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Committee on Obstetric Practice

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Emergent Therapy for Acute-Onset, Severe Hypertension During Pregnancy and the Postpartum Period

ABSTRACT: Acute-onset, severe systolic hypertension; severe diastolic hypertension; or both can occur in pregnant women or women in the postpartum period. Introducing standardized, evidence-based clinical guidelines for the management of patients with preeclampsia and eclampsia has been demonstrated to reduce the incidence of adverse maternal outcomes. Individuals and institutions should have mechanisms in place to initiate the prompt administration of medication when a patient presents with a hypertensive emergency. Once the hypertensive emergency is treated, a complete and detailed evaluation of maternal and fetal well-being is needed with consideration of, among many issues, the need for subsequent pharmacotherapy and the appropriate timing of delivery.

Risk reduction and successful, safe clinical outcomes for women with preeclampsia or eclampsia require appropriate and prompt avoidance and management of severe systolic and severe diastolic hypertension (1). Integrating standardized order sets into everyday safe practice in the United States is a challenge. Increasing evidence indicates that standardization of care improves patient outcomes (2). Introducing standardized, evidence-based clinical guidelines for the management of patients with preeclampsia and eclampsia has been demonstrated to reduce the incidence of adverse maternal outcomes (3, 4).With the advent of pregnancy hypertension guidelines in the United Kingdom, care of maternity patients with preeclampsia or eclampsia improved significantly and maternal mortality rates decreased because of a reduction in cerebral and respiratory complications (5, 6). Individuals and institutions should have mechanisms in place to initiate the prompt administration of medication when a patient presents with a hypertensive emergency (7). The use of checklists may be a useful tool to facilitate this process. This document revises Committee Opinion Number 514, *Emergent Therapy for Acute-Onset, Severe Hypertension With Preeclampsia or Eclampsia*, primarily to include nifedipine as a first-line therapy option for acute-onset, severe hypertension during pregnancy and the postpartum period.

Acute-onset, severe systolic (greater than or equal to 160 mm Hg) hypertension; severe diastolic (greater than or equal to 110 mm Hg) hypertension; or both can occur in pregnant women or women in the postpartum period. This can occur in the second half of gestation in women not known to have chronic hypertension who develop sudden, severe hypertension (ie, with preeclampsia, gestational hypertension, or HELLP [hemolysis, elevated liver enzymes, and low platelet count] syndrome) but also can occur among patients with chronic hypertension who are developing superimposed preeclampsia with acutely worsening, difficult to control, severe hypertension. Acute-onset, severe hypertension that is accurately measured using standard techniques and is persistent for 15 minutes or more is considered a hypertensive emergency. It is well known that severe hypertension can cause central nervous system injury. Two thirds of the maternal deaths in the most recent *Confidential Enquiries* report from the United Kingdom for 2003–2005 resulted from either cerebral hemorrhage or infarction (5). The degree of systolic hypertension (as opposed to the level of diastolic hypertension or relative increase or rate of increase of mean arterial pressure from baseline levels) may be the most important predictor of cerebral injury and infarction. In a case series of 28 women with severe preeclampsia and stroke, all but one woman had severe systolic hypertension just before a hemorrhagic stroke, and 54% died, whereas only 13% had severe diastolic hypertension in the hours preceding a stroke (8). A similar relationship between severe systolic

hypertension and risk of hemorrhagic stroke has been observed in nonpregnant adults (9). Thus, systolic blood pressure (BP) of 160 mm Hg or greater widely is included as part of the definition of severe hypertension in pregnant women or women in the postpartum period (10).

Pregnant women or women in the postpartum period with acute-onset, severe systolic hypertension; severe diastolic hypertension; or both require antihypertensive therapy. The goal is not to normalize BP, but to achieve a range of 140–150/90–100 mm Hg in order to prevent repeated, prolonged exposure of the patient to severe systolic hypertension, with subsequent loss of cerebral vasculature autoregulation. When this happens, maternal stabilization should occur before delivery, even in urgent circumstances (11). When acute-onset, severe hypertension is diagnosed in the office setting, the patient should be expeditiously sent to the hospital for treatment. Also, if transfer to a tertiary center is likely (eg, for preterm severe preeclampsia), BP should be stabilized and other measures initiated as appropriate, such as magnesium sulfate before transfer. Another risk for severe hypertension is endotracheal intubation, an intervention that is well known to increase BP sometimes to severe levels that require emergent therapeutic intervention (11). Induction of general anesthesia and intubation should never be undertaken without first taking steps to eliminate or minimize the hypertensive response to intubation. Close maternal and fetal monitoring by the physician and nursing staff are advised during the treatment of acute-onset, severe hypertension and judicious fluid administration is recommended even in the case of oliguria. After initial stabilization, the team should monitor BP closely and institute maintenance therapy as needed.

Recommendations

First-Line Therapy

Intravenous (IV) labetalol and hydralazine have long been considered first-line medications for the management of acute-onset, severe hypertension in pregnant women and women in the postpartum period. Although, relatively less information currently exists for the use of calcium channel blockers for this clinical indication, the evidence available suggests that oral nifedipine also may be considered as a first-line therapy (12–15). Some studies have shown that women who received oral nifedipine had their BP lowered more quickly than with either IV labetolol or hydralazine, and had a significant increase in urine output (12, 16). Concern for neuromuscular blockade and severe hypotension with the contemporaneous use of nifedipine and magnesium sulfate were not substantiated in a large retrospective review (17). However, because both drugs are calcium antagonists, careful monitoring is advisable.

