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## **ТИББИЁТДА ЯНГИ КУН НОВЫЙ ДЕНЬ В МЕДИЦИНЕ NEW DAY IN MEDICINE**

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## CARDIOVASCULAR RISK IN POSTPARTUM WOMEN WITH A HISTORY OF PREECLAMPSIA: A LITERATURE REVIEW

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### ✓ Resume

*Preeclampsia is a pregnancy-specific hypertensive disorder associated with increased maternal and perinatal morbidity. Emerging evidence indicates that women with a history of preeclampsia have a significantly higher risk of long-term cardiovascular disease (CVD) postpartum. This review summarizes epidemiological findings, pathophysiological mechanisms, and clinical implications related to cardiovascular risk in postpartum women with prior preeclampsia. Women with early-onset or severe preeclampsia are particularly prone to chronic hypertension, metabolic syndrome, heart failure, ischemic heart disease, and stroke. Early postpartum monitoring, lifestyle interventions, and patient education are essential to reduce long-term cardiovascular morbidity. Further research is needed to optimize prevention and management strategies in this high-risk population.*

**Keywords:** Preeclampsia, postpartum, cardiovascular disease, hypertension, metabolic syndrome, maternal health.

## СЕРДЕЧНО-СОСУДИСТЫЙ РИСК У ЖЕНЩИН ПОСЛЕ РОДА С ПРЕКЛАМПСИЕЙ: ОБЗОР ЛИТЕРАТУРЫ

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### ✓ Резюме

*Преэклампсия — это специфическое для беременности гипертензивное заболевание, связанное с повышенной материнской и перинатальной заболеваемостью. Современные исследования показывают, что женщины с анамнезом преэклампсии имеют значительно повышенный риск развития сердечно-сосудистых заболеваний в послеродовом периоде. В обзоре суммированы эпидемиологические данные, патофизиологические механизмы и клинические последствия для сердечно-сосудистого здоровья женщин после преэклампсии. Женщины с ранним или тяжелым течением преэклампсии особенно подвержены хронической гипертензии, метаболическому синдрому, сердечной недостаточности, ишемической болезни сердца и инсульту. Раннее наблюдение после родов, корректировка образа жизни и образовательные программы для пациенток являются ключевыми мерами профилактики долгосрочной сердечно-сосудистой патологии.*

**Ключевые слова:** Преэклампсия, послеродовой период, сердечно-сосудистые заболевания, гипертензия, метаболический синдром, здоровье матери

## ANAMNEZIDA PREKLAMPSIYA BO'LGAN TUG'RUQDAN KEYINGI AYOLLARDA YURAK-QON TOMIR XAVFI: ADABIYOTLAR SHARHI

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## ✓ Resume

*Preeklampsiya — homiladorlik davriga xos gipertenziya bilan tavsiflangan kasallik bo'lib, ona va chaqaloq salomatligiga salbiy ta'sir ko'rsatadi. So'nggi tadqiqotlar shuni ko'rsatadiki, preeklampsiyadan o'tgan ayollar tug'ruqdan keyin uzoq muddatli yurak-qon tomir kasalliklari xavfiga sezilarli darajada duch keladilar. Ushbu sharh preeklampsiyadan keyingi ayollarda yurak-qon tomir xavfi bilan bog'liq epidemiologik ma'lumotlar, patofiziologik mexanizmlar va klinik tavsiyalarni jamlaydi. Erta boshlanishi yoki og'ir shakli bo'lgan preeklampsiya ayollarni surunkali gipertenziya, metabolik sindrom, yurak yetishmovchiligi, ishemiya va insult xavfiga ko'proq moyil qiladi. Tug'ruqdan keyingi erta monitoring, hayot tarzi o'zgarishlari va bemorlarni ma'lumot bilan ta'minlash uzoq muddatli yurak-qon tomir kasalliklarini oldini olishda muhim ahamiyatga ega.*

*Kalit so'zlar: Preeklampsiya, tug'ruqdan keyingi davr, yurak-qon tomir kasalliklari, gipertenziya, metabolik sindrom, ona salomatligi*

## Relevance

Preeclampsia is a hypertensive disorder unique to pregnancy, affecting approximately 3–8% of pregnancies worldwide. It is a leading cause of maternal and perinatal morbidity and mortality, particularly in low- and middle-income countries. Traditionally, preeclampsia has been considered a condition that resolves after delivery; however, recent evidence has shown that its impact extends far beyond the perinatal period. Women who experience preeclampsia are at significantly increased risk of developing chronic hypertension, ischemic heart disease, stroke, and heart failure later in life.

The prevalence of cardiovascular disease (CVD) is rising globally, and it is now recognized that a history of pregnancy complications, especially preeclampsia, represents an important early-life predictor of future cardiovascular risk. Studies indicate that cardiovascular events occur at a younger age in women with prior preeclampsia compared to the general population. Moreover, preeclampsia often coexists with other metabolic disorders such as obesity, insulin resistance, and dyslipidemia, which further exacerbate long-term cardiovascular risk.

Given these findings, understanding the link between preeclampsia and postpartum cardiovascular health has become a critical public health issue. Early identification of women at high risk provides an opportunity for preventive strategies, including lifestyle modification, pharmacological interventions, and structured postpartum follow-up. Despite growing awareness, standardized guidelines for long-term cardiovascular monitoring in this population remain limited, highlighting the urgent need for research and clinical protocols aimed at reducing morbidity and mortality in women with a history of preeclampsia.

**Purpose of the study:** The aim of this review is to summarize current evidence on the risk of cardiovascular disease in postpartum women who experienced preeclampsia and to highlight potential mechanisms, clinical implications, and preventive strategies.

