

Pregnancy Medical Home Program Care Pathway:

Management of women with hypertensive disorders of pregnancy

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A. Background

Preeclampsia is a leading cause of iatrogenic preterm birth. In the past, severe preeclampsia was treated by timely delivery. Current data suggest improved perinatal outcomes with expectant management of severe preeclampsia (1). The average gestational age gained with expectant management of severe preeclampsia ranges from 7-14 days (2). Women who have preeclampsia without severe features should be managed expectantly until 37 0/7 weeks of gestation (3).

B. Definitions

Definitions apply to women typically with a gestational age > 20 weeks (4).

- I. Gestational hypertension: A systolic BP \geq 140 mmHg or diastolic BP \geq 90 mmHg taken on 2 occasions >4 hours apart in the absence of proteinuria or severe features that occur after 20 weeks of gestation in a woman with previously normal blood pressure.
- II. Preeclampsia: A systolic BP \geq 140 mmHg or diastolic BP \geq 90 mmHg taken on 2 occasions > 4 hours apart with new onset proteinuria or with severe features.
- III. Severe Features
 - a. Severe Hypertension: systolic BP \geq 160mmHg or diastolic BP \geq 110 mmHg taken on 2 occasions.
 - b. Thrombocytopenia: platelet count <100,000/mm³
 - c. Impaired liver function: abnormally elevated liver enzymes (to twice normal concentration).
 - d. New onset renal insufficiency: serum creatinine > 1.1 mg/dL or doubling of the serum creatinine from baseline
 - e. Pulmonary edema
 - f. New onset visual or cerebral disturbances

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- IV. Proteinuria: >300mg of protein in a 24-hour timed urine collection or protein/creatinine ratio ≥ 0.3 mg/dL or dipstick reading of 1+ if quantitative methods not available.
- V. Chronic hypertension with superimposed preeclampsia: Onset of proteinuria in a woman with preexisting hypertension, sudden increase in proteinuria if already present in early gestation, sudden increase in hypertension or development of severe features.

C. Management of preeclampsia without severe features or chronic hypertension with superimposed preeclampsia without severe features

- I. Setting for management: Outpatient with close follow-up or inpatient in a facility with obstetrical services available. Women with preeclampsia with severe features, chronic hypertension with superimposed preeclampsia, or non-compliance should be hospitalized.
- II. Antepartum surveillance
 - a. Evaluation at least twice weekly for evidence of severe features of preeclampsia by measurement of blood pressure and review of symptoms.
 - b. Fetal testing with daily fetal kick counts and at least twice-weekly biophysical profile or non-stress test.
 - c. Weekly determination of amniotic fluid volume.
 - d. Ultrasound at 2-3 week intervals to evaluate fetal growth.
 - e. Laboratory testing for evidence of thrombocytopenia, renal insufficiency, elevated liver enzymes or hemolysis completed at diagnosis and repeated with changes in clinical characteristics or at least weekly.
 - f. Once a diagnosis of preeclampsia is established, timed urine collections are not warranted as expectant management may continue despite the severity of proteinuria.
 - g. Oral anti-hypertensive medications should only be used in those with severe hypertension.
- III. Indications for delivery
 - a. ≥ 37 0/7 weeks
 - b. Non-reassuring fetal testing
 - c. Consider consultation for any patient <37 0/7 weeks of gestation with additional clinical complications, such as PPRM, fetal growth restriction, suspected abruption
- IV. Mode of delivery
 - a. Vaginal is preferred. Cesarean deliveries are reserved for the usual obstetrical indications.
- V. Seizure prophylaxis
 - a. Data strongly support the use of intrapartum magnesium sulfate for preeclampsia with severe features. The literature for preeclampsia without severe features remains unclear.

- b. If magnesium sulfate is used for seizure prophylaxis, therapy should continue for 12-24 hours postpartum or when urine output is ≥ 150 ml per hour for 3 hours.

