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Monitoring Hemogram Comparison in Patients with Acute Lymphoblastic Leukemia Before and After Consolidation

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***Abstract:** This article is devoted to the comparative monitoring of the hemogram in patients with acute lymphoblastic leukemia before and after consolidation, and the article highlights a number of cases that occurred during the treatment of patients. Innovative treatment solutions are also mentioned.*
***Keywords:** Hemogram, lymphoblastic leukemia, leukocyte formula, blood, therapy, chimeric transcript.*

I. INTRODUCTION

Studying the survival of patients with ALL in the post-remission period in complete remission largely depends on the indicators of the hemogram with the leukocyte formula, the usefulness of the treatment, optimization of PPT and how correctly and clearly the patients adhered to the principles of program treatment assigned to them, which is the significance and relevance of this study. Purpose of the study: to study the hemogram indicators with the leukocyte formula of the peripheral blood of patients with ALL in dynamics during treatment, the course of consolidation of induction of remission and during periods of optimization of continuous maintenance therapy with complete remission with survival of up to 2 years in the post-remission period of life of patients.

II. MATERIALS AND METHODS

Under our supervision there were 35 patients with ALL, in whom general clinical research methods were carried out, hemograms with the leukocyte formula of peripheral blood were studied in dynamics, cytochemical studies, bone marrow and cerebrospinal fluid. The obtained digital data as a result of the research was subjected to statistical processing. After verification of the diagnosis, to obtain induction of remission in patients with ALL, we used the protocols VAMP, CVAMP, SOAP, 5+2 and their combinations, if necessary in rotation. Acute lymphoblastic leukemias are a heterogeneous group of clonal diseases of the blood system that arise from mutations in T- or B-cell progenitors. Ph-negative acute lymphoblastic leukemia is a group that includes several subtypes of acute lymphoblastic leukemia in which the Philadelphia chromosome is not detected (Ph-t(9;22)). It includes all B-cell and T-cell acute lymphoblastic leukemias and lymphoblastic lymphomas. Ph-positive acute lymphoblastic leukemia is a variant of acute lymphoblastic leukemia in which the t(9;22) translocation is determined by standard cytogenetic testing (G-banding) or FISH. The diagnosis of Ph-positive acute lymphoblastic leukemia cannot be based solely on the method of molecular detection of the chimeric transcript. Cytogenetic or FISH (fluorescent in situ hybridization) studies are mandatory. The polymerase chain reaction method is used to determine the chimeric transcript variant, which is subsequently used to monitor minimal residual disease.

Complete remission is a state of hematopoietic tissue in which 5% or less blast cells are found in the bone marrow aspirate with a normal ratio of all hematopoietic sprouts, with the number of neutrophils in the peripheral blood more than 1.0 x 109/l, with a platelet count of more than or equal to 100 x 109/l, in the absence of extramedullary foci of leukemic growth. Statement of morphological completeness remission (respectively, resistance assessment) is carried out either after the first phase of induction therapy or after the second. In the absence of complete remission after completion of two stages of induction therapy, a refractory form of acute lymphoblastic leukemia is registered. In this regard, it is necessary to emphasize that in a number of patients, after completing the second phase of induction therapy against the background of restoration of hematopoiesis after cytostatic exposure, an increased percentage of blast cells (up to 10-12%) can be determined in the early stages after its completion. In this case (especially if complete remission was recorded after the first phase of induction therapy), a week later, against the background of restored hematopoiesis, it is advisable to perform a repeat sternal puncture.

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Complete remission is divided into three main types: 1) cytogenetic, 2) molecular, 3) with incomplete restoration of peripheral blood parameters, when the number of neutrophils is less than 1 x 109 / l, and platelets are less than 10 x 109 / l. Last category. This is specifically stated because, according to some data, the prognosis for such patients is somewhat worse. However, experts do not recommend stating complete remission in such patients. However, outside of clinical trials, this response formulation is rarely used. Partial remission (partial response) - this term is recommended to be used only in phase I-II clinical studies that evaluate the antitumor efficacy, toxicity, tolerability of new drugs and determine the optimal doses of these drugs. The resistant form is a form of the disease that is stated in the absence of complete remission after completion of two phases of induction therapy.

