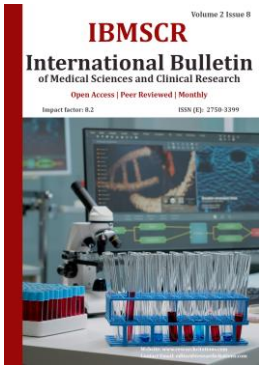

ASSESSMENT OF PLATELET MORPHOLOGY IN WOMEN WITH REACTIVE MISSION OF PREGNANCY IN THE PRESENCE OF ANTIPHOLIPID ANTIBODIES

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ANNOTATION

The purpose of the study was to assess the state of the morphological structure of platelets in women with recurrent miscarriage in the presence of antiphospholipid antibodies. The study involved 78 women aged 18 to 26 years, 24 of them (Group 1) were patients with an incipient miscarriage, in the presence of antiphospholipid antibodies and retained their pregnancy. In 54 patients (Group 2) with aborted pregnancy. The morphology and activity of platelets were studied. It has been established that in women with miscarriage in the presence of antiphospholipid antibodies, there are significant changes in the morphology of platelets and a consistently high activity of platelets.

Keywords: pregnant women with miscarriage, antiphospholipid antibodies, platelet morphology.+

Introduction

Miscarriage is one of the urgent problems of modern obstetrics and gynecology. In recent years, the frequency of miscarriage over several years is 15-20% of all desired pregnancies and does not tend to decrease. One of the causes of miscarriage, according to Makatsaria A.D., (2009), is antiphospholipid syndrome. In the studies of Chugunov A.A. (2012), it is indicated that obstetric pathology caused by antiphospholipid syndrome occurs in 76-81% of women, while the relative risk of placental insufficiency is 50%, intrauterine death of the fetus - 4.5%, fetal growth retardation syndrome - 46%, thrombosis - up to 53.1%, threatening abortion - 46%, premature birth - 42%, preeclampsia - 46.2%, arterial hypertension - 15.6%.

Despite large-scale studies aimed at studying the causes of miscarriage, there is no unified system that includes a variety of etiological factors. Therefore, it is relevant to search for new links that reveal the pathogenesis of miscarriage from the standpoint of disorders in the platelet link of the hemostasis system, and the development of new diagnostic methods based on them.

As you know, the normal course of the gestational period in pregnant women is largely determined by the activity and structure of platelets, which, in turn, determines the adequate rheological properties of the blood. At the same time, platelet functions can change depending on numerous syndromes associated with recurrent miscarriage: anatomical anomalies, hormonal disorders, chromosomal defects, disorders in the state of the blood coagulation system. At the same time, the morphology of platelets in women with miscarriage remains insufficiently studied. The aim of this study was to assess the state of the morphological structure of platelets in women with recurrent miscarriage in the presence of antiphospholipid antibodies.

Material and research methods

78 women aged 18 to 26 years were examined, 24 of them (Group 1) were patients with a miscarriage, in the presence of antiphospholipid antibodies and who retained their pregnancy. In 54 patients (Group 2) with aborted pregnancy. The gestational age of women in the control, first and second groups was 8.27±1.60, 7.50±2.19, 7.60±2.40 weeks, respectively.

The control group consisted of 18 patients with a normal course of the gestational process and without autoantibodies. Determination of anticardiolipin antibodies was carried out by enzyme immunoassay (ELISA) using test systems Anti-Phospholipid Screen with human B2-Glycoprotein I as cofactor (OR GenTec Diagnostica GmbH-Germany). All patients were counted the number of platelets in venous blood. Intravascular activity of platelets (vAT) was determined visually using a phase-contrast microscope [9, 28] according to Shitikova A.S. et al. (1997). All the results obtained were subjected to statistical processing on a personal computer using the Excel and Statgraphics programs. The result was considered significant at $p < 0.05$.

Research results and discussion

In a morphological study of platelets in women with miscarriage in the presence of antiphospholipid antibodies, the first visible manifestation of platelet activation is a change in their shape, which can serve to adequately assess this process, both induced in vitro and developing in the body. In the vascular bed, in the absence of pathological activating influences, the vast majority of intact platelets, called discocytes, have a characteristic discoid or lentil shape and an almost smooth surface. The characteristic change in shape during the induction of hemostatic reactions of platelets reflects certain processes of their internal ultrastructural and biochemical restructuring.

At the same time, a typical sequence of changes develops: from the form of an intact platelet - a discocyte to activated cells - a discoechinocyte, in which processes appear on the surface, and then to a spherocyte or spheroechinocyte. In the latter, not only the shape becomes more and more spherical, but the number of processes also increases. In the course of adhesion on the glass, platelets spread out - their diameter increases by 1.5-2 times; in such cells, individual granules become more clearly visible, the number of which can reach 20-30 per 1 cell. At the same time, there is a gradual shift of the granules to the periphery of platelets. The granules then bind to the cell wall and exit the platelet. After the release of the granules, the platelets change shape: from flattened, they become more rounded and form short outgrowths, which can subsequently elongate. Such platelets have locomotor (motor) activity and can collect in tight clusters on a glass slide.

