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REVIEW

Current Understanding on Hypertensive Disorders in Pregnancy

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Abstract: Hypertensive disorders of pregnancy (HDP) are a complex spectrum of conditions that develop during gestation, posing significant risk to maternal and fetal health. This disorder encompasses gestational hypertension, preeclampsia, eclampsia, and chronic hypertension during pregnancy, with notably higher prevalence in low- and middle-income countries. By systematically reviewing latest clinical and experimental evidence concerning about HDP, this review aimed to provide a new understanding on risk assessment and clinical prevention strategies for HDP. In addition, there is still controversy over the antihypertensive treatment for pregnant women with mild to moderate hypertension during pregnancy or hypertension without terminal organ damage. It did not still confirm when to start antihypertensive treatment, the better antihypertensive target and recommended drugs. Therefore, this review also elaborated on used antihypertensive drugs and their effects on mother and fetus in recent years. Summarily, our conclusion suggested preventing HDP still requires a multi-faceted approach including diet, exercise and lifestyle habits. More prospective data were necessary to scientifically clarify preventive and therapeutic measures.

Keywords: hypertensive disorders of pregnancy, risk assessment, prevention strategies, pregnant woman, antihypertensive therapy

Introduction

Pregnancy induced hypertension (HDP) is a global health issue that affects 5% to 10% of pregnancies and leads to 700,000 maternal and 500,000 fetal deaths annually.[1] Although the global HDP mortality rate dropped from 39.8/100,000 in 1990 to 27.8/100000 in 2019, its incidence rate is still rising, especially in countries with low social population index (SDI).[1,2] HDP is defined as the onset of sustained hypertension after 20-week gestation, which is characterized by systolic blood pressure (BP) ≥140 mmHg and/or diastolic BP ≥90 mmHg, with normalization occurring within 12 weeks after postpartum.[2] This disease spectrum mainly includes gestational hypertension (GH), pre-eclampsia (PE), eclampsia, hypertension in pregnancy and hypertension with superimposed preeclampsia.[2,3] HDP can be manifested with diverse maternal symptoms including edema, proteinuria, headache, visual disturbances, epigastric discomfort and chest tightness.[3] Without timely intervention, it can potentially develop to severe complications such as heart failure, renal impairment and intracranial hemorrhage, posing life-threatening risk to both mother and fetus.[4] In fact, recent evidence have witnessed growing emphasis on risk prediction for HDP.[5] Large-scale clinical studies have identified some risk factors, including maternal age, pre-pregnancy body weight, family history and others.[5–8] However, considerable controversy persists regarding the management of mild-to-moderate HDP with or without end-organ damage, particularly concerning the optimal timing for initiating antihypertensive therapy, thresholds of target BP and preferred pharmacologic agents.[3] For severe hypertension in pregnancy, current guidelines recommend rapid BP reduction to <160/105 mmHg within minutes to hours, followed by gradual stabilization at 140–150/90–100 mmHg.[9] First-line antihypertensive agents typically include labetalol, methyldopa and nifedipine, though their safety profile during pregnancy remain debated.[10] This review synthesized current evidence on risk factors, pathophysiological mechanisms and

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therapeutic approaches for HDP patients, aiming to provide clinical guidance for early prevention and effective BP management among these patients.

Risk Factors for HDP

Common Risk Factors

Age, weight, chronic diseases, pre-pregnancy hypertension, metabolic abnormalities, multiple pregnancies, family history and other factors have been confirmed to be common risk factors for HDP.[11] For example, pregnant women over 40 years old or under 20 years old are more likely to develop HDP, and the age of the first pregnancy being under 20 years old or over 35 years old is also one of the high-risk factors.[12] A previous study found that gestational anemia, a history of growth hormone use and spontaneous abortion were the important factors on predicting the progression of GH to PE.[13] Overweight or obesity with a body mass index (BMI) exceeding the normal range is an independent risk factor for HDP.[14] Chen et al found that patients with chronic diseases such as diabetes, antiphospholipid syndrome and chronic nephritis were more likely to suffer from HDP.[15] As for metabolic factors, fasting blood glucose (FPG), triglycerides (TG), familial hypercholesterolemia (FH), lactate dehydrogenase (LDH), mean platelet volume (MPV)[16] and blood urea nitrogen (BUN) in the circulating blood were all associated with the occurrence of HDP.[17] Therefore, focusing on evaluating the above risk factors might help to predict the risk of developing HDP.

Emerging Risk Factors

Recent evidence have shown that lifestyle plays an important role in the development of HDP.[18–22] Poor lifestyle conditions such as a high-salt diet and physical inactivity were associated with the occurrence of HDP.[18] HDP incidence were significantly higher than that in low altitude, suggesting some environmental factors might have an influence on the HDP risk.[19] In recent years, researchers have also made some new attempts, for example, Li et al performed a prospective evaluation on the association between vaginal microorganisms and HDP by vaginal swab sequencing to identify bacteria.[20] They found that *L. crispatus* dominant vaginal community was related to with a reduced HDP risk, supporting that vaginal microbiome characteristics might be helpful to identify individuals at high risk of HDP and might provide a potential target for the development of new prepregnancy intervention methods.[21] Ohseto et al explored the relationship between dietary electrolyte intake and the prevalence of HDP subtype, by estimating the dietary intake of calcium, potassium, sodium and magnesium with the food frequency questionnaire.[22] They came to a conclusion that the intake of calcium and potassium might play an important role in the pathogenesis of PE.[22] Briefly, the risk factors of HDP are involved in multiple aspects, and further mechanism exploration for these risk factors can be more accurately and quickly predict the occurrence of HDP.[1–3]

Risk Models for HDP

Clinical indicators have been found to be one of the commonly used methods to predict HDP.[1–4] Recently, researchers have explored more valuable clinical indicators, combined with statistical methods to build predictive models for the risk assessment.[23] For instance, Gunderson et al proposed a novel risk assessment model by combining traditional factors with BP patterns within 20 weeks of gestation, to more accurately distinguish the low-risk to intermediate-risk HDP.[24] Nurkkala et al also demonstrated the importance of BP for HDP prediction, reporting that the universal BP polygenic risk score (BPPRS) added to the model including clinical risk factors and preeclampsia-specific polygenic risk score (PEPRS) can significantly improve the predictive efficiency of HDP.[25] In addition, one study used multi-population meta-analysis to identify 12 independent sites associated with predicted PE and HDP, deriving a genome-wide polygenic risk score.[5]

