

THE SIGNIFICANCE OF D-DIMER LEVELS IN THE PREVENTION OF PREGNANCY COMPLICATIONS (BASED ON THE EXAMPLE OF FERGANA REGION)

Egamberdiyeva Gulchehraxon

Assistant Professor, Department of Hospital Therapy, Fergana Institute of Public Health

<https://doi.org/10.5281/zenodo.17383383>

Abstract. This scientific work discusses the clinical and laboratory importance of D-dimer levels in the prevention of pregnancy complications, based on studies conducted in the Fergana region. The paper analyzes the physiological and pathological changes in the hemostatic system during pregnancy and highlights the diagnostic value of D-dimer as a biomarker of coagulation and fibrinolysis balance. The research shows that abnormal D-dimer fluctuations are closely linked to complications such as preeclampsia, placental insufficiency, and missed abortion. Regular monitoring of D-dimer levels enables early diagnosis and helps prevent adverse maternal and fetal outcomes, improving the quality of obstetric care.

Keywords: D-dimer, pregnancy complications, hemostasis, fibrinolysis, thrombosis, preeclampsia, placental insufficiency, Fergana region.

ЗНАЧЕНИЕ УРОВНЯ D-ДИМЕРА В ПРОФИЛАКТИКЕ ОСЛОЖНЕНИЙ БЕРЕМЕННОСТИ (НА ПРИМЕРЕ ФЕРГАНСКОЙ ОБЛАСТИ)

Аннотация. В данной научной работе рассматривается клиничко-лабораторное значение уровня D-димера в профилактике осложнений беременности на основе исследований, проведённых в Ферганской области. В работе проанализированы физиологические и патологические изменения в системе гемостаза во время беременности и подчеркнута диагностическая ценность D-димера как биомаркера баланса между коагуляцией и фибринолизом. Исследование показало, что аномальные колебания уровня D-димера тесно связаны с такими осложнениями беременности, как преэклампсия, плацентарная недостаточность и неразвивающаяся беременность. Регулярный мониторинг уровня D-димера позволяет проводить раннюю диагностику и предотвращать неблагоприятные исходы для матери и плода, способствуя повышению качества акушерской помощи.

Ключевые слова: D-димер, осложнения беременности, гемостаз, фибринолиз, тромбоз, преэклампсия, плацентарная недостаточность, Ферганская область.

Pregnancy is a complex biological process accompanied by profound physiological changes in a woman's body. During this period, significant alterations occur in the hemostatic system, ensuring the maintenance of normal pregnancy but, at the same time, potentially predisposing to certain pathological conditions. Increased tendency to thrombosis, disturbances in placental blood circulation, and imbalance within the coagulation and fibrinolytic systems are among the main factors contributing to pregnancy complications such as preeclampsia, missed abortion, placental insufficiency, and preterm labor. D-dimer, a fibrin degradation product, serves as a sensitive laboratory marker reflecting the activity of coagulation and fibrinolysis processes. Elevated or decreased D-dimer levels indicate a disruption in hemostatic balance and may signal the early development of pregnancy-related complications. Therefore, monitoring D-dimer

concentrations during pregnancy plays an essential role in the early detection and prevention of these complications.

Based on the clinical and laboratory data obtained in Fergana region, this study aims to determine the relationship between D-dimer level variations and pregnancy complications, identify hemostatic disorders at early stages, and develop preventive measures. Research in this area holds significant scientific and practical importance for improving maternal health and strengthening maternal and child protection systems. Pregnancy is a unique physiological state that demands complex adaptive changes in almost all organ systems, especially the hemostatic system, which maintains the balance between coagulation and fibrinolysis. These changes are essential for the protection of both the mother and the fetus, ensuring proper placental circulation and minimizing the risk of excessive bleeding during childbirth. However, when the regulation of this delicate balance is disturbed, it can lead to severe obstetric complications such as preeclampsia, placental insufficiency, intrauterine fetal death, or disseminated intravascular coagulation (DIC).

One of the most reliable and widely used indicators of hemostatic activity in modern laboratory diagnostics is D-dimer. It is a specific degradation product formed during fibrin breakdown in the process of fibrinolysis. The presence and concentration of D-dimer in blood plasma directly reflect the intensity of thrombus formation and its subsequent degradation. Under normal pregnancy conditions, D-dimer levels gradually increase as gestation progresses, reaching their highest physiological levels during the third trimester. This increase is not pathological but rather a part of the body's adaptive response to pregnancy.

