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Original Article

Adverse maternal and fetal outcomes and deaths related to preeclampsia and eclampsia in Haiti

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ABSTRACT

Objective: The purpose of this study was to define the prevalence and clinical characteristics of preeclampsia and eclampsia at a hospital in rural Haiti.
Methods: This is a retrospective review of women presenting to Hôpital Albert Schweitzer (HAS) in Deschapelles, Haiti with singleton pregnancy and diagnosis of preeclampsia or eclampsia from January 1, 2011 through December 31, 2012. Hospital charts were reviewed to obtain medical and prenatal history, hospital course, delivery information, and fetal/neonatal outcomes. The outcomes included placental abruption, antepartum eclampsia, postpartum eclampsia, maternal death, birthweight <2500 g and stillbirth. Data are presented as median (quartile 1, quartile 3) or *n* (%) and risk ratios.
Results: During the study period, 1743 women were admitted to the maternity service at HAS and 290 (16.6%) were diagnosed with preeclampsia or eclampsia. Only singleton pregnancies were analyzed ($N = 270$). Nearly all (95.0%) patients admitted with preeclampsia had severe preeclampsia. There were 83 patients with eclampsia (30.7%) of which 61 (73.4%) had antepartum eclampsia. There were 48 stillbirths (17.8%) and 5 maternal deaths (1.9%). Patients with antepartum eclampsia were younger, more likely to be nulliparous and had less prenatal care compared to women with antepartum preeclampsia. Antepartum eclampsia was associated with placental abruption and maternal death.
Conclusions: The rates of preeclampsia and its associated complications, such as eclampsia, placental abruption, maternal death and stillbirth, are high at this facility in Haiti. Such data are essential to developing region-specific systems to prevent preeclampsia-related complications.

Introduction

Hypertensive disorders of pregnancy cause approximately 12% of maternal deaths globally, particularly in developing countries [1]. Haiti has one of the highest

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maternal mortality ratios in the Western Hemisphere and an incidence of preeclampsia nearing 18%, more than five times higher than the incidence of 2–3% in the United States [2].

When preeclampsia is diagnosed, a timely delivery (often preterm) is recommended to optimize maternal and fetal health [3,4]. A recent World Health Organization survey showed that the provider-initiated preterm delivery rate increased, while stillbirth and early neonatal mortality decreased, with an increase in development index of the countries [5]. This study concluded that adequate obstetric care, including optimal timing for delivery in high-risk pregnancies could improve pregnancy outcomes [5,6]. However, in low-income countries, such as Haiti, access to prenatal care remains limited, resulting in little screening for preeclampsia and missed opportunities for timely delivery. A detection tool that is affordable and practical is needed for low- and middle-income countries [7].

In studies of adverse maternal outcomes in women with preeclampsia, gestational age, chest pain, oxygen saturation and abnormal laboratory values have been named as possible predictors of poor outcomes in high-income countries [8]. Such a model was recently tested in a low resource setting and showed reasonable ability to identify women at increased risk of adverse outcomes associated with hypertensive disorders of pregnancy [9]. However, no such predictive model has been used in Haiti, and no published studies have evaluated which interventions can reduce maternal/fetal mortality. We recently published that although recommended by the American College of Obstetrics and Gynecology (ACOG), the screening for preeclampsia-related adverse outcomes based on the presence of hypertension and proteinuria, performs only modestly [10]. Diagnosing preeclampsia can be a resource-intense and tedious process requiring measures such as hospital admission. However, routine use of this approach is costly [11], and as such not feasible in low-income countries that face the greatest disease burden.

There is one published study from Haiti demonstrating the incidence of preeclampsia and eclampsia to be 18% [12]. In a recent systematic review of global and regional estimates of preeclampsia and eclampsia, no data were available from Haiti. This article called for efforts to implement data collection from all countries to describe the magnitude and consequences of preeclampsia and eclampsia [13]. The aim of the present study was to describe the incidence of preeclampsia, eclampsia and its related complications in a rural Haitian hospital, as well as the clinical characteristics of these patients. We also compared these characteristics to women with a similar diagnosis in an academic tertiary center in the United States and assessed standard clinical parameters that are associated with preeclampsia-related adverse outcomes in Haiti.

Material and methods

This study was approved by the hospital administration at Hôpital Albert Schweitzer (HAS) and the institutional review board at Beth Israel Deaconess Medical Center (BIDMC). HAS is located in Deschapelles, Haiti and delivers 800–900 patients a year. BIDMC is located in Boston, Massachusetts and is an academic tertiary care center delivering approximately 5000 patients a year.

The medical records of HAS patients evaluated for and/or admitted with a diagnosis of preeclampsia or eclampsia (antepartum and postpartum), as determined by the staff obstetrician, from January 1, 2011 through December 31, 2012 were reviewed. We included women with any of the following diagnoses: antepartum preeclampsia (mild or severe), antepartum eclampsia, postpartum eclampsia and postpartum preeclampsia. At HAS, preeclampsia was defined by blood pressure $\geqslant$140/90 mmHg plus urine protein dipstick $\geqslant$2+. Severe preeclampsia was diagnosed by blood pressure $\geqslant$160/110 mmHg, laboratory abnormalities consistent with hemolysis, low platelets and elevated liver enzymes (HELLP syndrome) or symptoms (i.e. headache, visual changes, right upper quadrant pain) in patients with hypertension and proteinuria. Eclampsia was diagnosed in patients with antepartum or postpartum preeclampsia who developed seizures. Renal failure was defined as creatinine $\geqslant$97.24 μmol/L. Demographic and clinical data were extracted from medical charts by the study investigators using standardized forms.

Data from BIDMC patients were abstracted from a database developed for a prospective study that evaluated plasma angiogenic profiles of all patients evaluated for and admitted with preeclampsia from July 2009 through October 2010. This study is described in detail elsewhere [10]. In brief, pregnant women presenting to obstetrical triage at BIDMC for preeclampsia evaluation were enrolled. Information on clinical diagnoses and adverse outcomes was collected from the time of presentation through the subsequent two weeks. Preeclampsia was defined as blood pressure $\geqslant$140/90 mmHg on 2 occasions 2 h to 2 weeks apart after 20 weeks of gestation and proteinuria of $\geqslant$300 mg/24 h or urine protein-to-creatinine ratio of $\geqslant$0.3 after 20 weeks of gestation. Severe preeclampsia was diagnosed by blood pressure >160/110 mmHg, laboratory abnormalities consistent with HELLP syndrome, oliguria ($\leqslant$500 ml/24 h), symptoms (i.e. headache, visual changes or epigastric pain) or intrauterine growth restriction ($\leqslant$10th percentile for gestational age) in patients with preeclampsia. Eclampsia was diagnosed in patients with antepartum or postpartum preeclampsia who developed seizures. Preterm delivery was defined as delivery before 37 weeks of gestation. Clinical information was extracted from electronic medical records [10].

Outcomes of interest in both populations included placental abruption, antepartum eclampsia, postpartum eclampsia, maternal death, birthweight <2500 g and stillbirth. Data analysis was limited to singleton pregnancies.

Statistical analysis

Data were summarized using median (quartile 1, quartile 3) or *n* (%) and compared using a Wilcoxon rank sum, Chi-square or Fisher's exact test. Poisson regression with robust variances was used to calculate risk ratios and 95% confidence intervals. For blood pressure, risk ratios were calculated for a 10 mmHg change; for urine protein,