Biomarker model usually refers to the prediction method by detecting certain biomolecules or metabolites in pregnant women.[5–8] A previous study by combining the soluble fms-like tyrosine kinase 1/placental growth factor (PlGF) ratio with uterine artery Doppler ultrasound parameters (pulse index and resistivity index) created an effective mid-term pregnancy prediction method for the occurrence of early-onset HDP.[26,27] Their results showed that this algorithm can improve the performance on predicting severe PE and complications such as prenatal fetal death or acute fetal distress, compared to biochemical markers or uterine Doppler parameters used alone.[27] Tejaswi et al used the enzyme colorimetric

method to determine the urinary calcium-creatinine ratio (UCCR) to predict PE, showing that the UCCR indicator was a good predictor of PE in primipara, and can be considered as a routine screening test at 20 to 28 weeks of pregnancy during routine prenatal examination.[28]

Imaging examination is a non-invasive detection method to predict HDP risk by the observation and analysis of the imaging uterus, fetus and blood flow of pregnant women.[29] Common imaging methods include ultrasound examination, magnetic resonance imaging and others.[30,31] However, these examinations require operation and interpretation by professional technicians, and rely heavily on medical resources. Liu et al extracted radiomics features from diffusion weighted imaging (DWI) and apparent diffusion coefficient (ADC) images, developing a radiomics nomogram by combining it with maternal age and BMI, which showed a good performance in the training and test groups.[32] Papastefanou et al showed that placental volume from imaging examination was an independent predictor of pregnancy complications associated with placental insufficiency at 11 to 14 weeks.[33] In addition, it was found that ocular artery Doppler can improve the prediction performance of PE, especially for the PE prediction within 3 weeks after pregnancy.[34]

Making a simple summary, the prediction model for HDP is mainly based on the common risk factors such as maternal age, family history, body weight, chronic diseases, prepregnancy hypertension and metabolic abnormalities.[1–8] These factors are easily accessible and have been widely used in clinical practice, providing doctors with a preliminary basis for risk assessment. However, due to the large individual differences between various pregnant women, the prediction effect of the same risk factor is discrepant in different pregnant women.[35] These clinical prediction models usually can only provide a relatively rough risk assessment, and it is difficult to accurately predict the risk of individual pregnant women.[8] Biomarker prediction models are usually able to provide more objective and accurate predictive information, which might help doctors to more accurately assess the risk of pregnant women, but the detection of some biomarkers is more expensive and may be difficult to popularize in some regions or medical facilities.[36] In addition, the predictive effect of some biomarkers needs to be further validated and/or improved to ensure their accuracy and reliability.[37] The predictive model of imaging examination is non-invasive, excellent and intuitive, and can provide rich diagnostic information for doctors through ultrasound and magnetic resonance imaging. However, it usually requires professional technical personnel to operate and interpret, which has the disadvantage of great subjectivity.[38] More and more new biomarkers or imaging methods are needed to further address the limitations of current risk predictions for HDP in the future.

Pathological Mechanism of HDP

The pathogenesis of HDP is quite complex that can be involved in multiple factors working together, including genetic factors, hormone changes, immune regulation, and others.[39]

Genetic Factors

Genetics plays a certain role in the onset of pregnancy induced hypertension. Research evidence has already shown that the risk of HDP might be relatively higher if her mother or sister has a history of pregnancy induced hypertension during period of gestation.[40,41] Polymorphisms in certain genes are associated with susceptibility to gestational hypertension, which might affect vascular function, hormone metabolism and immune system regulation, thereby increasing the HDP risk.[42–44]

Hormonal Changes

During pregnancy, the hormone levels in a woman's body tend to undergo significant changes.[45] The placenta can secrete a large amount of hormones such as placental lactogen, estrogen and progesterone, which not only maintain pregnancy, but also have an impact on the physiological function of the mother body.[46,47] For example, estrogen and progesterone have a significant relaxing effect on smooth muscle in blood vessels.[46–48] In order to ensure normal blood circulation, the mother body can regulate BP through a series of mechanisms about pregnancy-related hormones, potentially leading to a significant increase in BP.[49] Placental prolactin can also affect insulin sensitivity, leading to abnormal glucose metabolism, indirectly causing abnormal increase in BP.[50]

Immune System

The immune system of women body often undergoes adaptive change to avoid maternal rejection of the fetus during pregnancy.[51] But this adjustment, sometimes, results in excessive activation of the immune system.[52] The excessive inflammatory factors produced by immune cells can damage endothelial cells and lead to vasoconstriction, thereby causing an abnormal increase in BP.[53]

Hemodynamic Changes

As the fetus grows, the blood volume of pregnant women gradually increases to meet the demands of the fetus and themselves.[54] However, some pregnant women's cardiovascular system cannot adapt well to this change. Their heart needs to work harder to pump blood for oxygen demand of whole body tissues, contributing to an increase BP.[55] At the same time, an enlarged uterus in the abdomen may compress the inferior vena cava during pregnancy, reducing the amount of blood returning to the heart.[56] In order to maintain sufficient cardiac output, heart might increase pumping pressure, further leading to an increase in BP.[57]

Others

Additionally, the underlying diseases of pregnant women such as chronic hypertension, diabetes, and kidney disease are more likely to increase the risk of HDP.[1–8] Except that advanced pregnancy (age $\geq$ 35 years), multiple pregnancies, obesity, and other confirmed factors, there are evidence showing that long-term mental stress and anxiety in pregnant women may also affect the neuroendocrine system, leading to elevated BP.[58–60] Further understanding these causes can help expectant mothers take preventive measures during pregnancy, ensuring the health of both mother and baby.

Treatment for HDP

Antihypertensive drugs for HDP patients should not only consider the treatment effect and cardiovascular prognosis of pregnant woman, but also pay more attention to fetal safety.[61] Some antihypertensive drugs are considered safe and widely used in obstetrics, while others are contraindicated because of teratogenic or toxic effects on the fetus.[62,63] Therefore, the safety of antihypertensive drugs is the primary issue in the treatment of HDP. We tried to introduce common antihypertensive drugs, precautions for drug treatment and their effects on mother and fetus.

