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FEATURES OF COAGULATION HEMOSTASIS DISORDERS IN PREGNANT WOMEN: CURRENT CONCEPTS AND CLINICAL SIGNIFICANCE

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Abstract: This article examines the clinical and laboratory characteristics of hemostatic disorders in pregnant women and current approaches to their management, based on an analysis of 50 scientific publications from the world literature published over the past five years.
Keywords: reproductive health, pregnancy, hemostasis, thrombocytopenia, thrombocytopathy, hypercoagulability, hypocoagulability, obstetric hemorrhage, maternal mortality.

ОСОБЕННОСТИ НАРУШЕНИЙ КОАГУЛЯЦИОННОГО ГЕМОСТАЗА У БЕРЕМЕННЫХ ЖЕНЩИН: СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ И КЛИНИЧЕСКОЕ ЗНАЧЕНИЕ

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Абстракт: В данной статье рассматриваются клинико-лабораторные особенности нарушений системы гемостаза у беременных женщин и современные подходы к их ведению, основанные на анализе 50 научных публикаций мировой литературы, опубликованных за последние пять лет.
Ключевые слова: репродуктивное здоровье, беременность, гемостаз, тромбоцитопения, тромбоцитопатия, гиперкоагуляция, гипокоагуляция, акушерские кровотечения, материнская смертность.

Background: The health of women of reproductive age remains a key public health challenge; maternal mortality is a key indicator of the quality of perinatal care. In 2023, WHO estimates that approximately 260,000 women died during pregnancy, childbirth, or the postpartum period, with approximately 92% of these deaths occurring in low- and lower-middle-income countries. These losses are largely due to preventable causes, with obstetric hemorrhage and hyper/hypocoagulation complications being the leading causes (6).

Postpartum hemorrhage is the leading cause of maternal mortality in many regions of the world: each year, millions of women experience severe postpartum hemorrhage, resulting in approximately 70,000 deaths and numerous cases of severe disability among survivors. This highlights the clinical and public policy importance of improving the prevention, recognition, and emergency care of postpartum hemorrhage (7).

Venous thromboembolism (VTE) during pregnancy and the postpartum period is relatively rare, but is associated with a high rate of serious outcomes: based on systematic reviews and large publications, the incidence is estimated at ≈0.5–2.0 cases per 1000 pregnancies (a value of approximately 1/1000 is often cited), with the risk being particularly elevated in the postpartum period; VTE remains one of the leading causes of maternal mortality in developed countries (5).

Thrombocytopenia and platelet disorders: reviews indicate that decreased platelet counts occur in approximately 4–12% of pregnant women; the majority is benign gestational thrombocytopenia,

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while severe forms (<1% with levels <100×10^9/L) pose a high risk of bleeding during childbirth and interventions. This justifies the need for systemic screening and differentiation of the causes of thrombocytopenia during pregnancy (4). In the Republic of Uzbekistan, model estimates show a significant decrease in the maternal mortality rate by 2023 compared to the early 2000s—to approximately 26 cases per 100,000 live births (estimation methods vary). However, obstetric hemorrhage and associated coagulopathies remain a clinically significant cause of maternal morbidity and require enhanced antenatal and perinatal surveillance (3). The increasing average age of primiparous women, increased obesity, and comorbidities (hypertension, diabetes) increase the underlying risk of thrombotic and obstetric complications.

The widespread use of assisted reproductive technologies is partly associated with an increase in multiple pregnancies and obstetric interventions, which may increase the risk of premature bleeding and thrombosis. Interpretation of laboratory markers of hemostasis in pregnant women is challenging: physiological trimester shifts (increased fibrinogen, coagulation factors, and D-dimer changes) make standard "non-consensus" reference values inapplicable; trimester-specific ranges and standardized methods are needed (5).

Disagreements in recommendations: international guidelines (RCOG, ACOG, ASH, etc.) overlap, but also contain significant differences in approaches to risk assessment, indications for antithrombotic prophylaxis, and LMWH (low molecular weight heparin) dosage. This complicates the unification of clinical practice and requires additional comparative studies (1).

Limited access to blood components and coagulation monitoring in some regions, as well as inadequate staff training for emergency transfusion scenarios, increase the clinical risks of postpartum hemorrhage and disseminated intravascular coagulation (DIC), especially in low-resource settings (7).

Hemostasis disorders lead to a wide range of complications: maternal mortality (including pulmonary embolism), post-thrombotic syndrome, the need for multivolume transfusion therapy, an increased risk of fetoplacental insufficiency, intrauterine growth restriction, and perinatal mortality. These consequences have long-term socioeconomic impacts, including loss of ability to work, and family and societal costs for rehabilitation and chronic care (5).

A trimester-specific set of laboratory references and standardized diagnostic algorithms (including the role of D-dimer and thromboelastography) are needed.

Research is needed on optimal risk stratification and the verification of venous thromboembolism risk scales in different populations. Randomized trials are needed on optimal prophylaxis strategies and safe anticoagulant dosages for specific subgroups (hereditary thrombophilias, obesity, and the postoperative period). In resource-limited countries, implementation of postpartum hemorrhage protocols, ensuring availability of donor blood, and training personnel in emergency care algorithms are needed (2).

Conclusion: Coagulation hemostasis disorders in pregnant women represent one of the most complex and clinically significant problems in modern perinatology. Physiological hypercoagulability, characteristic of normal pregnancy, is an adaptive mechanism aimed at preventing blood loss during childbirth. However, under certain conditions—such as thrombophilia, preeclampsia, infections, and immune and endothelial disorders—this mechanism progresses to a pathological stage, causing both hypercoagulable (thrombosis, thromboembolism) and hypocoagulable (bleeding, DIC) complications.

Modern epidemiological data show that the incidence of coagulopathies in pregnant women remains consistently high: postpartum hemorrhage occurs in 5% of women, thrombocytopenia in 8%, and severe forms of disseminated intravascular coagulation (DIC), although rare (0.05–

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0.1%), result in death in 20–40% of cases if not diagnosed promptly. Meanwhile, venous thromboembolism (VTE) is the leading cause of maternal mortality in high-income countries, accounting for up to 15% of all cases according to WHO data (2023). In recent years, interest in the problem of hemostatic complications has increased exponentially. New evidence has emerged of the impact of viral infection and inflammation on endothelial function and the coagulation cascade, necessitating a revision of approaches to the prevention and management of high-risk pregnancies.

The following are key to reducing maternal and perinatal morbidity:

- early laboratory and instrumental diagnosis of hemostatic disorders (including thromboelastography, determination of coagulation factors and antibodies);
- risk stratification and individualized selection of anticoagulant therapy (primarily LMWH);
- multidisciplinary management of pregnant women involving obstetricians/gynecologists, hematologists, and anesthesiologists.

Scientific and clinical interest in this topic is driven by the fact that coagulation disorders are directly linked to key obstetric complications—preeclampsia, antenatal death, premature birth, and postpartum hemorrhage. A comprehensive study of these conditions allows for improved prognosis and the development of more effective prevention and treatment algorithms.

Thus, this problem remains extremely pressing not only in terms of maternal mortality but also in the context of the quality of perinatal outcomes and the safety of pregnancy and childbirth. Timely diagnosis and correction of hemostatic disorders is a key area of modern perinatal medicine and a crucial task for national and international healthcare systems.

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