Reduce maternal morbidity by the expeditious and decisive treatment of severe hypertension in pregnancy

In women with preeclampsia, clinical findings that are associated with increased maternal morbidity include: severe hypertension, dyspnea or chest pain, thrombocytopenia, and elevated creatinine or aspartate transaminase levels

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Obstetrician-gynecologists are deeply committed to reducing maternal mortality and severe morbidity. Hypertensive diseases of pregnancy, including preeclampsia and eclampsia, are important contributors to both maternal mortality and severe morbidity. Among US live births from 2011–2013 there were 1,078 pregnancy-related maternal deaths, and 10% were attributed to preeclampsia or eclampsia.[1] Hypertensive disease of pregnancy is also a major cause of severe maternal morbidity, with an increased risk of acute renal failure, respiratory failure, and cerebrovascular events.[2] Preeclampsia is associated with a 4-fold increased risk of thrombocytopenia and coagulopathy and a 2-fold increased risk of postpartum hemorrhage.[3]

Severe hypertension is defined as a systolic blood pressure (BP) ≥160 mm Hg or a diastolic BP ≥110 mm Hg on 2 measurements within 15 minutes.[4,5] Severe hypertensive disease of pregnancy is a common clinical problem in obstetrics, requiring clinicians to respond expeditiously and decisively to minimize adverse maternal outcomes. Following the identification of severe hypertension, a diagnosis and management plan should be initiated within 30 to 60 minutes.[4] Some experts recommend that treatment be initiated within 15 minutes of identifying severe hypertension in a pregnant woman.[6]

The American College of Obstetricians and Gynecologists recommends that obstetric programs adopt standardized guidelines for the management of women with preeclampsia or eclampsia.[4] The National Partnership for Maternal Safety recommends that all obstetric programs

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Instant Poll

In obstetric practice, most experienced clinicians are aware of cases of hypertensive disease of pregnancy that have occurred in their community where there was a delay in the treatment of preeclampsia or the diagnosis was missed resulting in serious maternal harm.

Do you have an example of such a case that you can share with our readers (without violating HIPAA rules)?

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develop care bundles to respond to severe hypertension.[5] Key points in managing severe hypertension are summarized below.

1. Expeditiously initiate treatment of severe hypertension…

…with intravenous (IV) labetalol (administered as 20 mg/40 mg/80 mg sequential doses as needed) or hydralazine (administered as 10 mg/10 mg/20 mg/40 mg sequential doses as needed). Our preferred agent is labetalol, administered as a 20-mg IV infusion over 2 minutes. If the patient's BP remains elevated 10 min after the initial dose, administer labetalol 40 mg as an IV infusion over 2 min. If her BP remains elevated 10 min after this dose, administer 80 mg of labetalol. If the BP continues to be elevated, hydralazine treatment can be initiated as described below.

Occasionally there are national shortages of labetalol or a patient has a low heart rate or contraindication such as heart disease or asthma prohibiting its use. If labetalol is not available, we use hydralazine administered as a 10-mg IV bolus over 2 min. If the BP remains elevated, every 20 min, an escalating dose of hydralazine is administered, first by repeating the 10-mg dose, then administering 20 mg, and finally 40 mg.

For women without IV access, we use oral nifedipine 10 mg to control hypertension only while awaiting the placement of an IV. If BP remains elevated after 30 min, a second dose of oral nifedipine 20 mg can be given with a plan to transition to IV agents as soon as possible. The risks of maternal tachycardia or overshoot hypotension with immediate release oral nifedipine limit its use in our clinical practice to this circumstance.

The Society for Maternal-Fetal Medicine recommends delivery (not expectant management) in the presence of severe preeclampsia if any of the following are present[13]:

- eclampsia
- pulmonary edema
- disseminated intravascular coagulation
- renal insufficiency
- abruptio placentae
- abnormal fetal testing
- HELLP syndrome or persistent symptoms of severe preeclampsia.

Once the BP is controlled, start maintenance oral hypertension therapy. Our first-line agent is labetalol 200 mg twice per day with a maximum dose of 800 mg 3 times daily (2,400 mg maximal daily dose).

2. Initiate treatment with magnesium sulfate

If the patient's BP is ≥160/110 mm Hg or if her BP is ≥140/90 mm Hg with coexisting symptoms of severe preeclampsia (for example a severe headache), initiate magnesium sulfate treatment. A standard regimen is magnesium sulfate 4 to 6 g administered as an IV bolus over 20 min followed by the IV infusion of 2 g per hour. In our clinical opinion, if you plan on initiating IV antihypertensive treatment for severe hypertension you also should strongly consider starting magnesium sulfate to reduce the risk of an eclamptic seizure.

We also start magnesium sulfate therapy for women with severe hypertension and clinical symptoms or laboratory signs of preeclampsia even in the absence of proteinuria. Approximately 2% of women with preeclampsia will develop an eclamptic seizure and magnesium sulfate treatment significantly reduces the risk of seizure and may also reduce maternal mortality.[7,8]

Magnesium sulfate is contraindicated in women with myasthenia gravis. In women with renal dysfunction, the loading dose can be given, but the continuous magnesium sulfate infusion should not be initiated until serum magnesium levels are assessed.