However, excessively high D-dimer levels beyond the expected physiological range may indicate a pathological hypercoagulable state, which can compromise placental blood flow and trigger pregnancy complications. For instance, elevated D-dimer concentrations have been associated with preeclampsia, intrauterine growth restriction (IUGR), placental abruption, and missed abortion. Conversely, abnormally low D-dimer levels might signal impaired fibrinolytic activity, leading to microthrombus formation in the placental vessels and, consequently, fetal hypoxia. From a clinical perspective, measuring D-dimer levels provides valuable diagnostic and prognostic information. Regular monitoring helps in identifying patients at risk of thromboembolic events and placental dysfunction early in pregnancy. In such cases, preventive interventions- such as low-dose anticoagulant therapy or closer obstetric supervision can be initiated to reduce maternal and fetal complications.

The Fergana region, being one of the densely populated areas of Uzbekistan, presents an important context for studying maternal health indicators. Local environmental factors, genetic predispositions, and healthcare accessibility all influence pregnancy outcomes. Research focusing on D-dimer levels among pregnant women in this region helps establish population-specific reference ranges and contributes to the development of more accurate diagnostic criteria for early risk detection. The evaluation of D-dimer levels in pregnant women represents a crucial step toward improving maternal healthcare quality. It allows for the timely identification of coagulation abnormalities, supports the prevention of life-threatening obstetric complications, and enhances both maternal and fetal survival outcomes. Integrating D-dimer testing into routine prenatal care,

particularly in high-risk regions such as Fergana, offers a promising approach to advancing preventive obstetric medicine in Uzbekistan.

Conclusion

The assessment of D-dimer levels during pregnancy plays a vital role in understanding the hemostatic balance and preventing serious obstetric complications. As a sensitive marker of fibrin degradation, D-dimer reflects both coagulation activation and fibrinolytic activity, providing valuable insight into maternal vascular health. Its clinical and laboratory evaluation enables early detection of pathological hypercoagulation, placental circulation disorders, and other pregnancy-related complications such as preeclampsia, missed abortion, and intrauterine growth restriction. Findings from studies conducted in the Fergana region confirm that abnormal fluctuations in D-dimer concentrations are closely linked to adverse pregnancy outcomes. Therefore, incorporating D-dimer testing into routine prenatal examinations allows healthcare providers to identify at-risk women earlier and apply preventive measures more effectively. In conclusion, systematic monitoring of D-dimer levels should be recognized as an important component of maternal health management. This approach not only helps prevent pregnancy complications but also contributes to improving the overall quality of obstetric care and safeguarding the health of both mother and child.

References:

1. Cunningham, F.G., Leveno, K.J., Bloom, S.L., Dashe, J.S., Hoffman, B.L., Casey, B.M. *Williams Obstetrics*. 27th Edition. — New York: McGraw-Hill Education, 2022.
2. James, A.H. *Venous Thromboembolism in Pregnancy*. *New England Journal of Medicine*, 2021; 384(8): 726–734.
3. Kovac, M., Mikovic, Z., Rakicevic, L. *D-dimer in Normal Pregnancy and Pregnancy Complications: Reference Ranges and Diagnostic Value*. *Clinical Chemistry and Laboratory Medicine*, 2020; 58(2): 227–234.
4. Levi, M., Ten Cate, H. *Disseminated Intravascular Coagulation and Its Relation to Pregnancy Complications*. *Thrombosis Research*, 2020; 191(Suppl 1): S68–S71.
5. Tans, G., Curvers, J., Middeldorp, S. *Changes in Coagulation and Fibrinolysis During Normal Pregnancy*. *Seminars in Thrombosis and Hemostasis*, 2019; 45(1): 12–19.
6. World Health Organization (WHO). *Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors*. Geneva: WHO Press, 2022.
7. Abdugʻaniyeva, M.X., Rasulova, N.M. *Homiladorlik davrida gemostaz tizimini oʻzgarishlari va ularning klinik ahamiyati*. *Tibbiyot Jurnal*, 2023; №2: 45–50.