

PECULIARITIES OF COAGULATION HEMOSTASIS DISORDERS IN PREGNANT WOMEN: CONTEMPORARY PERSPECTIVES AND CLINICAL IMPLICATIONS

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Abstract: This article examines the clinical and laboratory characteristics of hemostatic disorders in pregnant women and modern approaches to their management, based on the analysis of 50 scientific publications from the international literature published over the past five years.

Keywords: reproductive health, pregnancy, hemostasis, thrombocytopenia, thrombocytopathy, hypercoagulation, hypocoagulation, obstetric hemorrhage, maternal mortality.

Relevance of the Problem

The health of women of reproductive age remains a key priority of public health, and maternal mortality is one of the principal indicators of the quality of perinatal care. According to WHO estimates, in 2023 approximately 260,000 women died during pregnancy, childbirth, or the postpartum period, with $\approx 92\%$ of these deaths occurring in low- and lower-middle-income countries. Most of these losses are attributable to preventable causes, among which obstetric hemorrhage and coagulation disorders (hyper- and hypocoagulation) occupy leading positions (6).

Postpartum hemorrhage is the leading cause of maternal mortality in many regions of the world: millions of women experience severe postpartum bleeding each year, resulting in approximately 70,000 deaths and numerous cases of severe long-term disability among survivors. This underlines the clinical and socio-political importance of improving prevention, recognition, and emergency management of postpartum hemorrhage (7).

Venous thromboembolism (VTE) during pregnancy and the postpartum period is relatively rare but carries a high risk of serious outcomes. Systematic reviews and large-scale studies estimate its incidence at $\approx 0.5\text{--}2.0$ cases per 1,000 pregnancies (most often reported around 1/1,000), with a particularly elevated risk in the postpartum period. VTE remains one of the leading causes of maternal mortality in high-income countries (5).

Thrombocytopenia and platelet disorders: Reviews indicate that a reduction in platelet count occurs in approximately 4–12% of pregnancies. Most cases represent benign gestational thrombocytopenia, whereas severe forms ($<1\%$ with platelet count $<100 \times 10^9/L$) pose a significant risk of bleeding during delivery and interventions, emphasizing the need for systematic screening and differential diagnosis of thrombocytopenia in pregnancy (4). In the Republic of Uzbekistan, model-based estimates for 2023 show a significant reduction in the maternal mortality ratio compared to the early 2000s—approximately 26 cases per 100,000 live births (depending on the estimation method). However, obstetric hemorrhage and related coagulopathies remain clinically important causes of maternal morbidity, requiring strengthening of prenatal and perinatal surveillance (3). Increasing maternal age at first birth, rising obesity rates, and the prevalence of comorbidities (hypertension, diabetes) increase baseline risk for thrombotic and obstetric complications. The growing use of assisted reproductive technologies is also partially associated with an increased number of multiple pregnancies and obstetric interventions, potentially elevating the risk of hemorrhagic and thrombotic events.

Interpretation of **laboratory hemostatic markers** during pregnancy is challenging: physiological trimester-specific changes (elevated fibrinogen and coagulation factors, fluctuating D-dimer levels) make standard non-pregnant reference ranges inapplicable. Thus, trimester-specific reference values and standardized methodologies are essential (5).

There are discrepancies among international guidelines (RCOG, ACOG, ASH, etc.) regarding risk assessment, indications for antithrombotic prophylaxis, and LMWH dosing. This complicates the harmonization of clinical practice and underscores the need for comparative studies (1).

Limited access in some regions to blood components, coagulation monitoring, and adequately trained personnel for emergency transfusion scenarios increases clinical risks during postpartum hemorrhage and disseminated intravascular coagulation (DIC), especially in low-resource settings (7).

Hemostatic disorders lead to a wide range of complications: maternal mortality (including pulmonary embolism), post-thrombotic syndrome, multiple transfusion requirements, and increased risk of fetoplacental insufficiency, intrauterine growth restriction, and perinatal mortality. These outcomes have long-term socioeconomic consequences, including disability, loss of productivity, and increased costs of rehabilitation and chronic care (5).

There is an urgent need for trimester-specific laboratory reference values and standardized diagnostic algorithms (including the roles of D-dimer and thromboelastography). Further studies are required to optimize risk stratification and validate VTE risk scores across different populations, as well as randomized trials to determine optimal prophylactic strategies and safe anticoagulant dosages for specific subgroups (e.g., hereditary thrombophilia, obesity, postoperative cases). In low-resource countries, the implementation of postpartum hemorrhage protocols, provision of blood products, and staff training in emergency response algorithms remain critical priorities (2).

Conclusion: Coagulation hemostasis disorders in pregnant women represent one of the most complex and clinically significant challenges in modern perinatology. Physiological hypercoagulation characteristic of normal pregnancy serves as an adaptive mechanism aimed at preventing blood loss during delivery. However, under certain conditions—such as thrombophilia, preeclampsia, infections, immune and endothelial dysfunction—this mechanism becomes pathological, leading to both hypercoagulable (thrombosis, thromboembolism) and hypocoagulable (bleeding, DIC) complications.

Recent epidemiological data show that the prevalence of coagulopathies in pregnant women remains consistently high: postpartum hemorrhage occurs in 5% of women, thrombocytopenia in 8%, while severe DIC, though rare (0.05–0.1%), results in mortality rates of 20–40% when diagnosis is delayed. Meanwhile, venous thromboembolism (VTE) remains the leading cause of maternal death in high-income countries, accounting for up to 15% of all cases according to WHO (2023).

In recent years, the interest in hemostatic complications has increased markedly. New evidence demonstrates the impact of viral infection and inflammation on endothelial function and the coagulation cascade, prompting a revision of prevention and management strategies in high-risk pregnancies.

Key factors in reducing maternal and perinatal morbidity include:

- Early laboratory and instrumental diagnostics of hemostatic disorders (including thromboelastography, coagulation factor assays, and antibody detection);
- Risk stratification and individualized anticoagulant therapy (primarily LMWH);
- Multidisciplinary management involving obstetricians, hematologists, and anesthesiologists.

Scientific and clinical interest in this topic stems from the direct relationship between coagulation disorders and major obstetric complications such as preeclampsia, antenatal fetal death, preterm labor, and postpartum hemorrhage. Comprehensive study of these conditions can improve prognosis and facilitate the development of more effective prevention and treatment algorithms.

Thus, this issue remains highly relevant not only in terms of maternal mortality but also regarding perinatal outcomes, pregnancy safety, and delivery care quality. Timely diagnosis and correction of hemostatic disorders represent one of the key directions in modern perinatal medicine and a major objective of both national and international health systems.

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