III. RESULTS AND DISCUSSION

All 35 patients, starting from the day of admission to the clinic during treatment, a course of consolidation of induction of remission with complete remission in order to optimize continuous maintenance therapy for patients with ALL, were registered at the dispensary for the purpose of correcting the cytostatics they received and preventing possible relapses of the disease. Comparative indicators of the leukocyte formula with the hemogram of patients with ALL with complete remission in the dynamics of treatment and continuous maintenance therapy with survival up to 2 years.

Upon admission to the clinic, patients had a hemogram and leukocyte count with anemic syndrome and a high content of blast cells; arithmetic mean and mean deviation errors of hemoglobin are 56.2□3.01 g/l, erythrocytes 2.2□0.9x1012/l, color index 0.7□0.02, platelets 145□4.0x109/l; leukocytes 25.3□2.9x109/l, lymphoblasts 38.4□4%, prolymphocytes 1%, band 2□03%, segmented 6□1.1%, lymphocytes 62□4.2%, ESR 42□5, 1 mm/hour, clinical diagnosis of ALL.

After the first course of PCT, hemoglobin 50.6□4g/l, erythrocytes 2.13□0.7x1012/l, color index 0.7□0.02, platelets 139□4x109/l, leukocytes 20.6□9x109/l, lymphoblasts 15.7□3.0%, prolymphocytes 5.5□0.9%, myelocytes 3.8□0.8, metomyelocytes 3.8□05%, i.e. leukocytosis and blast cells in the peripheral blood have decreased significantly, which means that program PCT is working, after a 9-day break it is necessary to continue the second and third courses of PCT.

After the third course of programmatic chemotherapy, hemoglobin is 68.0□3.0 g/l when compared with the indicators upon admission P1□0.01; erythrocytes 2.85□0.1x1012/l, at P1□0.05, color index 0.78□0.02, platelets 142□5x109/l, P1□0.05; leukocytes 3.6□0.2x109/l, P1□0.01; blast and intermediate cells disappeared from view altogether, band cells 8.6□0.8%, P1□0.01, segmented 51□3.6%, P1□0.01, lymphocytes 36□4.1%, P1□ 0.01, ESR 20.6□2.6 mm/hour P1□0.05. hemogram and leukocyte formula indicators after the third course of PCT improved significantly with reliable indicators, i.e. blast cells disappeared, the leukocyte formula returned to normal. Hence the need arises to conduct a course of reinforcement of the resulting remission and prevention of neuroleukemia.

After a course of consolidation of remission induction and prevention of neuroleukemia, the hemogram and leukocyte formula began to look as follows; hemoglobin 72□2.3g/l, P2□0.05, red blood cells 3.0□0.2x1012/l P2□0.05; color index 0.8□0.01, platelets 150□6.1x109/l P2□0.05, leukocytes 4.1□0.9x109/l, P2□0.05 i.e. hematopoiesis indicators significantly increased when compared with the indicators after the third course of chemotherapy, and the leukocyte count returned to normal, band 9.2□1.3% P2□0.05; segmented 53.8□4.1%, P2□0.05, lymphocytes 34□4.7% P2□0.05 and ESR 16.2□2.3 mm/hour, i.e. complete clinical and hematological remission occurred.

3 months after remission, hemoglobin 75□2.5 g/l, red blood cells 3.15□0.1x1012/l, C.P. 0.73□0.01, platelets 145□5.5x109/l, leukocytes 3.9□1.9x109/l; blasts were not detected, band 10□0.8%, segmented 51□3.5%, lymphocytes 32□2.8% and ESR 18□2.3 mm/hour.