General Principles of Antihypertensive Therapy

The antihypertensive therapy of HDP was based on the BP level, gestational age, and other risk factors related to the safety of maternal and fetal.[64,65] The main purpose is to reduce the adverse incidence and mortality associated with hypertension in both the mother and fetus and extend gestational duration as much as possible to allow the fetus had more time to develop and mature before delivery.[64,66,67] However, limited scale of randomized controlled trials, evidence derived from meta-analyses and clinical databases have resulted in controversy regarding the pharmacological treatment of HDP.[66] Therefore, the safety and efficacy data for evaluating antihypertensive drugs are very limited. Currently, the selection of antihypertensive drugs during pregnancy is mainly based on the patient's race, existing treatments, drug efficacy and safety, clinical experience and familiarity with the drugs.[68] Moreover, the process of antihypertensive treatment should strive for stability, and maintain a relatively stable value for BP.[69] When severe hypertension with organ damage such as acute left ventricular failure occurs, it is necessary to urgently lower the BP to the target range, and reach stability within 24–48 hours.[69]

Drug Therapy for Mild to Moderate HDP

At present, the treatment for mild to moderate HDP (140–159 and/or 90–109 mmHg) and hypertension without target-organ damage were still controversial.[65–67] Existing clinical guidelines have not reached agreement on when to start antihypertensive treatment, optimal antihypertensive target and recommended therapeutic drugs.[68,69] The 2018 European Society of Cardiology guidelines recommend initiating antihypertensive therapy for all HDP women (with or without proteinuria) with sustained elevation more than BP 140/90 mmHg.[68] The 2020 American College of Obstetricians and

Gynecologists guidelines recommend that antihypertensive medication should not be required for preeclampsia patients with mild gestational hypertension and/or no end-organ damage.[70] The 2020 guidelines of the Society of Obstetrics and Gynecology of Chinese Medical Association recommend that antihypertensive treatment should be used for hypertensive pregnant women with systolic BP ≥140 mmHg and (or) diastolic BP ≥90 mmHg.[71] Methyldopa, rabelolol and nifedipine are the preferred drugs recommended.[72]

The reasons for previous guidelines that antihypertensive treatment was not recommended for mild and moderate hypertension during pregnancy are as follows: (1) Due to the physiological decline in BP in the first trimester, the risk of cardiovascular complications in pregnant women is relatively low, especially in patients without a history of severe hypertension and/or normal renal function;[68] (2) Fetal perfusion is depends on appropriate maternal BP, and the lowering BP might cause damage to uterine placental perfusion, contributing to an elevated risk of developing preeclampsia and low birth weight;[73] (3) Although treatment of mild to moderate HDP can reduce the progression to severe hypertension, it dose not really improve adverse maternal and perinatal outcomes.[74] Therefore, the current evidence is not clear whether mild or moderate hypertension during pregnancy should be actively intervened by antihypertensive drugs. Closely monitoring the clinical manifestations of pregnant women and fetus and the experience of clinicians might be important to determine whether antihypertensive treatment should be considered individually.

Drug Therapy for Severe HDP

Severe hypertension during pregnancy is defined as systolic BP/diastolic BP ≥160/110 mmHg in previous most guidelines.[65–69] The goal for lowering BP in severe HDP is to reduce BP under 160/105 mmHg within minutes to hours, and then steadily maintain BP at 140–150/90–100 mmHg to prevent the loss of cerebral vascular autoregulation, thus avoiding stroke and other organ damage.[75,76] However, there is currently no evidence showing that reducing BP to the "normal" range (<140/90 mmHg) can provide additional benefits. Rapidly lowering BP by more than 25% above mean arterial pressure may result in inadequate perfusion, affecting placental perfusion and fetal growth.[77]

Therefore, for the treatment of severe HDP, the principle of lowering BP too quickly should be not followed. For patients with acute severe hypertension during pregnancy, magnesium sulfate should be administered promptly to reduce the risk of eclampsia and maternal morbidity and mortality, without adverse effects on the fetus.[78] However, magnesium sulfate should not be used as a BP-lowering drug for pregnant woman. Most guidelines still recommend using labetalol, methyldopa or nifedipine for antihypertensive treatment,[65–69,75,76] because these drugs do not require cardiac monitoring and do not reduce uterine placental blood flow.[79]

Selecting Antihypertensive Drugs for HDP

Calcium Channel Blockers

Existing evidence suggest that calcium channel blockers (CCBs) used during pregnancy are considered safe that their use in early pregnancy is not a major risk for teratogenesis.[62] For instance, nifedipine has been considered as the most commonly used antihypertensive agent during pregnancy, and most guidelines recommend the short-acting nifedipine as the first-line treatment for hypertension emergency,[65–69] especially when intravenous access is unavailable or not established. Additionally, sustained-release nifedipine has minimal side effects on the fetus and uteroplacental vessel, which is basically effective in controlling severe hypertensive emergencies when used intravenously with labetalol or hydralazine.[80] In animal models, diltiazem can cause bone abnormalities, and both verapamil and digoxin can cause fetal growth retardation, hypotension and bradycardia for pregnant woman. Thus, these two drugs are not recommended for the treatment of HDP.[68]

Beta Blockers

Beta (β) receptor blockers have been extensively studied previously,[81] Theoretically, the β blockers might reduce placental perfusion, leading to fetal growth restriction and low birth weight.[82] However, most studies have ruled out these risks, and there is currently no clear evidence of teratogenicity during pregnancy, with the most extensive research focusing on labetalol. Labetalol is also one of the most widely used drugs in HDP treatment, acting as a non-selective β

receptor blocker.[83] Studies have confirmed that labetalol did not alter uteroplacental blood flow with a safe use during pregnancy.[84] Most guidelines predominantly recommend labetalol as a first-line drug for treating HDP.[65–70] A previous meta-analysis also showed that β receptor blockers seem to be more effective than methyldopa in reducing the risk of severe hypertension, but there is no significant difference in the PE risk.[74] However, atenolol can cross the placenta and adversely affect uteroplacental hemodynamics, leading to low birth weight, preterm birth, neonatal hypoglycemia and bradycardia, so that it is not recommended for use during pregnancy.[68,85]

Angiotensin Converting Enzyme Inhibitor/Angiotensin II Receptor Antagonist

Existing evidence have suggested that angiotensin-converting enzyme inhibitors (ACEIs) and angiotensin II receptor blockers (ARBs) have teratogenic effects.[86,87] The use of ACEIs or ARBs during pregnancy is associated with fetal death, miscarriage, congenital cardiovascular diseases, central nervous system abnormalities, musculoskeletal malformations, gastrointestinal malformations and renal abnormalities.[88] Therefore, these drugs should be immediately discontinued after pregnancy, and women planning to conceive should switch to other appropriate antihypertensive medications.

