Specific Changes in the Composition of Peripheral Blood in Women During the Postpartum Period

Abdullayeva M.A.

Senior Lecturer of the Department of Obstetrics and Gynecology No. 1
Andijan State Medical Institute

ABSTRACT

During the period of pregnancy, the woman's body undergoes a lot of adaptive processes, these changes prepare the fetus for normal development, development, maturation of the ovarian-uterine system and uncomplicated childbirth. At the same time, some hidden diseases appear during pregnancy, which may not be clinically apparent during pregnancy, but may manifest after childbirth [4,8,10,11,12,13]. Therefore, the importance of changes in peripheral blood in the last stages of pregnancy, in the postpartum period, remains an urgent problem. It is known from modern medicine that the composition of peripheral blood during pregnancy undergoes significant changes during the development of pregnancy and the postpartum period [1,3,5,7,9].

Keywords: Ovarian-Uterine System, Peripheral Blood, Pregnancy And The Postpartum Period

During the period of pregnancy, the woman's body undergoes a lot of adaptive processes, these changes prepare the fetus for normal development, development, maturation of the ovarian-uterine system and uncomplicated childbirth. At the same time, some hidden diseases appear during pregnancy, which may not be clinically apparent during pregnancy, but may manifest after childbirth [4,8,10,11,12,13]. Therefore, the importance of changes in peripheral blood in the last stages of pregnancy, in the postpartum period, remains an urgent problem. It is known from modern medicine that the composition of peripheral blood during pregnancy undergoes significant changes during the development of pregnancy and the postpartum period [1,3,5,7,9]. However, many researchers do not pay attention to changes in blood composition and its dynamics during pregnancy and childbirth, in many scientific papers only some hematological indicators after childbirth are checked. it is dated to later and earlier periods [2,5,10]. When assessing the state of the body, peripheral blood indicators are as important as other analysis indicators, it is important to study this condition in all periods after childbirth, even in those who have no complications and are considered physically healthy women[2,6,11,13].

In order to determine and evaluate changes in peripheral blood parameters during pregnancy and postpartum period, we conducted the following examinations. To achieve this goal, we set ourselves the **following tasks**:

- Determination of changes in peripheral blood parameters during pregnancy and postpartum periods;
- determination of changes in peripheral blood indicators, state of the uterus, changes in the postpartum woman at different intervals in the postpartum period;
- to compare these changes with indicators of healthy nulliparous women.

Investigation methods used and data obtained.

In order to fulfill these tasks, peripheral blood indicators were studied in 120 physically healthy pregnant women. These analyzes were carried out with the help of an analyzer produced in 2011 named Hematological analyzer VS-3000 . This analyzer determines the number of leukocytes in peripheral blood, the number of erythrocytes, hemoglobin, hematocrit index, average volume of erythrocytes (EUX), average content of hemoglobin in erythrocytes (EGT), average blood concentration of hemoglobin in erythrocytes (EGK), calculates the leukocyte formula, including various indicators of platelets, Esr (Erythrocyte sedimentation rate) was determined. Briefly, an extended analysis of peripheral blood was performed.

These examinations were conducted before delivery and 50 days after delivery. Pregnancy, childbirth and the postpartum period in these women proceeded without complications. The age of women who gave birth is 19-38 years. 67 out of 120 women were pregnant for the first time, 43 were pregnant again. These women were pregnant from 2 to 4 times. The average stay of these women in the hospital after giving birth was 4.2+1 day. Blood tests were performed first in the first hospital, then in the polyclinic on the 3rd, 7th, 9th, 12th, 21st, 30th, 120th days after delivery. During these days, the postpartum period - the period of breastfeeding - the postpartum period was carefully monitored clinically. In short, an extended peripheral blood test was performed.

The results obtained as a result of the checks showed that our data on the composition of peripheral blood on the 3rd day after childbirth significantly differed from that of healthy non-pregnant women.

For example, the number of red blood cells and the amount of hemoglobin in the examined women on the 3rd day after childbirth were slightly reduced compared to the corresponding indicators in healthy non-pregnant women, and accordingly the number of red blood cells was $3,7\times10^{12}$- ($3,2\times10^{12}$-$4,7\times10^{12}$) and hemoglobin was equal to 108 (101- 141) g/l. VBC (average volume of red blood cells) (normally 80-100 fl - femtoliter) on the 3rd day after birth is in the range from 75 to 101 fl. (an average of 89 fl). In one third of the examined 83 fl. HCE (hemoglobin content in erythrocytes) was 28.7 p.g. (25.6-32.9 p.g.), CHE (average concentration of hemoglobin in the blood in erythrocytes) averaged 41.7% (40.3 - 34.0%), hematocrit index averaged 35.6% (29.0 - 44.8%). Usually, in healthy non-pregnant women, VBC is 83-98 fl., HCE is 27-32 pg. CHE is 36%, and the hematocrit index ranges from 32% to 42%. Thus, we found that the average values of VBC , HCE, CHE and hematocrit did not deviate from the norm in uncomplicated childbirth. However, in the first 3 days after delivery, these indicators changed. On the 3rd day after delivery, it was found that the number of white blood cells is at the lower limit of normal values or even lower. This indicator ranges from $4.3+0.7 \times 10^9$ to $2.8+0.6 \times 10^9$ and the Esr index increased in most patients after childbirth and averaged 34 mm/h (10-47 mm/h). On the 3rd postpartum day, the total number of leukocytes increased and a relative increase of neutrophils was observed, with the appearance of metamyelocytes and myelocytes, and a rejuvenation or shift of neutrophils to the left. The relative size of rod-shaped neutrophils is from 15 to 29%, and the number of neutrophils with rod-shaped nuclei is 10% and more in more than 5% of examined women. On the 3rd day after delivery, the amount of neutrophils was 76%, lymphocytes 19%, eosinophils 1.4%, monocytes 3.3%.