After 6 months, hemoglobin 77□3.3, P3□0.05; red blood cells 3.13□4.0x109/l; P2□0.05, color index 0.7□0.2; platelets 147□4.0x109/l; P1□0.05 leukocytes 5.0□2.8, P3□0.05, blasts were not detected, i.e. comparative deterioration of the hemogram, compared with previous periods, due to relapse. However, the leukocyte formula remains within normal fluctuations, band 9.4□0.7%, segmented 52□3.4% P3□0.05 and lymphocytes 31□2.7% P3□0.05; ESR 17.57□2.5 mm/hour P3□0.05. It should be noted here that hematopoiesis was stabilized in some patients with moderate anemia, and in some cases, at the slightest sign of relapse, we carried out anti-relapse PCT and eliminated the threat of relapse.

After 1 and 1.5 years in the post-remission period, hemoglobin is 73□2.07 g/l and 58□3.2 g/l, respectively; red blood cells 2.9□0.11x1012/l and 2.5□0.3x1012/l; color index 0.7□0.01 and 0.4□0.01; platelets 137□5.7x109/l and 118□5.4x109/l; leukocytes 4.8□0.7x109/l and 4.7□1.0x109/l; lymphoblasts 1.2□0.1% and 25.0□2.8%; prolymphocytes 3.5□0.4% and 4.3□0.4%; myelocytes 2.0□1.1% and 4.1□0.8%; metomyelocytes 2.0□0.0 and 1.5□0.1%; rod cells 9□0.8% and 8□0.9%; segmented 50□2.9% and 33□4% lymphocytes 33.5□2.0 and 36□3% and ESR 17.0□2.2 and 21□2.6 mm/hour.

It should be noted here that there is a gradual decrease in hemoglobin levels, especially after 1.5 years in the post-remission period of life of these patients due to an increase in relapses of the underlying disease and their purulent-septic-infectious complications after 1 year out of 35 in 4 (11.4%) and after 1.5 years out of 35, 21 (60%) patients died before reaching 2 years of post-remission. The reasons for frequent relapses out of 4 in 2 (50%) and out of 21 in 9 (42.9%) patients were unable to provide themselves with the necessary cytostatic drugs and could not comply with the principles of regularity.

Up to 2 years in the post-remission period, hemogram indicators and leukocyte morphology - leukocyte formula - deteriorated even more; hemoglobin is 48.5□3.0 g/l compared to the indicators after the third course of PCT, deteriorated even more sharply, red blood cells 1.4□0.2x1012/l color index 0.6□001; platelets 98□2x109/l; leukocytes 3.9□0.7x109/l, lymphoblasts 25.7□0.7%, prolymphocytes 1.6□0.1%, myelocytes 1.0□0.0%, band 5.4□0.5% , segmented cells 20□2.2%, lymphocytes 50□2.7% and ESR 28□1.5. During this period, there was a sharp deterioration in the leukocyte formula and hemogram, the number of blast cells increased even more, which indicates that all patients who survived until this period were in a deeply terminal state and of the remaining 35, 10 (28.6%) died from various complications ALL as a result of secondary immunodeficiency is usually the final stage of acute lymphoblastic leukemia. The average survival rate was 20.8 months in the post-remission period of patients' lives.