α2 Receptor Agonists

Phentolamine is a non-selective α1 and α2 adrenergic receptor blocker. Relevant guidelines from the Chinese Medical Association's Obstetrics and Gynecology Society mentioned that phentolamine can be administered intravenously for the treatment of HDP.[71] Urapidil has a dual mechanism of action at both central and peripheral levels, and it can block post-synaptic α1 receptors in the periphery and modulates the activity of the center in the brain by stimulating 5-HT1A receptors, preventing BP elevation.[72] The ESC guidelines recommend its use for the treatment of severe hypertension and hypertensive crises during pregnancy.[68] Prazosin is a selective post-synaptic α1 receptor blocker and is not recommended for the treatment of HDP, although some guidelines suggested it as a second-line treatment for mild to moderate hypertension during pregnancy.[89]

α Receptor Agonists

Methyldopa and clonidine can stimulate the brainstem α2 receptors to reduce central sympathetic nerve output.[83,90] Methyldopa was first used in obstetrics as early as 1963, which is still widely used because of its safety and effectiveness now.[83] It can gradually control BP over 6 to 8 hours without affecting the hemodynamics of the placenta and fetus or causing teratogenic effect, making it widely used in the treatmenting HDP.[90] However, compared to β receptor antagonists, methyldopa might significantly increase the risk of preeclampsia and preterm birth.[90,91] Exposure to methyldopa or clonidine in mid-to-late pregnancy may increase the risk of small for gestational age but does not increase perinatal mortality.[83] In addition, methyldopa and clonidine can cause neonatal hypotension and maternal depression,[68] which should be avoided after postpartum.

Other Antihypertensive Drugs

Sodium nitroprusside is a potent vasodilator with very rapid and strong arterial and venous vasodilation.[92] But it can produce cyanide and thiocyanate through biotransformation that might have toxic effect to the fetus, making it unsuitable for use during pregnancy.[92] It is only considered in cases of severe preeclampsia or hypertensive emergencies with left ventricular failure and refractory pulmonary edema that cannot be controlled by other medications.[69–74,93,94] Nitroglycerin acts on nitrous oxide synthase and can dilate both arteries and veins, alleviating the anterior and posterior load.[95] It is mainly used in the treatment of preeclampsia combined with pulmonary edema and/or coronary artery disease.[65–69] Intravenous nitroglycerin is equally effective as oral nifedipine.[95,96] Thiazides and loop diuretics can cross the placenta but do not cause fetal malformations.[97] However, these drugs can lead to adverse reactions in the pregnant woman, such as reduced blood volume, decreased amniotic fluid, reduced platelets, hypoglycemia and electrolyte disturbances.[68] In women with preeclampsia or during lactation, who already have a reduced blood volume, the use of diuretics can further lead to reduced amniotic fluid and decreased milk production, or even inhibit lactation.[68,83,90–92] Therefore, the use of these drugs is not recommended during pregnancy.

Summary

Poor control of blood pressure during pregnancy can affect maternal and fetal health as well as pregnancy outcomes. Although multiple countries and academic guidelines have provided specific recommendations for antihypertensive treatment during pregnancy, there is currently a lack of high-quality data on the long-term prognosis of mother and fetus. Large randomized trial data are also limited and pharmacokinetic studies of antihypertensive drugs during pregnancy are scarce, and there is heterogeneity in pharmacokinetic descriptions between different studies. In order to achieve evidence-based and personalized use of antihypertensive drugs, further studies are needed on the relationship between pregnancy pathology, pregnancy pharmacokinetics and pharmacodynamics in the future, in order to prevent under-treatment and overtreatment and minimize adverse reaction. In clinical practice, higher quality evidence is necessary to provide a basis for refined management of gestational hypertension treatment and to safeguard maternal and infant health.

Disclosure

Jiahua Liao is the first author. There is no conflict of interest to be clarified for our work.

