and spleen. The disease is diagnosed by a random clinical blood test.

During the initial period of acute leukemia, the patient usually does not consult a specialist. The difficulty of early diagnosis of acute leukemia is due to the absence of pathognomonic signs for this disease, as well as the oncological alertness of physicians. The rapid growth and accumulation of blast cells due to the intensive proliferation and migration of blast cells from the bone marrow to peripheral tissues can lead to the rapid development of the disease. The clinical symptoms of this period can be divided into five

Intoxication syndrome - is characterized by general weakness, high body temperature, chills (especially at night), headache, lower back pain, fatigue, muscle atrophy, cardiac arrest, and recovery.

Immunodeficiency syndrome - is characterized by severe impairments of cellular and humoral immunity, a decrease in phagocytosis, and complement activity. It creates favorable conditions for the development of a condition that could lead to the patient's death. Neoplastic leukemia is characterized by fever lasting more than two weeks, a temperature of 38.7°C or higher, and no indication of infection or response to empirical antibiotic therapy.

At the beginning of the disease, there may be no specific changes in the clinical picture, such as 2–3-line cytopenia (anemia, thrombocytopenia, leukopenia), or only anemia, leukopenia, or leukocytosis. Blast cells may not be detected, or conversely, leukocytes may account for a significant proportion (up to 90-95%) of the blood test. The number of mature neutrophils is reduced, while eosinophils and basophils disappear, and the ESR increases. The diagnosis is straightforward when blast cells are detected in the peripheral blood. Even without a hematologist, an initial exam by a general practitioner or specialist is essential. A full inquiry, examination, and clinical blood analysis will aid in the diagnosis of leukemia. In addition, laboratory technicians with experience and qualifications play an essential role in determining the outcome of the patient, as leukemia is one of the diagnoses made "in the microscope." If there is any doubt about acute leukemia, the patient should be referred to the hematology department for confirmation of diagnosis and treatment with cytostatic drugs. Peripheral blood changes in acute leukemia are as follows: 1) normocytic anemia; 2) the number of leukocytes ranges from severe leukopenia to severe leukocytosis (from 1 to 300 x109/l): a) aleukemic form - the leukocyte count is 1-3 x109/l, no blast cells or 1-2% of the cells are blast cells, relative lymphocytosis; b) subleukemic form - the leukocyte count is 4-14 x109/l, and blast cells make up 5-10%; c) leukemic form - the leukocyte count is >15 x109/l, and blast cells constitute more than 10%. 3) thrombocytopenia; 4) leukemic gaps in the leukocyte formula - the presence of blast and immature cells, and gaps in the moderate stage. 5) ESR increases.

Changes in the bone marrow in acute leukemia: 1) blast transformation of bone marrow - more than 30% of the cells are blast cells; 2) suppression of bone marrow hematopoietic activity or erythroid hyperplasia, megakaryocyte reduction; 3) megakaryocytes; a decrease in the number of megakaryocytes.

The cytotoxic reactions to the blood test help determine acute leukemia. The identification of the metabolic active enzymes and substrates of blast cells, such as myeloperoxidase, acidic and alkaline phosphatases, non-specific esterase, glycogen, and lipids, are of great diagnostic importance. Cytotoxic reactions can help identify blasts, determine the degree of maturation, and treatment strategy.

General blood analysis in Acute leukemia.

Hemoglobin - 72 g/l; erythrocytes - 1.7×1012/l, hematocrit level - 22%, MCV - 100 fl, MCH - 31 pg, leukocytes - 17.0×109/l. Leukocyte formula: blasts - 75%, segmented neutrophils - 8%, lymphocytes - 15%, monocytes - 2%, platelets - 5.0×109/l, reticulocytes - 0.1%, ESR - 65 mm/hour.

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