

The Management of Hypertension in Pregnancy

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Hypertensive pregnancy disorders complicate 6% to 8% of pregnancies and cause significant maternal and fetal morbidity and mortality. The goal of treatment is to prevent significant cerebrovascular and cardiovascular events in the mother without compromising fetal well-being. Current guidelines differentiate between the treatment of women with acute hypertensive syndromes of pregnancy and women with preexisting chronic hypertension in pregnancy. This review will address the management of hypertension in pregnancy, review the various pharmacologic therapies, and discuss the future directions in this field.

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Introduction

Hypertensive pregnancy disorders cover a spectrum of conditions, including preeclampsia/eclampsia, gestational hypertension, chronic hypertension, and preeclampsia superimposed on chronic hypertension (Table 1). According to the National High Blood Pressure Education Program (NHBPEP) Working Group Report on High Blood Pressure in Pregnancy, hypertension occurs in 6% to 8% of pregnancies in the United States.¹ Hypertensive pregnancy disorders represent the most significant complications of pregnancy and contribute significantly to maternal and perinatal morbidity and mortality.² Most of the current recommendations for the treatment of these disorders are based on expert opinion and observational studies with a lack of evidence from randomized controlled trials. The overall strategy in the treatment of hypertension in pregnancy is to prevent maternal cerebrovascular and cardiac complications while preserving the uteroplacental and fetal circulation and limiting medication toxicity to the fetus.

Treatment strategies fall into 2 general categories: the management of acute hypertensive syndromes of pregnancy (eg, preeclampsia/eclampsia) and the management of chronic hypertension. Although the definitive treatment for acute hypertensive syndromes of pregnancy is delivery, expectant management with close observation may be appropriate in carefully selected patients, especially before 32 weeks gestation. Women with chronic hypertension should ideally be evaluated before pregnancy, with a focus on the presence of end-organ damage, evidence of secondary causes of hypertension (eg, renal artery stenosis due to fibromuscular dysplasia, primary hyperaldosteronism, and pheochromocytoma), medication adjustments, and counseling regarding the risks of preeclampsia and adverse fetal events.

Women with hypertensive pregnancy disorders should have a comprehensive plan of care, which includes prenatal counseling, frequent visits during pregnancy, timely delivery, appropriate intrapartum monitoring and care, and postpartum follow-up. Care of these patients involves counseling at every step of

the pregnancy to ensure that the woman is aware of the risks to her and her fetus, such that she can make informed decisions.

Blood Pressure Measurement

Hypertension in pregnancy is defined as a systolic blood pressure (SBP) of 140 mmHg or more and a diastolic BP (DBP) of 90 mmHg or more on two separate measurements at least 4 to 6 hours apart. However, the diagnosis of hypertension, in pregnancy or otherwise, requires first and foremost an accurate measurement of blood pressure (BP). Many automated BP cuffs have not been tested during pregnancy; therefore, obtaining a manual BP is the preferred technique. The 2000 NHBPEP Working Group Report on High Blood Pressure in Pregnancy recommends that the Korotkoff phase V (disappearance) sound be used to determine the DBP.¹ In the outpatient setting, proper BP technique is essential and includes the subject being in a seated position, legs uncrossed, back supported, and no tobacco or caffeine for 30 minutes prior. In recumbent, hospitalized patients, the provider should measure the BP in the left lateral decubitus position to minimize the BP change caused by the compression of the inferior vena cava by the gravid uterus.

BP measurements should be interpreted in the context of the stage of pregnancy and the expected changes in BP

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for each trimester. BP drops during the first and second trimesters, nadirs at approximately 20 weeks of gestation, and returns to preconception levels by the third trimester. Women who have not had regular medical care before pregnancy may be labeled as having “gestational hypertension” on the basis of elevated BPs in the third trimester when in reality they were hypertensive before pregnancy, which was masked by the physiologic changes during midpregnancy. If a woman has gestational hypertension that does not resolve after delivery, she will subsequently be diagnosed as having chronic hypertension.