3. Consider administering maternal betamethasone

Treatment with betamethasone advances fetal maturation if the pregnancy is preterm (for example, <34 weeks of gestation). A major cause of neonatal morbidity and mortality for pregnancy complicated by severe hypertensive disease is premature delivery. Maternal glucocorticoid treatment reduces the risk of neonatal morbidity and mortality if preterm delivery is anticipated. However, do not delay delivery for antenatal corticosteroids for women with severe and persistent hypertension or symptoms of preeclampsia that do not resolve following treatment.

We also consider women with eclampsia, placental abruption, pulmonary edema, or severe laboratory derangements too unstable to delay delivery for 48 hours to achieve the maximum benefit of steroid treatment. If antenatal corticosteroids are administered

in the late preterm period between 34 0/7 weeks and 36 6/7 weeks of gestation, obstetric management should not be altered and delivery should not be delayed.[9]

4. Preeclampsia plus a severe headache is a toxic combination

For patients with this constellation either have a plan for delivery or keep them under close surveillance. Occasionally a woman >20 weeks pregnant with new onset hypertension and a headache is seen in an emergency department and is not assessed for proteinuria or other preeclampsia laboratory abnormalities. If the woman is diagnosed as having a migraine or tension headache and discharged home with a headache medicine they are at high risk for serious morbidity, including stroke.

5. Preeclampsia plus thrombocytopenia complicates anesthesia options

If the platelet count falls too low (for instance, <70,000 platelets per μL), many anesthesiologists will not provide a regional anesthetic for delivery because of the risk of peridural bleeding. In addition, a low platelet count (<50,000 platelets per μL) significantly increases the risk of obstetric hemorrhage. Transfer of the patient to an obstetrics unit with a full-service blood bank capable of supporting multiple platelet transfusions may be warranted.

6. Preeclampsia plus dyspnea or chest pain increases the risk of severe maternal morbidity

Authors of a prospective study of 2,023 women with preeclampsia reported an increase in adverse maternal outcomes when the following factors were present: early gestational age, dyspnea, chest pain, oxygen saturation of SpO_2 <93%, thrombocytopenia, elevated creatinine, or elevated aspartate transaminase concentration.[10] If dyspnea is present, the patient may have pulmonary edema, pulmonary embolism, heart failure, acute asthma, or pneumonia. If the patient has chest pain the differential diagnosis includes pulmonary embolism, cardiac ischemia, cardiomyopathy, or another cardiac disease.

Consider obtaining a chest radiograph for pregnant women with dyspnea and a computed tomography pulmonary angiogram or lung scintigraphy (ventilation perfusion scan) if the chest radiograph is normal for women with chest pain.[6,11] We obtain a transthoracic echocardiogram in cases of pulmonary edema to evaluate for the possibility of peripartum cardiomyopathy.

7. HELLP syndrome

The triad of hemolysis, elevated liver enzymes, and low platelet count (HELLP) is associated with an increased risk of maternal mortality and severe morbidity.[12] In a study of 171 women with HELLP, factors that increased the risk for adverse maternal outcomes included[12]:

- aspartate aminotransferase (AST) levels >316 U/L
- alanine aminotransferase (ALT) levels >217 U/L
- total bilirubin levels >2.0 mg/dL
- lactate dehydrogenase (LDH) levels >1,290 U/L
- blood urea nitrogen test results >44 mg/dL
- platelet count <50,000 platelets per μL.

The clinical course of HELLP syndrome is characterized by progression and the potential for sudden and catastrophic deterioration. For example, some women with HELLP will suddenly develop a ruptured liver, pulmonary edema, or a stroke. The Society for Maternal-Fetal Medicine recommends against expectant management of women with HELLP syndrome.[13]

8. Delivery or expectant management?

Currently the only cure for preeclampsia is delivery. The Society for Maternal-Fetal Medicine recommends against expectant management of severe preeclampsia if certain problems occur (**BOX**, page 13).[13] For women with preeclampsia who are less than 34 weeks' gestation and do not have a contraindication to expectant management, consider transferring the patient to a tertiary maternal care center. In our practice, pregnant women with a hypertensive disorder are scheduled for an induction of labor and delivery at 37 weeks' gestation.

In the United States, major obstetric causes of pregnancy-related death include sepsis, venous thromboembolism-pulmonary embolism, hemorrhage, and hypertensive disease of pregnancy. Other important causes of pregnancy-related death include cardiac disease, stroke, and pre-existing major medical disease including advanced cancer. In the United States there are approximately 17 pregnancy-related maternal deaths per 100,000 live births.[1] Obstetricians are dedicated to reducing this excessively high rate of maternal death.

Given the US maternal death rate of 1 maternity death per 5,880 live births, over the course of a 40-year career, most obstetrician-gynecologists will have 1 or 2 of their pregnant patients die. From the perspective of an individual clinician, maternal death is an extremely rare event, with 1 death during every

20 years of practice. However, from a population perspective, maternal death in the United States is all too common compared to other developed countries. We can only reduce the rate of maternal death by working in interdisciplinary teams to ensure our obstetrics units are prepared to expeditiously diagnose and treat the most common obstetric causes of death and severe morbidity.

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