D. Management of gestational hypertension

- I. Close monitoring for the development of preeclampsia, particularly proteinuria
- II. Weekly nonstress test or biophysical profile
- III. Oral anti-hypertensive medications should only be used in those with severe hypertension.
- IV. Indication for delivery: Gestational age ≥ 37 0/7 weeks gestation

E. Management of preeclampsia with severe features or chronic hypertension with superimposed preeclampsia with severe features

- I. Initial evaluation and management
 - a. Maternal assessment of blood pressure and signs/symptoms of severe features
 - i. Laboratory evaluation: CBC with platelets, LFTs, creatinine
 - ii. Assess urine output, initiate 24 hour collection of urine for protein
 - iii. Antihypertensive therapy is indicated for sustained systolic BP ≥ 160 mm Hg or diastolic BP ≥ 110 mm Hg
 - iv. Magnesium sulfate for seizure prophylaxis
 - b. Fetal assessment
 - i. Continuous fetal monitoring as appropriate for gestational ages 24 0/7 – 33 6/7 weeks
 - ii. Ultrasound for estimated fetal weight and presentation
 - iii. Antenatal corticosteroids initiated prior to 34 0/7 weeks gestation
- II. Gestational dating criteria ≥ 34 0/7: delivery at hospital with appropriate level of maternal and neonatal support
- III. Gestational age < 34 0/7 weeks
 - a. Women with suspected early onset preeclampsia with severe features should be admitted for evaluation and consideration should be given to transfer to a center with appropriate level of maternal and neonatal support, including Maternal-Fetal Medicine consultation.
 - b. Patient Counseling
 - i. Patient should be counselled about management options, expectant management versus delivery
 1. Maternal risks and approximate incidence:
 - HELLP syndrome: 20%
 - Eclampsia: 2%

- Pulmonary edema: 5%
 - Acute renal failure: 2%
2. Fetal risks:
- Worsening fetal condition: 40%
 - Abruption placenta: rare
 - Fetal death: rare
- ii. Expectant management benefits the fetus by increasing gestational age at delivery, and carries some risk to the mother.
- c. Fetal death is an absolute contraindication to expectant management for severe disease in singleton pregnancies.
- d. Severe hypertension, controlled with antihypertensive medication, is not an indication for delivery prior to 34 0/7 weeks.
- e. If severe hypertension cannot be controlled with antihypertensive medication, then delivery is indicated
- f. The amount of proteinuria by itself is not an indication for delivery in women with early onset of preeclampsia with severe features.

References

1. Sibai BM. Evaluation and management of severe preeclampsia before 34 weeks' gestation. SMFM Clinical Opinion. AJOG 2011; 205(3): 191-8.
2. Magee LA, et al. Expectant management of severe preeclampsia remote from term: a structured systemic review. Hypertens Pregnancy 2009; 28(3): 312-47.
3. Sibai BM. Management of late preterm and early-term pregnancies complicated by mild gestational hypertension/pre-eclampsia. Semin Perinatol. 2011 Oct;35(5):292-6.
4. Task Force on Hypertension in Pregnancy. 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.

Note: Pregnancy Medical Home Care Pathways are intended to assist providers of obstetrical care in the clinical management of problems that can occur during pregnancy. They are intended to support the safest maternal and fetal outcomes for patients receiving care at North Carolina Pregnancy Medical Home practices. This pathway was developed after reviewing ACOG resources such as practice bulletins, committee opinions, and Guidelines for Perinatal Care as well as current obstetrical literature. PMH Care Pathways offer a framework for the provision of obstetrical care, rather than an inflexible set of mandates. Clinicians should use their professional knowledge and judgment when applying pathway recommendations to their management of individual patients.

Appendix A. Low-Dose Aspirin for the Prevention of Morbidity and Mortality from Preeclampsia

1. Women at elevated risk for preeclampsia should receive a recommendation for low-dose aspirin (81mg/day). This recommendation should be based on the presence of one or more “high risk” factors or two or more “moderate risk” factors.
 - Initiate at 12-16 weeks of gestation; may be initiated up to 28 weeks of gestation in patients with delayed entry to prenatal care
2. Definitions (adapted from U.S. Preventive Services Task Force):

High risk factors:

 - History of preeclampsia
 - Multifetal gestation
 - Chronic hypertension
 - Type I diabetes
 - Type II diabetes
 - Renal disease
 - Autoimmune disease

Moderate risk factors:

 - Nulliparity
 - African American race
 - Age 35 or older
 - Low socioeconomic status
 - >10 year interpregnancy interval
 - BMI >30
 - Mother or sister with history of preeclampsia
 - Prior low birthweight or adverse pregnancy outcome
3. U.S. Preventive Services Task Force recommends treatment for women at high risk and consideration of treatment for women with “several” moderate risk factors.
 - Number needed to treat to prevent preeclampsia = 42
 - Number needed to treat to prevent IUGR = 71
 - Number needed to treat to prevent preterm birth = 65

Reference:

LeFevre ML. Low-Dose Aspirin for the Prevention of Morbidity and Mortality from Preeclampsia: US Preventive Services Task Force Recommendation Statement. *Annals of Internal Medicine*, December 2014.

