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Management of severe hypertension in pregnancy

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ABSTRACT

While hemorrhage is the leading cause of maternal death in most of the world, hypertensive disorders of pregnancy are the leading cause of maternal mortality in the United States. The opportunity to improve outcomes lies in timely and appropriate response to severe hypertension. The purpose of this article is to review the diagnostic criteria for severe hypertension, choice of antihypertensive agents, and recommended algorithms for evaluation and management of acute changes in clinical status. Adhering to standard practices ensures that care teams can timely and appropriate care to these high risk patients. With heightened surveillance and prompt evaluation of signs and symptoms of worsening hypertension, maternal morbidity and mortality can be decreased.

Introduction

Hypertensive disorders of pregnancy account for approximately 17% of maternal mortality in the United States.[1] Maternal mortality reporting is not federally mandated, which limits the accuracy of national mortality statistics. However, the trends in mortality statistics have highlighted the need to address the issue (Figs. 1 and 2). Some states have established reporting systems that have highlighted the significant contribution of hypertensive disorders to maternal mortality. The California Pregnancy Associated Mortality Review found that the overall mortality rate for preeclampsia among deaths included in the registry was 1.6/100,000 live births for the period 2002–2004.[2] In the most recent Confidential Enquiries report from the United Kingdom, reflecting the time period from 2009 to 2012, the maternal mortality rate associated with preeclampsia and eclampsia was 0.38 per 100,000 maternities for 2010–2012, the lowest rate ever recorded, having decreased significantly since the last report from 2006 to 2008.[3] The authors cite the introduction of the National Institute for Heath and Care Excellence (NICE) guidance on Hypertension in Pregnancy in 2010 as one of the factors in achieving this reduction in mortality. The NICE guidelines outline evidence-based recommendations for the diagnosis and management of women with hypertensive disorders of pregnancy.[4]

Indeed, the opportunity to decrease morbidity and improve outcomes for women with hypertensive disorders during pregnancy lies in timely and appropriate response to severe hypertension. The ability to mount an effective response to any critical situation depends largely on preparedness, guidelines, and communication. A well-delineated algorithm for escalating response can improve communication among members of a care team and expedite delivery of care. Protocols should delineate triggers that might signal a change in clinical status and identify key personnel to be notified for further evaluation. Standard protocols such as the modified early obstetric warning system (MEOWS), introduced in the United Kingdom following the 2003–2005 Confidential Enquiry into Maternal and Child Health report, reliably predict maternal morbidity and mortality and reduce adverse outcomes.[3–5]

Clear and consistent diagnostic criteria should ensure that providers know when treatment is indicated and which

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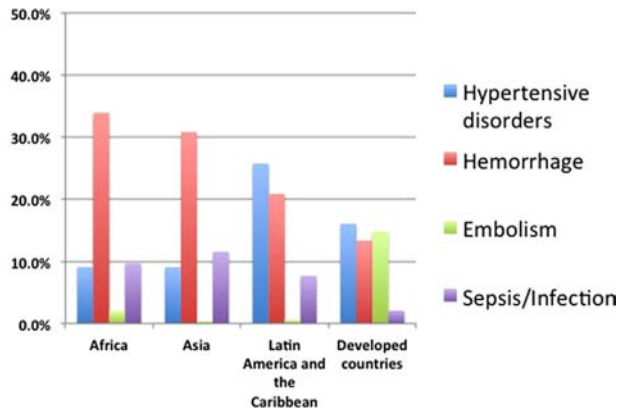

Fig. 1 – Proportion of maternal deaths from hemorrhage, hypertensive disorders, and infection or sepsis in different regions throughout the world. (Data adapted with permission from Khan et al.[20])

agents are first line. An adequate plan for monitoring should be in place that enables providers to reliably assess and document changes in clinical status. In the United States, recognition of the need to reduce maternal morbidity and mortality has led to the formation of the National Partnership for Maternal Safety. Unit-improvement bundles for obstetric services have been created as a part of this initiative, including (1) a system for detecting early warning signs, (2) a structured process for internal reviews to identify opportunities for improvement, and (3) support tools for patients, families, and staff who experience adverse outcomes. Management of severe hypertension was one of three bundles (including obstetric hemorrhage and venous thromboembolism) that were prioritized to address common and preventable causes of maternal morbidity and mortality.[6] In New York State, ACOG District II has developed the Safe Motherhood Initiative to promote the implementation of these bundles and to continue to develop standard approaches for handling obstetric emergencies.[7]

