CHRONIC HYPERTENSION IN PREGNANCY

Laurence E. Shields MD, Marian Regional Medical Center/Dignity Health

BACKGROUND:

The prevalence of chronic hypertension in the child-bearing age population has been reported to vary from 0.6% to greater than 22% depending on the age, BMI, and ethnicity of the patient, with about 1-5% of pregnant women having chronic hypertension.[1,2] The rate of chronic hypertension in the pregnant population has increased significantly since 1999.[2] This increased incidence of chronic hypertension has been attributed to increasing maternal age, along with increased rates of obesity and diabetes. Pregnancies complicated by chronic hypertension are at increased risk for a variety of maternal complications[3] including superimposed preeclampsia[4,5], pulmonary edema, placental abruption, acute renal failure, cerebral vascular accidents, stroke, and maternal death.[2,6] The rate of many complications associated with superimposed preeclampsia appear to be similar to those noted with severe preeclampsia.[7]

Among women who died from a pregnancy-related cause in California between 2002-2004, 17% (N=25/145) died from preeclampsia. Among this cohort of pregnancy-related deaths, the true burden of hypertension was significantly higher.[8] Fifty-seven of 145, or 39% of the women who died during pregnancy were noted to have hypertension during the prenatal period, at labor and delivery, or postpartum. This is five-to-six times higher than in the general obstetrical population in California, suggesting hypertension is a significant comorbidity for pregnancy-related deaths. Patients with a history of chronic hypertension also represented a significant percentage of those patients whom died from cardiomyopathy.

Chronic hypertension during pregnancy is defined as blood pressure (mm Hg) ≥ 140 systolic or ≥ 90 diastolic, prior to the 20th week of pregnancy (Table 1).[9,10] It is preferable to identify chronic hypertension prior to 12 weeks gestation, in part because the normal nadir of maternal blood pressure during pregnancy occurs at approximately 16-18 weeks. As a result, it is possible that a patient presenting with second trimester blood pressures slightly below the 140/90 cut-off for the diagnosis of chronic hypertension may in fact have mild to moderate chronic hypertension. Most national committees divide the severity of hypertension into mild or severe categories. The majority (90%) of patients diagnosed with chronic hypertension will have essential hypertension. (See Table 1, pg. 41) The remaining 10% will have a secondary cause of the hypertension and patients presenting with severe hypertension first diagnosed in early pregnancy should be evaluated for secondary causes (pheochromocytoma, primary aldosteronism, Cushing Syndrome, sleep apnea, methamphetamine use, renal artery stenosis).[1,11] As a result, it is possible that a patient's chronic hypertension increases with the risk for the development of superimposed preeclampsia and the presence of proteinuria at initial evaluation also increases the risk of adverse pregnancy outcomes.[4] The most severe adverse outcomes

of pregnancy related to hypertension (i.e., stroke and cerebral vascular accidents) are most closely associated with systolic hypertension above 155-160 mm Hg.[12]

The most effective therapeutic approach to women with chronic hypertension during pregnancy is controversial. Treatment trials have been limited in size and yielded mixed results. Many experts argue that treatment of hypertension outside of pregnancy is directed towards reducing the longer-term risk of cerebral vascular and cardiac events, and the duration of pregnancy is unlikely to influence these outcomes in patients with mild chronic hypertension. Well-controlled randomized trials are limited in assisting clinicians in appropriate choices of medical therapy. Two Cochrane reviews are available detailing the results of treatment of mild and moderate chronic hypertension during pregnancy.[7,13] In these reports, the use of beta-blockers and methyldopa were both associated with reductions in progression to severe hypertension, and beta-blockers were also associated with reductions in proteinuric preeclampsia, eclampsia, and neonatal Respiratory Distress Syndrome (RDS). Other widely accepted anti-hypertensive agents in pregnancy include labetalol, hydralazine, and nifedipine; however, there are some concerns that nifedipine may be associated with a modest increased risk for the development of superimposed preeclampsia.[1,7] Neither of these reviews addresses the issue of the level of blood pressure control, and concerns have been raised that aggressive treatment may decrease placental perfusion and negatively impact fetal growth.[13]

Recommendations related to treatment have been primarily in the form of expert opinion and consensus recommendations from groups like American Congress of Obstetrics and Gynecology (ACOG), Society of Obstetricians and Gynaecologists of Canada (SOGC), and the National Institute for Health and Clinical Excellence (NICE) (Table 2). Women with chronic hypertension who are treated with medication should be closely supervised for both maternal and fetal status by a physician experienced in treating and monitoring hypertension in pregnancy.