References

1. Countouris M, Mahmoud Z, Cohen JB, et al. Hypertension in pregnancy and postpartum: current standards and opportunities to improve care. *Circulation*. 2025;151(7):490–507. doi:10.1161/CIRCULATIONAHA.124.073302
2. Ryan K, McGrath L, Brookfield K. Hypertension management in pregnancy. *Annu Rev Med*. 2025;76(1):315–326. doi:10.1146/annurev-med-050423-085626
3. Antza C, Stabouli S, Kotsis V. Practical guide for the management of hypertensive disorders during pregnancy. *J Hypertens*. 2022;40(7):1257–1264. doi:10.1097/HJH.0000000000003194
4. Chou JC. Hypertensive disorders of pregnancy and cardiovascular risk: we are missing the opportunity of a lifetime. *J Am Coll Cardiol*. 2022;79(24):2412–2414. doi:10.1016/j.jacc.2022.04.013
5. Honigberg MC, Truong B, Khan RR, et al. Polygenic prediction of preeclampsia and gestational hypertension. *Nat Med*. 2023;29(6):1540–1549. doi:10.1038/s41591-023-02374-9
6. Burwick RM, Rodriguez MH. Angiogenic biomarkers in preeclampsia. *Obstet Gynecol*. 2024;143(4):515–523. doi:10.1097/AOG.0000000000005532
7. Greenland P, Segal MR, McNeil RB, et al. Large-scale proteomics in early pregnancy and hypertensive disorders of pregnancy. *JAMA Cardiol*. 2024;9(9):791–799. doi:10.1001/jamacardio.2024.1621
8. Briller JE. Echocardiographic screening in hypertensive pregnancy disorders: probing the window of opportunity. *J Am Coll Cardiol*. 2022;80(15):1477–1479. doi:10.1016/j.jacc.2022.08.717
9. Metoki H, Iwama N, Hamada H, et al. Hypertensive disorders of pregnancy: definition, management, and out-of-office blood pressure measurement. *Hypertens Res*. 2022;45(8):1298–1309. doi:10.1038/s41440-022-00965-6
10. Cífková R. Hypertension in pregnancy: a diagnostic and therapeutic overview. *High Blood Press Cardiovasc Prev*. 2023;30(4):289–303. doi:10.1007/s40292-023-00582-5
11. Khedagi AM, Bello NA. Hypertensive disorders of pregnancy. *Cardiol Clin*. 2021;39(1):77–90. doi:10.1016/j.ccl.2020.09.005
12. Zhang H, Wang W. Risk factors and adverse pregnancy outcomes in older pregnant women with hypertensive disorders of pregnancy. *J Obstet Gynaecol Res*. 2022;48(7):1710–1720. doi:10.1111/jog.15295
13. Yemane A, Teka H, Ahmed S, Temesgen H, Langen E. Gestational hypertension and progression towards preeclampsia in Northern Ethiopia: prospective cohort study. *BMC Pregnancy Childbirth*. 2021;21(1):261. doi:10.1186/s12884-021-03712-w
14. Sun J, Mei H, Xie S, et al. The interactive effect of pre-pregnancy overweight and obesity and hypertensive disorders of pregnancy on the weight status in infancy. *Sci Rep*. 2019;9(1):15960. doi:10.1038/s41598-019-52140-6
15. Chen D, Lao M, Zhang J, et al. Fetal and maternal outcomes of planned pregnancy in patients with systemic lupus erythematosus: a retrospective multicenter study. *J Immunol Res*. 2018;2018:2413637. doi:10.1155/2018/2413637
16. Maner-Smith KM, Ferranti E, Dunlop A, Corwin E, Ortlund EA. African American Women with cardiometabolic complications of pregnancy have decreased serum abundance of specialized pro-resolving lipid mediators and endocannabinoids. *Nutrients*. 2022;15(1):140. doi:10.3390/nu15010140
17. Xue Y, Yang N, Ma L, Gu X, Jia K. Predictive value of the complement factors B and H for women with gestational diabetes mellitus who are at risk of preeclampsia. *Pregnancy Hypertens*. 2022;30:210–214. doi:10.1016/j.preghy.2022.10.010
18. Jung SH, Kim H, Jung YM, et al. Healthy lifestyle reduces cardiovascular risk in women with genetic predisposition to hypertensive disorders of pregnancy. *Nat Commun*. 2025;16(1):1463. doi:10.1038/s41467-025-56107-2
19. Bailey B, Euser AG, Bol KA, Julian CG, Moore LG. High-altitude residence alters blood-pressure course and increases hypertensive disorders of pregnancy. *J Matern Fetal Neonatal Med*. 2022;35(7):1264–1271. doi:10.1080/14767058.2020.1745181
20. Li X, Tian Z, Cui R, et al. Association between pregestational vaginal dysbiosis and incident hypertensive disorders of pregnancy risk: a nested case-control study. *mSphere*. 2023;8(3):e0009623. doi:10.1128/msphere.00096-23
21. Gudnadottir U, Debelius JW, Du J, et al. The vaginal microbiome and the risk of preterm birth: a systematic review and network meta-analysis. *Sci Rep*. 2022;12(1):7926. doi:10.1038/s41598-022-12007-9
22. Ohseto H, Ishikuro M, Obara T, et al. Dietary calcium intake was related to the onset of pre-eclampsia: the TMM BirThree cohort study. *J Clin Hypertens*. 2023;25(1):61–70. doi:10.1111/jch.14606

