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RISK FACTORS FOR OBSTETRIC AND PERINATAL COMPLICATIONS IN FIRST PREGNANCY

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Abstract: This literature review analyzes clinical, epidemiological, somatic, reproductive and socio-demographic risk factors for obstetric and perinatal complications in first pregnancy. First pregnancy is considered an independent marker of increased obstetric risk because it is accompanied by pronounced hormonal, immunological, hemodynamic and hemostasiological adaptation of the maternal organism. The literature emphasizes the high clinical importance of preeclampsia, gestational hypertension, placental dysfunction, fetal growth restriction, gestational diabetes mellitus, iron deficiency anemia, urinary tract infections, preterm birth and postpartum hemorrhage among primigravid and primiparous women. Particular attention is paid to maternal age, obesity, adverse reproductive history, previous pregnancy losses and social determinants of health. The review substantiates the need for early risk stratification, interdisciplinary antenatal care, timely preventive interventions and personalized routing of pregnant women in order to reduce maternal and perinatal morbidity.

Keywords: first pregnancy, primigravida, primiparous women, risk factors, preeclampsia, placental dysfunction, perinatal outcomes, prevention.

Introduction

First pregnancy occupies a special position in obstetrics because it is the period during which a complex system of interaction between the maternal organism, the placenta and the fetus is formed for the first time. The absence of previous obstetric experience, the initial development of immunological tolerance to fetal antigens and the need for profound cardiovascular, endocrine and metabolic adaptation determine the vulnerability of primigravid women to a number of complications.

Modern literature data show that primiparous women more often face hypertensive disorders, placental insufficiency, fetal growth restriction, abnormalities of labor, operative delivery and postpartum complications. These conditions are not isolated clinical events; they reflect insufficient adaptation of maternal regulatory systems and may influence both the course of the current pregnancy and the prognosis of subsequent reproductive health.

The aim of this review is to summarize scientific data on the leading risk factors for obstetric and perinatal complications in women with first pregnancy and to identify the main directions for early prevention, dynamic monitoring and improvement of antenatal care.

First pregnancy as an independent factor of obstetric risk

First pregnancy has traditionally been regarded as a state of increased obstetric risk. This is related not only to the lack of previous childbirth experience but also to the primary formation of placental, immunological and vascular adaptation mechanisms. Inadequate trophoblast invasion,

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incomplete remodeling of the spiral arteries and imbalance of angiogenic factors may create the basis for the development of placental dysfunction, preeclampsia and fetal growth restriction.

Hormonal changes are of particular importance. Increased production of progesterone, estrogens and human chorionic gonadotropin is necessary for maintaining pregnancy, developing placental structures and ensuring uterine quiescence. However, disturbances in endocrine regulation can contribute to early reproductive losses, threatened miscarriage and complications in later gestation. The neuroendocrine system also participates in vascular tone regulation, metabolic adaptation and stress response.

Physiological hypercoagulation during pregnancy is a protective mechanism aimed at reducing blood loss during delivery. At the same time, excessive activation of coagulation, especially in women with thrombophilia, obesity, anemia or inflammatory diseases, increases the risk of microthrombosis in the uteroplacental circulation. This contributes to chronic placental hypoperfusion, fetal hypoxia, placental abruption and adverse perinatal outcomes.

Age-related and socio-demographic factors

Maternal age at the time of first pregnancy is one of the most significant predictors of gestational outcome. The highest risk of complications is observed in women younger than 20 years and older than 35 years. In young primigravidas, the reproductive and neuroendocrine systems may be functionally immature, while in women of advanced reproductive age the prevalence of somatic and gynecological diseases, metabolic disorders and reduced ovarian reserve increases.

Decision modeling based on national perinatal registries has shown that increasing age at first pregnancy planning is accompanied by a lower probability of spontaneous conception, higher frequency of miscarriage, greater need for assisted reproductive technologies, more multiple pregnancies and increased rates of cesarean delivery. These changes not only affect clinical outcomes but also increase the economic burden on the health care system.

Socio-demographic changes in recent decades are associated with later marriage, higher educational and professional aspirations among women and postponement of motherhood. Although these processes reflect social development, delayed first childbirth increases the proportion of women entering pregnancy with chronic diseases, overweight, endocrine disorders and reproductive history complications. Therefore, age should be assessed together with social determinants, access to antenatal care, digital literacy and adherence to medical recommendations.

Hypertensive disorders and preeclampsia

Preeclampsia remains one of the most severe complications of pregnancy and represents a systemic condition characterized by endothelial dysfunction, vasoconstriction, activation of the coagulation cascade and multi-organ involvement. According to international data, preeclampsia complicates approximately 2-8% of pregnancies, while the risk is higher in nulliparous and primigravid women, especially in the presence of obesity, advanced maternal age, assisted reproduction or chronic hypertension.

The literature emphasizes that preeclampsia in first pregnancy has both short-term and long-term consequences. Women who experienced early-onset preeclampsia have an increased risk of preterm birth, fetal growth restriction and lower birth weight in subsequent pregnancies. Moreover, pregnancy complications are increasingly considered an early marker of future cardiovascular disease risk, which makes postpartum counseling and long-term follow-up clinically important.