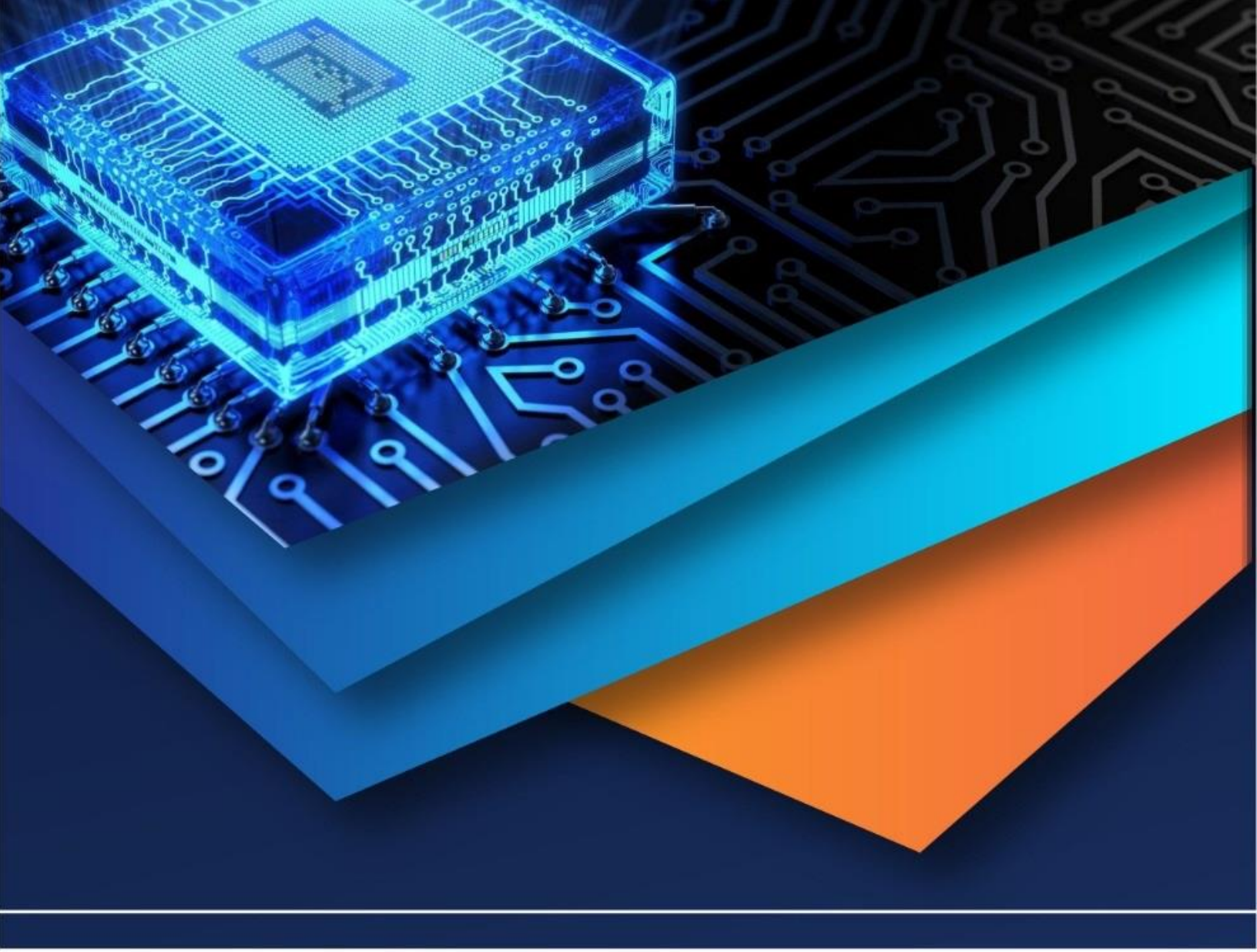
Thus, the indicators of the leukocyte formula and peripheral blood hemogram in patients with ALL in dynamics are the main prognostic indicators during treatment, clinical monitoring of risk depending on the stage of the disease, under the control of which it is possible to prevent relapses of the disease, prolong survival as much as possible and improve the quality of life of patients with ALL.

In the final, out of all 35 patients examined, 4 (11.4%) after 1 year, 21 (60%) after 1.5 years, another 10 (28.6%) up to 2 years in the post-remission period died as a result of relapse the underlying disease and its various complications. The most common purulent-septic-infectious, cytopenic, hemorrhagic complications were the causes of death of these patients as a result of secondary immunodeficiency in patients with ALL with a median survival of 20.8 months in the post-mission period of patients' lives.

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