In the control group, included in the comparison group, when assessing platelet morphology, it was found that the main indicators were within the physiological norm. The level of discocytes in the blood of healthy people was 85.1 ± 0.10%, the level of discoechinocytes was 9.1 + 0.14%, spherocytes - 2.9 + 0.15%, spheroechinocytes - 1.8 + 0.18% and bipolar forms - 1.1+0.10% of platelets also remained stable in the bloodstream (Table 1). At the same time, the sum of active forms of platelets averaged 14.9 ± 0.15% in the examined patients.

As can be seen from the presented research results, in patients of the 1st group, significant changes were noted in relation to all studied indicators of platelet morphology. Consequently, in women with miscarriage in the presence of antiphospholipid antibodies, there is a high functional activity of platelets, which is one of the causes of endotheliocyte dysfunction.

Table 1

Intravascular platelet activity in women with miscarriage in the presence of antiphospholipid

antibodies

Parameters	1-group n=24	2-group n=54	healthy faces n=18
Discocytes, %	65,4+0,54*	78,5+0,37*	85,1+0,10
Disco echinocytes, %	21,3+0,37*	12,4+0,58	9,1+0,44
Spherocytes, %	4,9+0,12*	3,4+0,14	2,9+ 0,19
Sphero-echinocytes, %	6.1+0,11*	4,5+0,11*	1,8+ 0,18
Bipolar forms, %	2,3+0,19*	1,2+0,09	1,1+0,10
Sum of Active Forms, %	36,7+3,05*	15,9+1,14*	12,9+ 0,85
The number of platelets in aggregates, %	14,8+1,23*	6,7+0,54	5,8+ 0,42
The number of small aggregates of 2-3 platelets, per 100 free-lying platelets	6,3+0,51*	3,3 +0,22	2,8+ 0,14
The number of medium and large aggregates, 4 or more platelets, per 100 free-lying platelets	0,32+0,02*	0,11+0,01	0,06+ 0,01

Note: * - significant differences in relation to the indicators of groups healthy pregnant women P<0.05,

Platelets are called "floating muscles" because of their unique ability to contractile reactions, which are the basis for most of their functions in the body. Platelets are capable of incorporating and storing a number of substances - serotonin, proteins, fibrinogen, etc. Finally, they are secretory cells and, in the process of activation, are capable of releasing most of the stored active substances necessary for their functions. The activity of platelets in the bloodstream has a serious impact on the state of microcirculation.

When analyzing the morphology of platelets in patients of group 2, the following picture was noted in blood smears: discocytes - 78.5 + 0.37%, discoechinocytes - 12.4 + 0.58%, spherocytes - 3.4 + 0.14% and spheroechinocytes - 4.5+0.11%. An increase in the amount of active forms of platelets and the number of platelets in aggregates was also noted. It should be noted that the relatively stable level of active forms of platelets in the 2nd group of pregnant women, which, in our opinion, is associated with the persistence of reduced expression of fibrinogen receptors on their membrane.

In the present study, it was also found that in women with miscarriage in the presence of antiphospholipid antibodies, there is a consistently high activity of blood platelets. At the same time, the revealed changes in platelets are probably largely due to the constancy of the level of sensitivity of their receptors to exogenous influences (blood concentrations of aggregation inducers and von Willebrand factor - platelet adhesion cofactor, biogenic amines, etc.) with a constant number of receptors for them on surface of platelets. Thus, the obtained results are important because accurate knowledge of adaptive changes in the hemostasis system during miscarriage in early pregnancy in pregnant women in the presence of antiphospholipid antibodies allows more successful diagnosis of possible hemostasiological complications in obstetrics, differentiation of physiological hypercoagulability and pathological activation of hemostasis, and targeted correction of the identified defects.

Thus, the determination of the functional activity of platelets in women with miscarriage in

the presence of antiphospholipid antibodies makes it possible to timely predict a violation of the course of pregnancy and provide early diagnosis of the threat of spontaneous miscarriage, which allows for timely prevention and correction aimed at prolonging pregnancy in the presence of antiphospholipid antibodies.

Conclusions

1. It has been established that in women with miscarriage in the presence of antiphospholipid antibodies, there are significant changes in platelet morphology and a consistently high activity of platelets.
2. The comparative stability of the level of active forms of platelets and their structure in the 2nd group of pregnant women, apparently due to the constancy of the reduced expression of fibrinogen receptors on their membrane.

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