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Pathogenetically, impaired trophoblast invasion, abnormal remodeling of spiral arteries and imbalance between proangiogenic and antiangiogenic factors play a key role. These mechanisms lead to placental ischemia and maternal systemic inflammatory response. In clinical practice, early identification of women at risk is based on a combination of anamnesis, blood pressure monitoring, body mass index, uterine artery Doppler indices, biochemical markers and dynamic assessment of maternal symptoms.

Preventive strategies include early registration for pregnancy, correction of modifiable risk factors, rational nutrition, control of body weight, management of chronic diseases and the use of low-dose acetylsalicylic acid in women at increased risk after 12 weeks of gestation according to contemporary recommendations. The effectiveness of prevention depends on timely risk assessment and adherence to standardized protocols.

Gestational diabetes, anemia, infections and placental dysfunction

Gestational diabetes mellitus is an important metabolic complication of pregnancy. Studies have shown that complications of the first pregnancy can predict the risk of gestational diabetes in a subsequent pregnancy. Hypertensive disorders, maternal obesity, macrosomia and perinatal loss in the first pregnancy significantly increase the likelihood of future metabolic disorders. These data support the need for early glucose screening and personalized counseling in women with an adverse first pregnancy history.

Iron deficiency anemia, frequently diagnosed in primigravid women, is associated with a higher frequency of fetal hypoxia, weakness of labor, postpartum hemorrhage and infectious complications. Anemia reduces the oxygen transport capacity of the maternal blood, decreases tissue resistance to hypoxia and aggravates the course of preeclampsia, placental insufficiency and postpartum recovery. Therefore, screening for hemoglobin and ferritin, nutritional counseling and timely iron supplementation are key preventive measures.

Urinary tract infections and asymptomatic bacteriuria increase the risk of pyelonephritis, premature rupture of membranes and preterm birth. Placental dysfunction occupies a central place in the structure of adverse outcomes among primigravidas. It may manifest as fetal growth restriction, chronic fetal hypoxia, abnormal Doppler indices, oligohydramnios or signs of fetal distress. Early detection of placental dysfunction requires a combination of ultrasound fetometry, Doppler assessment of uteroplacental and fetal blood flow, and analysis of maternal clinical risk factors.

Reproductive history and prognosis of subsequent pregnancies

Even when the current pregnancy is the first childbirth, previous pregnancy losses, spontaneous abortions and late reproductive losses are clinically relevant. A history of recurrent miscarriage or loss after 10 weeks of gestation is associated with a higher risk of preterm birth, stillbirth or low birth weight at first parity. This indicates the need for careful evaluation of reproductive history, including genetic, endocrine, infectious, immunological and hemostatic factors.

First pregnancy also forms a type of reproductive memory. Systematic analysis has demonstrated that a complicated first pregnancy increases the risk of recurrence of obstetric complications in subsequent gestations, whereas an uncomplicated first pregnancy is associated with a lower probability of future complications. This phenomenon may be related to immunological adaptation and more effective maternal tolerance during later pregnancies.

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Thus, first pregnancy has independent clinical value and provides prognostic information for the woman's future reproductive health. After a complicated first pregnancy, counseling should not end with delivery. Postpartum follow-up should include assessment of cardiovascular and metabolic risks, discussion of optimal interpregnancy interval, contraception, correction of anemia and preparation for the next pregnancy.

Prevention and early risk stratification

Prevention of complications in first pregnancy should begin as early as possible. At the first antenatal visit, maternal age, body mass index, blood pressure level, obstetric and gynecological history, somatic diseases, lifestyle factors and social determinants should be assessed. Women with a combination of risk factors require intensified observation and individualized care plans.

In high-risk women, the use of low-dose aspirin after 12 weeks of gestation is justified according to current recommendations. Additional preventive measures include correction of iron deficiency, control of glycemia, treatment of urinary tract infections, counseling on nutrition and physical activity, and timely referral to specialized centers. A multidisciplinary approach involving obstetricians, therapists, endocrinologists, cardiologists and neonatologists increases the effectiveness of prevention.

A promising direction is the transition from an episodic model of antenatal observation to a proactive, risk-oriented system that includes early stratification, dynamic monitoring and clear routing. In this model, first pregnancy is not considered a routine physiological state alone, but a critical period for identifying women at risk and implementing long-term measures to protect maternal and child health.

Conclusion

The analysis of the literature shows that first pregnancy is an independent marker of increased obstetric and perinatal risk. The most significant complications in this group are hypertensive disorders, preeclampsia, placental dysfunction, fetal growth restriction, gestational diabetes, anemia, infections, preterm birth, labor abnormalities and postpartum hemorrhage.

The leading risk factors include extreme reproductive age, obesity, gestational diabetes, anemia, urinary tract infections, adverse reproductive history, previous pregnancy losses, social vulnerability and insufficient antenatal monitoring. Early risk stratification, standardized prevention and interdisciplinary care make it possible to reduce the frequency of severe maternal and perinatal outcomes.

Therefore, optimization of first pregnancy management requires a comprehensive approach aimed at reducing maternal and perinatal morbidity, improving the quality of antenatal care and forming a personalized system of observation from the earliest stages of gestation.

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