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WOMEN'S HEALTH CARE PHYSICIANS

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Clinical Management Guidelines for Obstetrician–Gynecologists

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For a comprehensive overview of these recommendations, the full-text version of this Practice Bulletin is available at http://dx.doi.org/10.1097/AOG.0000000000003020.

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Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics in collaboration with Alex Vidaeff, MD, MPH; Jimmy Espinoza, MD, MSc; Hyagriv Simhan, MD; and Christian M. Pettker, MD.

Chronic Hypertension in Pregnancy

Chronic hypertension is present in 0.9–1.5% of pregnant women (1) and may result in significant maternal, fetal, and neonatal morbidity and mortality. The rate of maternal chronic hypertension increased by 67% from 2000 to 2009, with the largest increase (87%) among African American women. This increase is largely secondary to the obesity epidemic and increasing maternal age (1, 2). The trend is expected to continue.

The purpose of this document is to clarify the criteria used to define and diagnose chronic hypertension before or during pregnancy, to review the effects of chronic hypertension on pregnancy and vice versa, and to appraise the available evidence for management options. The purpose of these revised best practice recommendations is to provide a rational approach to chronic hypertension in pregnancy based on new research data and relevant pathophysiologic and pharmacologic considerations.

Clinical Management Questions

- *What considerations are important for prepregnancy counseling in patients with chronic hypertension?*
- *Which clinical tests are useful in the initial evaluation of a pregnant woman with chronic hypertension?*
- *When is evaluation for secondary hypertension appropriate, and what is that evaluation?*
- *What treatments should be used for pregnant women with chronic hypertension, and what are the goals of treatment?*
- *What is the role for low-dose aspirin in patients with chronic hypertension in pregnancy?*
- *Is there a role for fetal surveillance in pregnancies complicated by chronic hypertension?*
- *Are there intrapartum concerns unique to pregnant women with chronic hypertension?*
- *How is chronic hypertension distinguished from superimposed preeclampsia?*
- *When is delivery of a woman with chronic hypertension indicated?*
- *What are the postpartum considerations and recommendations in patients with chronic hypertension?*

[Box 2] Tests for Baseline Evaluation for Chronic Hypertension in Pregnancy

Serum aspartate aminotransferase and alanine aminotransferase
Serum creatinine
Serum electrolytes (specifically potassium)
Blood urea nitrogen
Complete blood count
Spot urine protein/creatinine ratio or 24-hour urine for total protein and creatinine (to calculate creatinine clearance) as appropriate
Electrocardiogram or echocardiogram as appropriate

Clinical Considerations and Recommendations

The following recommendation is based on good and consistent scientific evidence (Level A):

- For women with chronic hypertension, it is recommended to initiate daily low-dose aspirin (81mg) between 12 weeks and 28 weeks of gestation (optimally before 16 weeks) and to continue this therapy until delivery.

The following recommendations are based on limited or inconsistent scientific evidence (Level B):

- Initiation of antihypertensive therapy is recommended for persistent chronic hypertension when systolic pressure is 160 mm Hg or more, diastolic pressure is 110 mm Hg or more, or both. In the setting of comorbidities or underlying impaired renal function, treating at lower blood pressure thresholds may be appropriate.
- For the long-term treatment of pregnant women who require pharmacologic therapy, labetalol or nifedipine are reasonable options and are recommended above all other antihypertensive drugs. The use of angiotensin-converting-enzyme inhibitors, angiotensin receptor blockers, renin inhibitors, and mineralocorticoid receptor antagonists is generally not recommended.
- Antihypertensive treatment should be initiated expeditiously for acute-onset severe hypertension (systolic blood pressure of 160 mm Hg or more or diastolic blood pressure of 110 mm Hg or more, or both) that is confirmed as persistent (15 minutes or more). The available literature suggests that antihypertensive agents should be administered within 30–60 minutes. However, it is recommended to administer antihypertensive therapy as soon as reasonably possible after the criteria for acute-onset severe hypertension are met.

[Table 2] Common Oral Antihypertensive Agents in Pregnancy

Drug	Dosage	Comments
Labetalol	200–2,400 mg/d orally in two to three divided doses. Commonly initiated at 100–200 mg twice daily	Potential bronchoconstrictive effects. Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.
Nifedipine	30–120 mg/d orally of an extended-release preparation. Commonly initiated at 30–60 mg once daily (extended-release)	Do not use sublingual form. Immediate-release formulation should generally be reserved for control of severe, acutely elevated blood pressures in hospitalized patients. Should be avoided in tachycardia.
Methyldopa	500–3000 mg/d orally in two to four divided doses. Commonly initiated at 250 mg twice or three times daily	Safety data up to 7 years of age in offspring. May not be as effective as other medications, especially in control of severe hypertension. Use limited by side effect profile (sedation, depression, dizziness).
Hydrochlorothiazide	12.5–50 mg daily	Second-line or third-line agent