Table 1. Diagnostic Criteria for Patients with Chronic Hypertension in Pregnancy among U.S. and Canada Organizations

Organization		Mild (mm Hg)		Severe (mm Hg)
ACOG*	Systolic Diastolic	140-159 90-109		≥ 160 ≥ 110
SOGC**	Systolic Diastolic	≥ 140 ≥ 90		≥ 160 ≥ 110
		Mild	Moderate	Severe
NICE***	Systolic Diastolic	140-149 90-99	150-159 100-109	≥ 160 ≥ 110

*American College of Obstetrics and Gynecology
**Society of Obstetricians and Gynaecologists of Canada
***National Institute for Health and Clinical Excellence (NICE)

Table 2. Treatment Recommendations for Blood Pressure (Systolic/Diastolic mm Hg) Patients with Chronic Hypertension among U.S. and Canada Organizations

Organization	Recommendation	Goal	Co-Morbidities****
ACOG*	160/105	120 -160/80-105	Not applicable
SOGC**	140-159/90-109	130-155/90-109	130-139/80-90 mm Hg
NICE***	150/100	< 150/100	< 140/90

* American College of Obstetrics and Gynecology[14]
** Society of Obstetricians and Gynaecologists of Canada
*** National Institute for Health and Clinical Excellence
****Comorbid conditions (i.e., Special circumstances) are defined as the presence of impaired renal function, pre-gestational diabetes, cardiovascular disease, SOCG 2008;30 (3) S29

KEY LEARNING POINTS

Women with chronic hypertension should receive more frequent prenatal assessments during the late second and early third trimester due to the increased rate of maternal and fetal complications. The frequency of assessment should be weekly for those with stable blood pressure control, and every 3-4 days for those that are requiring increasing dosages of blood pressure medication.

1. Women with chronic hypertension should receive antihypertensive treatment if their blood pressure is in the severe range; they should be considered for therapy if their blood pressure elevation is mild to moderate, particularly if comorbid conditions such as diabetes, collagen vascular disease, or chronic renal disease are present.

2. Women presenting for their first prenatal visit in the mid-second trimester with blood pressures that are not quite high enough for a diagnosis of chronic hypertension (e.g., 130-139/80-89 mm Hg) may in fact have chronic hypertension and should be observed more frequently for blood pressure exacerbation.

3. Cardiomyopathy should be part of the differential diagnosis and assessment for women presenting with symptoms of shortness of breath and chronic hypertension, particular if they are in a high-risk category (preexisting diabetes, collagen vascular disease, obesity, advanced maternal age, African American ethnicity, or long standing chronic hypertension).

4. Evaluation of cardiac function using echocardiography and laboratory assessment Brain Natriuretic Peptides (BNP), a test for cardiovascular disease, should be considered in these patients.

EVIDENCE GRADING
Level of Evidence: I-A, III-C

REFERENCES

1. ACOG. Chronic Hypertension in Pregnancy, Practic Bulletin #125. *Obstet Gynecol.* 2012;119:396-407.
2. Bateman BT, Bansil P, Hernandez-Diaz S, Mhyre JM, WM C, Kuklina E. Prevalence, trends, and outcomes of chronic hypertension: a nationwide sample of delivery admissions. *Am J Obstet Gynecol.* 2012;206:134 e131-138.
3. Rey E, Couturier A. The prognosis of pregnancy in women with chronic hypertension. *Am J Obstet Gynecol.* 1994;171:410-416.
4. Sibai B, Lindheimer M, Hauth J, et al. Risk factors for preeclampsia, abruptio placentae, and adverse neonatal outcomes among women with chronic hypertension. National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units. *N Engl J Med.* 1998;339:667-671.
5. Sibai B. Chronic hypertension in pregnancy. *Obstet & Gynecol.* 2002;100.
6. Kuklina E, Meikle, S., Jamieson, D., Whiteman, M., Barfield, W., Hillis, S., Posner, S. Severe Obstetric Morbidity in the US, 1998-2005. *Obstetrics and Gynecology.* 2009;113:293-299.
7. Abalos E, Duley L, Steyn D, Henderson-Smart D. Antihypertension drug therapy for mild to moderate hypertension during pregnancy (Review). *Cochrane Database Systematic Reviews 2010:10.* 2010.
8. California Department of Health Care Services Maternal Child and Adolescent Health Branch. MCAH Bulletin California: The California Pregnancy-Associated Mortality Review (CA-PAMR) Report from 2002 to 2004 Maternal Death Reviews. 2012. http://www.cdph.ca.gov/data/statistics/Documents/MO-CA-PAMR-MaternalDeathReview-2002-04.pdf.
9. ACOG Practice Bulletin No. 125: Chronic hypertension in pregnancy. *Obstetrics and Gynecology.* Feb 2012;119(2 Pt 1):396-407.
10. Barton JR, Sibai BM. Prediction and prevention of recurrent preeclampsia. *Obstet Gynecol.* 2008;112(2 PART 1):359-372.
11. ACOG. Committee Opinion no. 514: Emergent therapy for acute-onset, severe hypertension with preeclampsia or eclampsia. *Obstet Gynecol.* 2011;118:1465-1468.
12. Sibai B. Diagnosis, prevention, and management of eclampsia. *Obstet Gynecol.* 2005;105(2):402-410.
13. Magee LA, Duley L. Oral beta-blockers for mild to moderate hypertension during pregnancy (Review). *Cochrane Database of Systematic Reviews.* 2009;2009:1:CD002863.
14. ACOG. Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstet Gynecol.* 2013;122(5):1122-1131.