23. Wind M, Fierro JJ, Bloemenkamp KWM, et al. Pregnancy outcome predictors in systemic lupus erythematosus: a systematic review and meta-analysis. *Lancet Rheumatol*. 2024;6(10):e667–e683. doi:10.1016/S2665-9913(24)00160-7
24. Gunderson EP, Greenberg M, Sun B, et al. Early pregnancy systolic blood pressure patterns predict early- and later-onset preeclampsia and gestational hypertension among ostensibly low-to-moderate risk groups. *J Am Heart Assoc*. 2023;12(15):e029617. doi:10.1161/JAHA.123.029617
25. Nurkkala J, Kauko A, Laivuori F, et al. Associations of polygenic risk scores for preeclampsia and blood pressure with hypertensive disorders of pregnancy. *J Hypertens*. 2023;41(3):380–387. doi:10.1097/HJH.0000000000003336
26. Stepan H, Galindo A, Hund M, et al. Clinical utility of sFlt-1 and PlGF in screening, prediction, diagnosis and monitoring of pre-eclampsia and fetal growth restriction. *Ultrasound Obstet Gynecol*. 2023;61(2):168–180. doi:10.1002/uog.26032
27. Chirilă CN, Mărginean C, Ghiga DV, Voidăzan S, Chirilă PM, Gliga ML. A second trimester prediction algorithm for early-onset hypertensive disorders of pregnancy occurrence and severity based on soluble fms-like Tyrosine Kinase 1 (sFlt-1)/Placental Growth Factor (PlGF) ratio and uterine doppler ultrasound in women at risk. *Children*. 2024;11(4):468. doi:10.3390/children11040468
28. Tejaswi MS, Kanthi Mangala J, Vinya P, Bhaskaran R. Urine calcium-creatinine ratio in prediction of pre-eclampsia. *J Obstet Gynaecol India*. 2023;73(1):51–56. doi:10.1007/s13224-022-01712-0
29. Elliott PM, Anastasakis A, Borger MA, et al; Authors/Task Force members. ESC Guidelines on diagnosis and management of hypertrophic cardiomyopathy: the task force for the diagnosis and management of hypertrophic cardiomyopathy of the European society of cardiology (ESC). *Eur Heart J*. 2014;35(39):2733–2779. doi:10.1093/eurheartj/ehu284
30. Kitt J, Krasner S, Barr L, et al. Cardiac remodeling after hypertensive pregnancy following physician-optimized blood pressure self-management: the POP-HT randomized clinical trial imaging substudy. *Circulation*. 2024;149(7):529–541. doi:10.1161/CIRCULATIONAHA.123.067597
31. Poon LC, Karagiannis G, Leal A, Romero XC, Nicolaides KH. Hypertensive disorders in pregnancy: screening by uterine artery Doppler imaging and blood pressure at 11–13 weeks. *Ultrasound Obstet Gynecol*. 2009;34(5):497–502. doi:10.1002/uog.7439
32. Liu X-F, Lu -J-J, Li M-D, Li Y, Zeng A-R, Qiang J-W. Prediction of pre-eclampsia by using radiomics nomogram from gestational hypertension patients. *Front Neurosci*. 2022;16:961348. doi:10.3389/fnins.2022.961348
33. Papastefanou I, Chrelias C, Siristatidis C, Kappou D, Eleftheriades M, Kassanos D. Placental volume at 11 to 14 gestational weeks in pregnancies complicated with fetal growth restriction and preeclampsia. *Prenat Diagn*. 2018;38(12):928–935. doi:10.1002/pd.5356
34. Sarno M, Wright A, Vieira N, Sapantzoglou I, Charakida M, Nicolaides KH. Ophthalmic artery Doppler in combination with other biomarkers in prediction of pre-eclampsia at 35-37 weeks' gestation. *Ultrasound Obstet Gynecol*. 2021;57(4):600–606. Erratum in: Ultrasound Obstet Gynecol. 2022 Mar;59(3):407. doi: 10.1002/uog.24878. doi: 10.1002/uog.23517.
35. Santos J, Schenone MH, Garovic VD. Early identification of individuals at risk for hypertensive disorders of pregnancy. *JAMA Network Open*. 2023;6(9):e2334858. doi:10.1001/jamanetworkopen.2023.34858
36. van Oostwaard MF. The alarming rise in risk factors for hypertensive disorders of pregnancy. *BJOG*. 2022;129(7):1061. doi:10.1111/1471-0528.17091
37. Kuehn BM. Hypertensive disorders in pregnancy are on the rise. *JAMA*. 2022;327(24):2387. doi:10.1001/jama.2022.9510
38. Tano S, Kotani T, Ushida T, et al. Visualizing risk modification of hypertensive disorders of pregnancy: development and validation of prediction model for personalized interpregnancy weight management. *Hypertens Res*. 2025;48(3):884–893. doi:10.1038/s41440-024-02024-8
39. Marzioni D, Piani F, Di Simone N, Giannubilo SR, Ciavattini A, Tossetta G. Importance of STAT3 signaling in preeclampsia (Review). *Int J Mol Med*. 2025;55(4):58. doi:10.3892/ijmm.2025.5499
40. Tyrmi JS, Kaartokallio T, Lokki AI, et al; FINNPEC Study Group. FinnGen project, and the estonian biobank research team. genetic risk factors associated with preeclampsia and hypertensive disorders of pregnancy. *JAMA Cardiol*. 2023;8(7):674–683. doi:10.1001/jamacardio.2023.1312
41. Rayes B, Ardissino M, Slob EAW, Patel KHK, Girling J, Ng FS. Association of hypertensive disorders of pregnancy with future cardiovascular disease. *JAMA Network Open*. 2023;6(2):e230034. doi:10.1001/jamanetworkopen.2023.0034
42. Tschiderer L, Van der schouw YT, Onland-Moret NC, et al. Pregnancy associated hypertensive disorders and risk of cardiovascular disease: a mendelian randomisation study. *Eur Heart J*. 2023;44(Suppl Supplement_2):655.2726. doi:10.1093/eurheartj/ehad655.2726
43. Bedrick BS, Christianson MS. Preimplantation genetic testing and hypertensive disorders of pregnancy: is the risk real? *Fertil Steril*. 2022;117(3):571–572. doi:10.1016/j.fertnstert.2022.01.019
44. Spinelli M, Zdanowicz JA, Keller I, et al. Hypertensive disorders of pregnancy share common cfDNA methylation profiles. *Sci Rep*. 2022;12(1):19837. doi:10.1038/s41598-022-24348-6
45. Gomes VCL, Gilbert BM, Bernal C, Crissman KR, Sones JL. Estrogen and progesterone receptors are dysregulated at the BPH/5 mouse preeclamptic-like maternal-fetal interface. *Biology*. 2024;13(3):192. doi:10.3390/biology13030192
46. Parisi F, Fenizia C, Introini A, et al. The pathophysiological role of estrogens in the initial stages of pregnancy: molecular mechanisms and clinical implications for pregnancy outcome from the periconceptional period to end of the first trimester. *Hum Reprod Update*. 2023;29(6):699–720. doi:10.1093/humupd/dmad016
47. Fan L, Li N, Liu X, et al. Hormone replacement treatment regimen is associated with a higher risk of hypertensive disorders of pregnancy in women undergoing frozen-thawed embryo transfer. *Front Endocrinol*. 2023;14:1133978. doi:10.3389/fendo.2023.1133978
48. Hu X, Liao Z, Li J, Zhou Y, Guo Y, Qian K. Young women were associated with higher risk of hypertensive disorders of pregnancy and cesarean section from hormone replaced cycles in frozen-thawed embryo transfer: a retrospective study of 5316 singleton deliveries. *Front Endocrinol*. 2023;14:1238887. doi:10.3389/fendo.2023.1238887
49. Liu Y, Gao B, Zeng X, et al. Association between thyroid-stimulating hormone and maternal hemodynamics in hypertensive disorders of pregnancy: an observational study. *BMC Pregnancy Childbirth*. 2019;19(1):396. doi:10.1186/s12884-019-2556-4
50. Lenke L, Martínez de la Escalera G, Clapp C, Bertsch T, Triebel J. A dysregulation of the prolactin/vasoinhibin axis appears to contribute to preeclampsia. *Front Endocrinol*. 2020;10:893. doi:10.3389/fendo.2019.00893
51. Nakashima A, Shima T, Aoki A, et al. Molecular and immunological developments in placentas. *Hum Immunol*. 2021;82(5):317–324. doi:10.1016/j.humimm.2021.01.012
52. Aneman I, Pienaar D, Suvakov S, Simic TP, Garovic VD, McClements L. Mechanisms of key innate immune cells in early- and late-onset preeclampsia. *Front Immunol*. 2020;11:1864. doi:10.3389/fimmu.2020.01864
53. Guan S, Bai X, Ding J, Zhuang R. Circulating inflammatory cytokines and hypertensive disorders of pregnancy: a two-sample Mendelian randomization study. *Front Immunol*. 2023;14:1297929. doi:10.3389/fimmu.2023.1297929