The total number of neutrophils was $9.1x10^9$ 1 l, and lymphocytes were equal to $1.7x10^9$ l. In healthy women, these parameters were 2x103 - $4.5x10^9$ neutrophils, $1.2x10^3$-$3x10^9$ lymphocytes in 1 liter of blood, thus, relative and absolute neutrophilia in the blood, and a decrease in the relative and total number of lymphocytes are observed in the postpartum period.

Eosinophils were not detected in smears in 27% of women on the 3rd day after delivery. The highest number of eosinophils was 3% (average 1.3%), and the amount of monocytes was 3.7% on average. It was shown in the dynamic tests of peripheral blood in the

postpartum period that starting from the 7th day, the amount of hemoglobin and erythrocytes in the blood begins to increase, the average is 123g/l (113 - 152g/l), and the number of erythrocytes is equal to $4.1x10^{12}$g. VBC remained the same for 3 weeks postpartum, and subsequently decreased to 80.5 fl. at one month and 77.3 fl. at 70 days postpartum. HCE, VBC and hematocrit indicators did not change relatively during the observation.

The average number of leukocytes in the blood gradually decreased in the postpartum period from $11.7x10^{6}$ to $9.1x10^{6}$ (in 1 liter) on days 9-12, and on the 21st day the same indicator was $7.4x10^{6}$ fell to 1l. It should also be mentioned that leukocytosis remained in 3/1 of control women on the 21st day after delivery. After 1 month after delivery, there were no women with leukocytosis, the number of leukocytes was lower than $8x10^{6}$. During these periods, the absolute and relative indicators of neutrophils in the leukocyte formula decreased, and the percentage of lymphocytes increased.

On the 9th day after birth, neutrophils accounted for 67.8% (58-81%), lymphocytes 27% (15-45%). On the 12th day and beyond, the number of neutrophils did not increase by 71% in any woman, and lymphocytes did not decrease by 21%. Regenerative shift of the leukocyte formula (shift to the left) was preserved in 50% of women who gave birth up to 2 weeks (rod neutrophils from 6% to 18%). In the subsequent period, a 5% increase in the amount of rod neutrophils was found in very few cases. The amount of eosinophils increased to 3.8% on the 12th day, the amount of monocytes did not undergo significant changes during the follow-up and remained between 1% and 10%. Esr decreased from 34 mm/h to 13 mm/ on the 30th.

Thus, on the 3rd day after childbirth, significant changes were detected in the peripheral blood parameters of women, the amount of erythrocytes and hemoglobin decreased, the ECT accelerated, VBC decreased, and the amount of leukocytes increased. An increase in the number of neutrophils, an increase in young neutrophils, a decrease in the number of eosinophils and a relative decrease in lymphocytes were observed in the leukocyte formula. The appearance of metamyelocytes, myelocytes in the leukocyte formula, the amount of rod-shaped neutrophils exceeding 6% indicates its shift to the left - regenerator.

Stabilization of hematological indicators starts from the 7th day after delivery and lasts until the 30th day after delivery.

Investigations of recent years show that in the postpartum period (6-8 weeks) intensive restructuring of neuroendocrine, neurohumoral factors in a woman's body appears in the nature of a protective reaction of adaptation to external environmental influences. In a relatively short period of time in the female body, the involution of the reproductive system of the uterus, the normalization of ovarian activity is accompanied by the restoration of lactation activity.

The process of giving birth, the process of preparation for childbirth, with the heavy physical process in the woman's body, causes severe tension in her organs and systems and leads to deep changes. Blood is a liquid necessary for the functioning of the body tissues of a living organism, and any changes in the organ systems lead to blood changes. Changes in the peripheral blood on the 3rd day after childbirth reflect the changes in the mother's body. In the 1st days after childbirth, proteolysis of decidual tissue, blood clots, regeneration of the mucous membrane of the uterus and milk production (lactation) begin.

Regeneration of the mother's organism continues from birth to 6-8 weeks, but after 10 days after birth, the intensity of these changes decreases. By the end of the 10th day, the epithelialization of the inner surface of the uterus ends, and by the 20th day, the endometrium is completely restored. On the 15th-18th day, mammary gland regeneration comes to an end, and the mammary glands begin to produce breast milk of a stable composition. When peripheral blood is checked after 3-4 weeks, its composition remains the same as the blood composition of non-pregnant women.

Conclusions:

So that

- in the postpartum period, women who have had an uncomplicated delivery and physically healthy women have situations that require various therapeutic help, therefore, it is necessary to check the peripheral blood in the postpartum period - during the chill period - during the puerperium;
- the condition of postpartum women is taken care of by checking the peripheral blood and evaluating it based on these indicators.

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