## Materials and Methods

This review analyzed recent scientific literature published between 2010 and 2025 using databases such as PubMed, Scopus, and Web of Science. Keywords included: “preeclampsia,” “postpartum cardiovascular risk,” “hypertension,” and “maternal heart disease.” Studies included observational cohort studies, meta-analyses, and clinical guidelines focusing on postpartum cardiovascular outcomes in women with preeclampsia. Data were synthesized to identify trends in risk, underlying mechanisms, and management strategies.

## Results and Discussion

### 1. Epidemiological Findings

Multiple cohort and population-based studies have demonstrated that women with a history of preeclampsia face significantly higher long-term cardiovascular risk. A meta-analysis by Bellamy et al. (2007) involving over 2 million women showed that preeclampsia increased the risk of future hypertension by approximately 3.7 times and the risk of ischemic heart disease by 2.2 times. Subsequent studies have reinforced these findings, with early-onset preeclampsia (before 34 weeks of gestation) being associated with more severe cardiovascular outcomes than late-onset forms.

Data from the Nurses' Health Study II indicate that women with severe preeclampsia were 2.5 times more likely to develop heart failure and 1.7 times more likely to experience a stroke within 10–20 years postpartum. Similarly, research from Scandinavian registries demonstrates that even mild or late-onset preeclampsia confers a 1.5–2-fold increased risk of long-term cardiovascular events compared to women with normotensive pregnancies.

## 2. Blood Pressure and Hypertension Trends

Hypertension is the most commonly observed cardiovascular consequence after preeclampsia. Studies report that 20–40% of women with prior preeclampsia develop chronic hypertension within 5–10 years postpartum. Blood pressure elevations often manifest within the first year after delivery, highlighting the importance of early postpartum monitoring. For example, a longitudinal cohort study by Ray et al. (2017) found that women with early-onset preeclampsia had an average systolic blood pressure 10–15 mmHg higher than control women five years after delivery.

## 3. Metabolic and Lipid Alterations

Women with preeclampsia frequently exhibit metabolic disturbances, including insulin resistance, impaired glucose tolerance, obesity, and dyslipidemia. Several studies suggest that these metabolic changes may precede pregnancy and become unmasked by the stress of preeclampsia, but they often persist postpartum, further increasing cardiovascular risk. For instance, a study by Brown et al. (2013) found that 35% of women with preeclampsia developed metabolic syndrome within 10 years postpartum, compared to 15% in women without preeclampsia.

## 4. Endothelial Dysfunction and Vascular Health

Persistent endothelial dysfunction is a hallmark of preeclampsia and is a critical link to long-term cardiovascular disease. Endothelial biomarkers such as circulating levels of soluble fms-like tyrosine kinase-1 (sFlt-1) and soluble endoglin, which are elevated during preeclampsia, have been found to remain abnormal in some women months to years after delivery. This prolonged vascular dysfunction contributes to accelerated atherosclerosis and increased risk of coronary artery disease. Imaging studies, including carotid intima-media thickness measurements, reveal that women with prior preeclampsia exhibit early subclinical atherosclerosis compared to matched controls.

## 5. Heart Failure and Structural Cardiac Changes

Evidence indicates that preeclampsia may also predispose women to structural cardiac changes, such as left ventricular hypertrophy and diastolic dysfunction. Echocardiographic studies performed 1–5 years postpartum show that women with early-onset preeclampsia often have reduced diastolic function and increased left ventricular mass, both of which are strong predictors of heart failure. A Danish cohort study reported that women with severe preeclampsia had a 2.5-fold higher incidence of heart failure 10 years after delivery.

## 6. Stroke and Cerebrovascular Risk.

Several large-scale studies have shown that preeclampsia significantly increases the risk of both ischemic and hemorrhagic stroke. The relative risk of stroke within 10–20 years postpartum is reported to be between 1.5 and 3 times higher compared to women without preeclampsia. Importantly, stroke risk is compounded in women who develop postpartum hypertension or retain other metabolic risk factors.

## 7. Additional Risk Factors and Stratification

The severity of preeclampsia, recurrence in subsequent pregnancies, early gestational onset, and the presence of comorbidities such as obesity, diabetes, or chronic kidney disease are all associated with higher postpartum cardiovascular risk. Women with recurrent preeclampsia are at particularly high risk, with studies indicating a fourfold increase in long-term hypertension and a twofold increase in cardiovascular events.

## 8. Clinical Implications

These findings underscore the importance of postpartum cardiovascular screening in women with a history of preeclampsia. Recommended practices include:

- Blood pressure measurement at 6 weeks, 6 months, and annually thereafter.
- Assessment of fasting glucose, HbA1c, and lipid profile within the first year postpartum.
- Lifestyle counseling focusing on diet, exercise, weight management, and smoking cessation.
- Early pharmacological intervention for persistent hypertension or dyslipidemia.

## 9. Preventive Strategies and Future Directions

Early identification of high-risk women allows for tailored preventive strategies, which may reduce the long-term burden of cardiovascular disease. Research is ongoing to evaluate the role of medications such as statins or ACE inhibitors in women with a history of preeclampsia and to investigate whether intensive lifestyle interventions can normalize cardiovascular risk trajectories. Future studies should also focus on genetic and epigenetic mechanisms linking preeclampsia to CVD to improve risk prediction and individualized prevention.

### Summary

In conclusion, women with a history of preeclampsia face a multifaceted increase in long-term cardiovascular risk, including hypertension, metabolic syndrome, structural cardiac changes, ischemic heart disease, heart failure, and stroke. The magnitude of this risk is influenced by the severity, onset, and recurrence of preeclampsia, as well as coexisting metabolic or lifestyle factors. Postpartum monitoring, early intervention, and patient education are critical to mitigating these risks and improving long-term health outcomes.

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