[Table 3] Antihypertensive Agents Used for Urgent Blood Pressure Control in Pregnancy

Drug	Dosage	Comments	Onset of Action
Labetalol	10–20 mg IV, then 20–80 mg every 10–30 minutes to a maximum cumulative dosage of 300 mg; or constant infusion 1–2 mg/min IV	Tachycardia is less common and fewer adverse effects than other agents. Avoid in women with asthma, preexisting myocardial disease, decompensated cardiac function, and heart block and bradycardia.	1–2 minutes
Hydralazine	5 mg IV or IM, then 5–10 mg IV every 20–40 minutes to a maximum cumulative dosage of 20 mg; or constant infusion of 0.5–10mg/hr	Higher or frequent dosage associated with maternal hypotension, headaches, and abnormal fetal heart rate tracings; may be more common than other agents.	10–20 minutes
Nifedipine (immediate release)	10–20 mg orally, repeat in 20 minutes if needed; then 10–20 mg every 2–6 hours; maximum daily dose is 180 mg	May observe reflex tachycardia and headaches.	5–10 minutes

Abbreviations: IM, intramuscularly; IV, intravenously.

- For women with chronic hypertension and with no additional maternal or fetal complications supporting earlier delivery,
  - if not prescribed maintenance antihypertensive medications, delivery before 38 0/7 weeks of gestation is not recommended.
  - if prescribed maintenance antihypertensive medications, delivery before 37 0/7 weeks of gestation is not recommended.
- Women with severe acute hypertension that is not controlled with traditional chronic antihypertensive regimens or women who develop superimposed preeclampsia with severe features should be delivered upon diagnosis at 34 0/7 weeks of gestation or more. Because of the significant maternal–fetal and maternal–neonatal morbidity, immediate delivery after maternal stabilization is recommended if any of the following are present at any gestational age in women with superimposed preeclampsia: uncontrollable severe hypertension, eclampsia, pulmonary edema, disseminated intravascular coagulation, new or increasing renal insufficiency, placental abruption, or abnormal fetal testing.
- Women who develop superimposed preeclampsia with severe features before 34 0/7 weeks of gestation may be candidates for expectant management under certain circumstances, although expectant management is not recommended beyond 34 0/7 weeks of gestation. In these cases, inpatient management is recommended and should be undertaken only at facilities with adequate maternal and neonatal intensive care resources.

The following recommendations are based primarily on consensus and expert opinion (Level C):

- A woman with chronic hypertension should be evaluated prepregnancy to identify possible end-organ involvement, to consider evaluation for secondary hypertension, and for the optimization of maternal comorbidities (eg, obesity, diabetes) before pregnancy.
- It is recommended to maintain blood pressure levels for pregnant women with chronic hypertension treated with antihypertensive medications at or above 120 mm Hg but below 160 mm Hg systolic and at or above 80 mm Hg but below 110 mm Hg diastolic.
- Antenatal fetal testing is recommended for women with chronic hypertension complicated by issues such as the need for medication, other underlying medical conditions that affect fetal outcome, any evidence of fetal growth restriction, or superimposed preeclampsia.
- The risks of fetal growth restriction in patients with chronic hypertension warrant third trimester ultrasound assessment of fetal growth, with subsequent evaluation as appropriate.
- In cases of diagnostic uncertainty in discriminating transient blood pressure increases in chronic hypertension from superimposed preeclampsia, particularly with severe-range blood pressures, initial surveillance in the hospital setting is recommended. Work-up should include evaluation of hematocrit, platelets, creatinine, and liver function tests as well as assessment of new-onset proteinuria. Serum uric acid may be a helpful

marker. Elevated hematocrit (indicating hemoconcentration), thrombocytopenia, hyperuricemia, new-onset or worsening proteinuria, elevated serum creatinine, and elevated liver transaminases are more indicative of preeclampsia than chronic hypertension, and, from a practical point of view, the practitioner should think preeclampsia first. Fetal well-being should be assessed as appropriate with fetal heart rate monitoring and sonography. Often, serial blood pressure assessment during 4–8 hours can be helpful in discriminating acute and serious increases in blood pressure from transient hypertension.

▶ In women with superimposed preeclampsia without severe features and with stable maternal and fetal conditions, expectant management until 37 0/7 weeks of gestation with close maternal and fetal surveillance is suggested.

References

1. Bateman BT, Bansil P, Hernandez-Diaz S, Mhyre JM, Callaghan WM, Kuklina EV. Prevalence, trends, and outcomes of chronic hypertension: a nationwide sample of delivery admissions. Am J Obstet Gynecol 2012; 206:134.e1–8.
2. Martin JA, Hamilton BE, Ventura SJ, Osterman MJ, Kirmeyer S, Mathews TJ, et al. Births: final data for 2009. Natl Vital Stat Rep 2011;60:1–70.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force. Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

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