Care teams in obstetrics and in other disciplines such as emergency medicine, critical care and internal medicine often need to be reminded that vigilance for such changes needs to be maintained in the postpartum period as well. In a study of maternal mortality, 75% of maternal deaths associated with preeclampsia occurred in the postpartum period, 41% of which were more than 2 days postpartum.[8] Many of these women present to non-obstetricians who may be less familiar with the entity of postpartum preeclampsia.

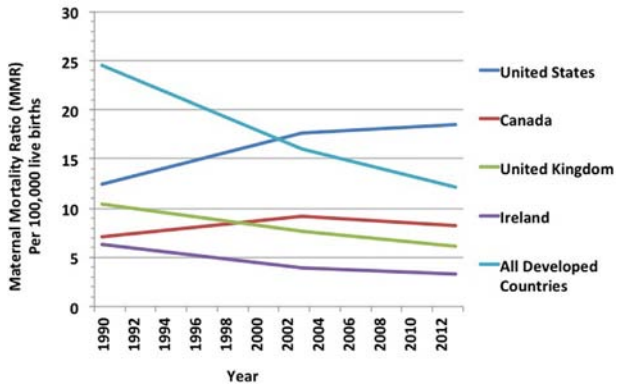

Fig. 2 – U.S. maternal mortality ratio per 100,000 live births from 1990 through 2013 and percent change in maternal deaths per 100,000 live births during the same period. (Data adapted with permission from Kassebaum et al.[21])

Diagnostic criteria for severe hypertension in pregnancy

The American College of Obstetrics and Gynecology (ACOG) Task Force of Hypertension in Pregnancy recently articulated new definitions of the four types of hypertension during pregnancy: (1) gestational hypertension, (2) preeclampsia-eclampsia, (3) chronic hypertension, and (4) chronic hypertension with superimposed preeclampsia. The blood pressure criteria diagnosis remained the same: systolic blood pressure (SBP) $\geq$ 140 mmHg or a diastolic blood pressure (DBP) $\geq$ 90 mmHg recorded on two occasions at least 4 h apart. Antihypertensive therapy should not be initiated for blood pressures less than 160 mmHg systolic or 110 mmHg diastolic.[9]

In the Task Force's updated summary of recommendations, proteinuria was removed as a necessary feature of the diagnostic criteria for preeclampsia, placing emphasis on the multi-organ system involvement seen in patients with this diagnosis. When proteinuria is not present, preeclampsia can be diagnosed when hypertension is found in the presence of new-onset thrombocytopenia, renal insufficiency, oliguria, impaired liver function, pulmonary edema, or cerebral or visual disturbances. Proteinuria of at least 300 mg in a 24-h urine collection, or a timed collection that is extrapolated to this value or results in a protein/creatinine ratio of at least 0.3 mg/dl, is considered the cut-off for proteinuria.[9]

Severe features of preeclampsia are listed in Table 1. Severe hypertension is defined as a SBP $\geq$ 160 mmHg or a diastolic blood pressure $\geq$ 110 mmHg recorded at least 4 h apart. Severe hypertension can occur during the antepartum, intrapartum, or postpartum period. SBP $\geq$ 160 mmHg or DBP $\geq$ 110 mmHg that persists for 15 min or more is considered a hypertensive emergency. Prompt treatment is indicated for all pregnant or postpartum patients who meet these diagnostic criteria.[10]

There is evidence in the general medical literature to suggest that the degree of systolic hypertension may be more closely associated with significant morbidity than diastolic hypertension.[11] This is true in pregnancy as well. In a series of 28 patients with severe preeclampsia and stroke, 27 had severe systolic hypertension as compared with 4 who had severe diastolic hypertension preceding stroke.[12] When hypertension becomes severe in the pregnant patient, systems should be in place for notifying providers immediately to facilitate timely bedside evaluation of the patient and appropriate treatment. Fetal surveillance should be initiated if indicated by the circumstances. Administration of antenatal corticosteroids should be considered if the fetus is $<$34 weeks gestation due to the increased risk for indicated preterm delivery.