54. Rengarajan A, Goldblatt HE, Beebe DJ, Virumbrales-Muñoz M, Boeldt DS. Immune cells and inflammatory mediators cause endothelial dysfunction in a vascular microphysiological system. *Lab Chip*. 2024;24(6):1808–1820. doi:10.1039/d3lc00824j
55. Garovic VD, Dechend R, Easterling T, et al; American Heart Association Council on Hypertension; Council on the Kidney in Cardiovascular Disease, Kidney in Heart Disease Science Committee; Council on Arteriosclerosis, Thrombosis and Vascular Biology; Council on Lifestyle and Cardiometabolic Health; Council on Peripheral Vascular Disease; and Stroke Council. Hypertension in Pregnancy: Diagnosis, Blood Pressure Goals, and Pharmacotherapy: A Scientific Statement From the American Heart Association. *Hypertension*. 2022;79(2):e21–e41. doi:10.1161/HYP.0000000000000208
56. Taeubert MJ, Wiertsema CJ, Vermeulen MJ, et al. Maternal iron status in early pregnancy and blood pressure throughout pregnancy, placental hemodynamics, and the risk of gestational hypertensive disorders. *J Nutr*. 2022;152(2):525–534. doi:10.1093/jn/nxab368
57. Albadrani M, Tobaiqi M, Al-Dubai S. An evaluation of the efficacy and the safety of home blood pressure monitoring in the control of hypertensive disorders of pregnancy in both pre and postpartum periods: a systematic review and meta-analysis. *BMC Pregnancy Childbirth*. 2023;23(1):550. doi:10.1186/s12884-023-05663-w
58. Horsley KJ, Tomfohr-Madsen LM, Ditto B, Tough SC. Hypertensive disorders of pregnancy and symptoms of depression and anxiety as related to gestational age at birth: findings from the all our families study. *Psychosom Med*. 2019;81(5):458–463. doi:10.1097/PSY.0000000000000695
59. Keenan M, Khashan AS, O'Byrne LJ, O'Keeffe GW, Al Khalaf S, Maher GM. Maternal hypertensive disorders of pregnancy and depression or anxiety in adolescence: Findings from the Millennium Cohort Study. *J Affect Disord*. 2024;347:23–28. doi:10.1016/j.jad.2023.11.042
60. Du L, Wang J-Y. Maternal hypertensive disorders of pregnancy and depression or anxiety in adolescence: more information needed. *J Affect Disord*. 2024;348:362–363. doi:10.1016/j.jad.2023.12.086
61. Li S, Tan I, Atkins E, Schutte AE, Gnanenthiran SR. The pathophysiology, prognosis and treatment of hypertension in females from pregnancy to post-menopause: a review. *Curr Heart Fail Rep*. 2024;21(4):322–336. doi:10.1007/s11897-024-00672-y
62. Ardissino M, Slob EAW, Rajasundaram S, et al. Safety of beta-blocker and calcium channel blocker antihypertensive drugs in pregnancy: a Mendelian randomization study. *BMC Med*. 2022;20(1):288. doi:10.1186/s12916-022-02483-1
63. Ogura S, Suzuki J, Suzuki H. Antihypertensive drug therapy for women with non-severe hypertensive disorders of pregnancy: a systematic review and meta-analysis. *Hypertens Res*. 2019;42(5):699–707. doi:10.1038/s41440-018-0188-0
64. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, et al; ESC Scientific Document Group. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy. *Eur Heart J*. 2018;39(34):3165–3241. doi:10.1093/eurheartj/ehy340
65. Brown MA, Magee LA, Kenny LC, et al. International Society for the Study of Hypertension in Pregnancy (ISSHP). Hypertensive Disorders of Pregnancy: ISSHP classification, diagnosis, and management recommendations for international practice. *Hypertension*. 2018;72(1):24–43. doi:10.1161/HYPERTENSIONAHA.117.10803
66. Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: executive summary: a report of the American college of cardiology/American heart association task force on clinical practice guidelines. *Circulation*. 2018;138(17):e426–e483. doi:10.1161/CIR.0000000000000597.
67. Cleary KL, Siddiq Z, Ananth CV, et al. Use of antihypertensive medications during delivery hospitalizations complicated by preeclampsia. *Obstet Gynecol*. 2018;131(3):441–450. doi:10.1097/AOG.0000000000002479
68. Regitz-Zagrosek V. 'Ten Commandments' of the 2018 ESC guidelines for the management of cardiovascular diseases during pregnancy. *Eur Heart J*. 2018;39(35):3269. doi:10.1093/eurheartj/ehy478
69. Isselbacher EM, Preventza O, Hamilton Black J 3rd, et al; Peer Review Committee Members. 2022 ACC/AHA guideline for the diagnosis and management of aortic disease: a report of the American heart association/American college of cardiology joint committee on clinical practice guidelines. *Circulation*. 2022;146(24):e334–e482. doi:10.1161/CIR.0000000000001106
70. Espinoza J, Vidaeff A, Pettker CM, Simhan H. Gestational hypertension and preeclampsia: ACOG practice bulletin, number 222. *Obstet Gynecol*. 2020;135(6):e237–e260. doi:10.1097/AOG.0000000000003891
71. Hypertensive Disorders in Pregnancy Subgroup, Chinese Society of Obstetrics and Gynecology, Chinese Medical Association. Pregnancy hypertension group of the obstetrics and gynecology branch of the chinese medical association pregnancy guidelines for diagnosis and treatment of hypertension. *Chin J Obstetrics Gynecol*. 2020;55(4):227–238.
72. Scott G, Gillon TE, Pels A, von Dadelszen P, Magee LA. Guidelines—similarities and dissimilarities: a systematic review of international clinical practice guidelines for pregnancy hypertension. *Am J Obstet Gynecol*. 2022;226(2):S1222–S1236. doi:10.1016/j.ajog.2020.08.018
73. Bateman BT, Heide-Jørgensen U, Einarsdóttir K, et al. β-blocker use in pregnancy and the risk for congenital malformations: an international cohort study. *Ann Intern Med*. 2018;169(10):665–673. doi:10.7326/M18-0338
74. Abalos E, Duley L, Steyn DW, Gialdini C. Antihypertensive drug therapy for mild to moderate hypertension during pregnancy. *Cochrane Database Syst Rev*. 2018;10(10):CD002252. doi:10.1002/14651858.CD002252.pub4
75. American College of Obstetricians and Gynecologists (ACOG), Committee on Obstetric Practice. ACOG committee opinion No. 767: emergent therapy for acute-onset, severe hypertension during pregnancy and the postpartum period. *Obstet Gynecol*. 2019;133(2):e174–e180. doi:10.1097/AOG.0000000000003075
76. Cífková R, Johnson MR, Kahan T, et al. Peripartum management of hypertension: a position paper of the ESC council on hypertension and the European Society of Hypertension. *Eur Heart J Cardiovasc Pharmacother*. 2020;6(6):384–393. doi:10.1093/ehjcvp/pvz082
77. Tamargo J, Caballero R, Delpón E. Pharmacotherapy for hypertension in pregnant patients: special considerations. *Expert Opin Pharmacother*. 2019;20(8):963–982. doi:10.1080/14656566.2019.1594773
78. Espinoza J, Vidaeff A, Pettker CM. ACOG practice bulletin No. 202: gestational hypertension and preeclampsia. *Obstet Gynecol*. 2019;133(1):1. doi:10.1097/AOG.0000000000003018.
79. Brown MA, Magee LA, Kenny LC, et al. The hypertensive disorders of pregnancy: ISSHP classification, diagnosis & management recommendations for international practice. *Pregnancy Hypertens*. 2018;13:291–310. doi:10.1016/j.preghy.2018.05.004
80. Duley L, Meher S, Jones L. Drugs for treatment of very high blood pressure during pregnancy. *Cochrane Database Syst Rev*. 2013;2013(7):CD001449. doi:10.1002/14651858.CD001449.pub3
81. Martinez A, Lakkimsetti M, Maharjan S, et al. Beta-blockers and their current role in maternal and neonatal health: a narrative review of the literature. *Cureus*. 2023;15(8):e44043. doi:10.7759/cureus.44043