Ambulatory blood pressure monitoring (ABPM) and the hyperbaric index (HBI) have been suggested as alternative methods for diagnosing elevated BP in pregnancy.³ The HBI is defined as the amount of BP excess during a given time period above a 90% tolerance limit, with units of mmHg $\times$ hours. One promising study suggested that HBI calculated from a 48-hour ABPM performed in the first trimester had a 93% sensitivity and 100% specificity for predicting preeclampsia,⁴ although other researchers have not been able to replicate this high degree of accuracy and reliability.^{5,6} There is currently no official role of ABPM in the diagnosis of hypertensive pregnancy disorders.⁷ Home monitoring of BP by automated cuffs in pregnancy has not been validated, and some monitors have been shown to be inaccurate in pregnancy; therefore, in-office, manual BPs remain the gold standard for the diagnosis and monitoring of hypertension in pregnancy.^{8,9} This may involve frequent outpatient visits, especially in those with severe hypertension.

BP Management in Pregnancy

Hypertension in Preeclamptic Patients

The NHBPEP Working Group Report on High Blood Pressure in Pregnancy and the American College of Obstetrics and Gynecology (ACOG) guidelines recommend treatment in preeclampsia when the DBP is persistently above 105 to 110 mmHg,¹ but there is no official recommendation regarding a SBP threshold for treatment. Most experts agree that pharmacologic therapy should be initiated when the BP approaches 150/100 mmHg,¹⁰ and the goal is to prevent cerebral and cardiovascular events in the mother. If a woman

has mild preeclampsia (DBP < 100 mmHg) with normal laboratory tests, other than low-level proteinuria, management as an outpatient can be appropriate provided that there are frequent outpatient visits and that fetal nonstress testing is favorable. The frequency of formal ultrasound testing depends on the clinical condition and is at the discretion of an obstetrician. In the setting of severe preeclampsia that is being managed expectantly in the hospital, daily ultrasounds for fetal well-being may be indicated.

Although treatment of hypertension may improve the risk profile of the mother, and therefore delay delivery, it does not cure preeclampsia, nor does it delay the progression to preeclampsia.¹¹ The diagnosis of severe preeclampsia includes more than 1 of the following criteria: severe hypertension (defined as DBP > 100 mmHg), nephrotic range proteinuria, oliguria, cerebral or visual disturbances, pulmonary edema, epigastric or right upper

quadrant pain, impaired liver function, thrombocytopenia, or fetal growth restriction. The only definitive therapy for preeclampsia is delivery. When urgent control of BP is necessary, or when delivery is expected within the next 48 hours, intravenous agents, such as labetalol or hydralazine, are the drugs of choice. Oral agents may be considered if delivery is not imminent, and the choices of medications will be discussed further below.

Eclampsia may occur in the absence of gestational hypertension or preeclampsia, complicating up to 0.3% of all deliveries.¹² Magne-

sium sulfate has been shown to decrease the risk of eclampsia and maternal death without evidence of significant harm to the mother or baby.¹³ Therefore, intravenous magnesium sulfate should be administered for seizure prophylaxis during delivery and for 24 hours after delivery. The rate of continuous infusion, but not the loading dose, should be decreased for women with kidney failure (because magnesium is renally excreted), and serum magnesium should be checked every 1 to 2 hours, as compared to women with normal kidney function, for whom the level can be checked every 4 to 6 hours.

Timing of Delivery

The decision regarding the timing of delivery should be made after a careful assessment of the risks to the fetus and the mother. In appropriately selected patients,

CLINICAL SUMMARY

- Hypertensive pregnancy disorders complicate 6% to 8% of pregnancies in the United States.
- The strategy for the treatment of hypertension in pregnancy is to prevent maternal cerebrovascular and cardiac complications while preserving uteroplacental blood flow and limiting medication toxicity to the fetus.
- The definitive therapy for acute hypertensive syndromes of pregnancy is delivery, although antihypertensive medications are often necessary to lower the blood pressure in the mother to prevent maternal complications and decrease neonatal complications related to prematurity by allowing for the continuation of pregnancy.
- Women with chronic hypertension should have a prenatal visit that includes an evaluation for secondary causes of hypertension, medication adjustments, and counseling regarding the high risk of developing preeclampsia.

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