Patients may respond to one drug and not another. Magnesium sulfate is not recommended as an antihypertensive agent, but magnesium sulfate remains the drug of choice for seizure prophylaxis in severe preeclampsia and for controlling seizures in eclampsia. Box 1, Box 2, and Box 3 outline order sets for the use of labetalol, hydralazine, and nifedipine for the initial management of acute-onset, severe hypertension in women who are pregnant or in the postpartum period with preeclampsia or eclampsia (12–14, 16, 18). It is important to note differences in

Box 1. Order Set for Severe Intrapartum or Postpartum Hypertension Initial First-Line Management With Labetalol* ⇦

- Notify physician if systolic blood pressure (BP) measurement is greater than or equal to 160 mm Hg or if diastolic BP measurement is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is viable.
- If severe BP elevations persist for 15 minutes or more, administer labetalol (20 mg intravenously [IV] over 2 minutes).
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (40 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (80 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer hydralazine (10 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, obtain emergency consultation from maternal–fetal medicine, internal medicine, anesthesia, or critical care subspecialists.
- Give additional antihypertensive medication per specific order.
- Once the aforementioned BP thresholds are achieved, repeat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours.
- Institute additional BP timing per specific order.

*Please note there may be adverse effects and contraindications.

Data from National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved October 14, 2014.

Box 2. Order Set for Severe Intrapartum or Postpartum Hypertension Initial First-Line Management With Hydralazine*

- Notify physician if systolic blood pressure (BP) is greater than or equal to 160 mm Hg or if diastolic BP is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is viable.
- If severe BP elevations persist for 15 minutes or more, administer hydralazine (5 mg or 10 mg intravenously [IV] over 2 minutes).
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, administer hydralazine (10 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (20 mg IV over 2 minutes). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 10 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (40 mg IV over 2 minutes) and obtain emergency consultation from maternal–fetal medicine, internal medicine, anesthesia, or critical care subspecialists.
- Give additional antihypertensive medication per specific order.
- Once the aforementioned BP thresholds are achieved, repeat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours.
- Institute additional BP timing per specific order.

*Please note there may be adverse effects and contraindications.

Data from National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved October 14, 2014.

Box 3. Order Set for Severe Intrapartum or Postpartum Hypertension Initial First-Line Management With Oral Nifedipine*

- Notify physician if systolic blood pressure (BP) is greater than or equal to 160 mm Hg or if diastolic BP is greater than or equal to 110 mm Hg.
- Institute fetal surveillance if undelivered and fetus is viable.
- If severe BP elevations persist for 15 minutes or more, administer nifedipine† (10 mg orally).
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, administer nifedipine capsules (20 mg orally). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, administer nifedipine capsule (20 mg orally). If BP is below threshold, continue to monitor BP closely.
- Repeat BP measurement in 20 minutes and record results.
- If either BP threshold is still exceeded, administer labetalol (40 mg intravenously over 2 minutes) and obtain emergency consultation from maternal–fetal medicine, internal medicine, anesthesia, or critical care subspecialists.
- Give additional antihypertensive medication per specific order.
- Once the aforementioned BP thresholds are achieved, repeat BP measurement every 10 minutes for 1 hour, then every 15 minutes for 1 hour, then every 30 minutes for 1 hour, and then every hour for 4 hours.
- Institute additional BP timing per specific order.

*Please note there may be adverse effects and contraindications.

†Capsules should be administered orally and not punctured or otherwise administered sublingually.

Data from National Heart, Lung, and Blood Institute. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. Bethesda (MD): NHLBI; 2004. Available at: http://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Retrieved October 14, 2014.

recommended dosage intervals between these options, which reflect differences in their pharmacokinetics. Although all three medications are appropriately used for the treatment of hypertensive emergencies in pregnancy, each agent can be associated with adverse effects. Parenteral hydralazine may increase the risk of maternal hypotension (systolic BP, 90 mm Hg or less) (19). Parenteral labetalol may cause neonatal bradycardia and should be avoided in women with asthma, heart disease, or congestive heart failure (20, 21). Nifedipine has been associated with an increase in maternal heart rate, and with overshoot hypotension (12). No significant changes in umbilical blood flow have been observed with the use of either labetalol or hydralazine (22), and maternal and perinatal outcomes are similar for both drugs (15). Likewise, no significant changes in the uteroplacental blood flow or the fetal heart have been noted with the use of nifedipine for severe pregnancy induced hypertension (23–25).

If IV access is not yet obtained and treatment for acute-onset, severe hypertension is urgently needed, a 200-mg dose of labetalol can be administered orally and

repeated in 30 minutes if an appropriate improvement is not observed (6). The oral nifedipine algorithm also can be initiated in this setting as IV access is being obtained.

Second-Line Therapy

In the rare circumstance that IV bolus labetalol, hydralazine, or oral nifedipine fail to relieve acute-onset, severe hypertension and are given in successive appropriate doses such as those outlined in the order sets (see Box 1, Box 2, and Box 3), emergent consultation with an anesthesiologist, maternal–fetal medicine subspecialist, or critical care subspecialist to discuss second-line intervention is recommended. Second-line alternatives to consider include labetalol or nicardipine by infusion pump (26–28).

Sodium nitroprusside should be reserved for extreme emergencies and used for the shortest amount of time possible because of concerns about cyanide and thiocyanate toxicity in the mother and fetus or newborn, and increased intracranial pressure with potential worsening of cerebral edema in the mother (18). Once the hypertensive emergency is treated, a complete and detailed evaluation of maternal and fetal well-being is needed with consideration of, among many issues, the need for subsequent pharmacotherapy and the appropriate timing of delivery.

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