82. Katsi V, Papakonstantinou IP, Papazachou O, Makris T, Tsioufis K. Beta-blockers in pregnancy: clinical update. *Curr Hypertens Rep*. 2023;25(2):13–24. doi:10.1007/s11906-023-01234-8
83. Easterling T, Mundle S, Bracken H, et al. Oral antihypertensive regimens (nifedipine retard, labetalol, and methyldopa) for management of severe hypertension in pregnancy: an open-label, randomised controlled trial. *Lancet*. 2019;394(10203):1011–1021. doi:10.1016/S0140-6736(19)31282-6
84. Sanusi AA, Leach J, Boggess K, et al. Pregnancy outcomes of nifedipine compared with labetalol for oral treatment of mild chronic hypertension. *Obstet Gynecol*. 2024;144(1):126–134. doi:10.1097/AOG.0000000000005613
85. Bellos I, Pergialiotis V, Papapanagiotou A, Loutradis D, Daskalakis G. Comparative efficacy and safety of oral antihypertensive agents in pregnant women with chronic hypertension: a network metaanalysis. *Am J Obstet Gynecol*. 2020;223(4):525–537. doi:10.1016/j.ajog.2020.03.016
86. van der Zande JA, Ramlakhan KP, Prokselj K, et al. ROPAC investigators. ACE inhibitor and angiotensin receptor blocker use during pregnancy: data from the ESC Registry Of Pregnancy and Cardiac Disease (ROPAC). *Am J Cardiol*. 2024;230:27–36. doi:10.1016/j.amjcard.2024.08.004
87. Buawangpong N, Teekachunhatean S, Koonrungsesomboon N. Adverse pregnancy outcomes associated with first-trimester exposure to angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers: a systematic review and meta-analysis. *Pharmacol Res Perspect*. 2020;8(5):e00644. doi:10.1002/prp2.644
88. Antza C, Dimou C, Doundoulakis I, et al. The flipside of hydralazine in pregnancy: a systematic review and meta-analysis. *Pregnancy Hypertens*. 2020;19:177–186. doi:10.1016/j.preghy.2020.01.011
89. Shanmugalingam R, Barrett HL, Beech A, et al. A summary of the 2023 Society of Obstetric Medicine of Australia and New Zealand (SOMANZ) hypertension in pregnancy guideline. *Med J Aust*. 2024;220(11):582–591. doi:10.5694/mja2.52312
90. van de Vusse D, Mian P, Schoenmakers S, et al. Pharmacokinetics of the most commonly used antihypertensive drugs throughout pregnancy methyldopa, labetalol, and nifedipine: a systematic review. *Eur J Clin Pharmacol*. 2022;78(11):1763–1776. doi:10.1007/s00228-022-03382-3
91. Bajpai D, Popa C, Verma P, Dumanski S, Shah S. Evaluation and management of hypertensive disorders of pregnancy. *Kidney360*. 2023;4(10):1512–1525. doi:10.34067/KID.0000000000000228
92. Shoemaker CT, Meyers M. Sodium nitroprusside for control of severe hypertensive disease of pregnancy: a case report and discussion of potential toxicity. *Am J Obstet Gynecol*. 1984;149(2):171–173. doi:10.1016/0002-9378(84)90192-3
93. Behrens I, Basit S, Melbye M, et al. Risk of post-pregnancy hypertension in women with a history of hypertensive disorders of pregnancy: nationwide cohort study. *BMJ*. 2017;358:j3078. doi:10.1136/bmj.j3078
94. Stempel JE, O'Grady JP, Morton MJ, Johnson KA. Use of sodium nitroprusside in complications of gestational hypertension. *Obstet Gynecol*. 1982;60(4):533–538.
95. Yang Z, Zhao J. Effectiveness of placental blood perfusion monitoring of nitroglycerin and labetalol in treatment of women with pregnancy-induced hypertension. *Afr J Reprod Health*. 2025;29(2):61–68. doi:10.29063/ajrh2025/v29i2.7
96. Sridharan K, Sequeira RP. Drugs for treating severe hypertension in pregnancy: a network meta-analysis and trial sequential analysis of randomized clinical trials. *Br J Clin Pharmacol*. 2018;84(9):1906–1916. doi:10.1111/bcp.13649
97. Fishel Bartal M, Blackwell SC, Pedroza C, et al. Oral combined hydrochlorothiazide and lisinopril vs nifedipine for postpartum hypertension: a comparative-effectiveness pilot randomized controlled trial. *Am J Obstet Gynecol*. 2023;228(5):571.e1–571.e10. doi:10.1016/j.ajog.2023.01.015