Appendix B. Patient Education Materials: Management Of Hypertensive Disorders Of Pregnancy

American College of Obstetrics and Gynecology (ACOG)

These [frequently asked questions](#) for patients are available as a website or PDF and address:

- Explanation of high blood pressure, chronic hypertension, gestational hypertension, preeclampsia and HELLP syndrome
- Risk for the patient and the fetus if preeclampsia occurs
- Signs and symptoms of preeclampsia
- A glossary of medical terms

Similar information is available from ACOG in PDF form in [Spanish](#).

March of Dimes

Included with information on [pregnancy complications](#), the March of Dimes provides an explanation of the physiology of [high blood pressure](#) during pregnancy in plain English addressing the following topics:

- What is blood pressure
- What the blood pressure numbers represent and what is considered a normal value in pregnancy
- Complications associated with high blood pressure in pregnancy including preeclampsia, premature birth, low birth weight and placental abruption
- How to manage high blood pressure during and before pregnancy

The March of Dimes also provides information on [HELLP syndrome](#) and [preeclampsia](#), accompanied by a 4-minute [video](#) featuring a provider explaining preeclampsia.

Preeclampsia Foundation

This organization provides information for patients about preeclampsia, HELLP syndrome and heart disease. It includes information about differentiating symptoms of pregnancy from symptoms of pre-eclampsia [here](#). [An animated video](#) (3 minutes) identifies the 7 preeclampsia symptoms that pregnant woman should be aware of.

For women who have experienced preeclampsia during pregnancy, the Preeclampsia Foundation includes [information](#) about how to modify lifestyle to reduce that risk. They also discuss the importance of advocating for your health by mentioning your history preeclampsia to future healthcare providers even if your experience occurred years ago or you have finished having children.

Appendix C. Provider Resources: Management of Hypertensive Disorders of Pregnancy

ACOG Task Force on Hypertension in Pregnancy

This publication reviews the evidence and recommendations for the management of gestational hypertension, preeclampsia and HELLP.

- Page 32 antenatal surveillance in preeclampsia and HELLP Syndrome
- Page 48 outlines evaluation and management of women at risk for preeclampsia recurrence
- Page 60 reviews recommendations for fetal surveillance for women with chronic hypertension

ACOG: Committee Opinion on Emergent Therapy for Acute-Onset, Severe Hypertension During Pregnancy and the Postpartum Period

This Committee Opinion includes recommended order sets for the pharmacologic management of severe hypertension during pregnancy.

California Maternal Quality Care Collaborative (CMQCC)

CMQCC published a Preeclampsia Toolkit that is available free of charge after registering with the site. Notable tools include the guide to Accurate Blood Pressure Measurement which reviews the techniques for measuring blood pressure as well as the appropriate cuff sizes by arm circumference and considerations for patients whose arm circumference exceed available cuff sizes.

NIH U.S. National Library of Medicine Medline Plus: High Blood Pressure in Pregnancy

This site includes a summary of high blood pressure in pregnancy with sections including current news relevant to high blood pressure in pregnancy and links to pertinent clinical trial sites. The site provides patient education materials in English and Spanish including:

- Preeclampsia (Spanish): Includes images accompanying key terms for blood pressure, edema and weight gain to aid in counseling patients. A 30 second animation, available in English and Spanish, explains the link between preeclampsia and the placenta.

Perinatology.com – UPC Ratio Calculator

This site includes multiple clinical calculators, including a Urine Protein to Creatinine Ratio (UPCR) calculator to aid in management of proteinuria.

Safe Motherhood Initiative: Severe Hypertension in Pregnancy Bundle

ACOG District II Safe Motherhood Initiative published a slide set and treatment algorithms for labetalol, hydralazine and nifedipine use in severe hypertension. The treatment algorithms and following sample checklists are available free of charge online:

- Hypertensive Emergency Checklist
- Eclampsia Checklist
- Emergency Department Postpartum Preeclampsia Checklist

UNC Center for Maternal and Infant Health

The University of North Carolina School of Medicine at Chapel Hill publishes obstetrics treatment [algorithms](#). Several pertain to management of hypertensive disorders in pregnancy, including

- [New Onset Hypertension Postpartum](#): includes table of antihypertensive medications, dosing, side effects and considerations for lactation
- [Thromboembolic Disease in Pregnancy](#): includes anticoagulation regimens for conditions at increased risk of hypertension during pregnancy.