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Blood pressure assessment and first-line pharmacological agents in women with eclampsia

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ABSTRACT
Background: Eclampsia is a life-threatening complication of pregnancy. Timely blood pressure assessment and administration of magnesium sulphate are essential management. In this retrospective single-centre study we examined the timing and magnitude of maternal blood pressure before eclampsia, and whether magnesium sulphate was administered as the first agent for treatment.
Methods: We conducted a five-year review of eclampsia in a tertiary referral obstetric hospital. Using data from electronic birthing records and hospital coding (ICD-10AM) we identified patients with the diagnostic criteria for eclampsia and assessed patient characteristics, blood pressure and pharmacological treatment.
Results: There were 33 812 births from July 2008 to June 2013 with 19 cases of eclampsia (1:1780). Patients were 32 ± 5.9 years of age, 36 ± 3.9 weeks of gestation, 63% were nulliparous and all had a singleton pregnancy. Antepartum eclampsia occurred in 74%. In the four hours before a fit, 47% of patients had blood pressure recorded, of whom 78% were hypertensive. Magnesium sulphate was administered as first therapy in 47% of patients but it was not given to any patient transferred to hospital by ambulance. Of the patients who fitted antenatally, 86% underwent caesarean section, of whom 25% received neuraxial anaesthesia.
Conclusions: Our study highlights the need for vigilance when managing pregnant women with hypertension, especially in the third trimester as eclampsia is most likely preceded by raised blood pressure. It also highlights the need for timely commencement of magnesium sulphate in the community and during transfer to hospital for the treatment of eclampsia, and for prevention of eclampsia in hospital when thresholds for severe preeclampsia are met.

Keywords: Eclampsia; Preeclampsia; Caesarean section; Magnesium sulphate; Blood pressure; Anaesthesia

Introduction

Eclampsia is an uncommon but serious complication of pregnancy. It is associated with a high case fatality and complication rate.[1] Eclampsia is defined as convulsions in addition to preeclampsia with no pre-existing neurological dysfunction.[2] There is a clear consensus in the literature that the morbidity and mortality associated with this disorder can be avoided by adequate and timely provision of treatment, including magnesium sulphate.[3] Without treatment, eclampsia is a leading cause of maternal and neonatal morbidity and mortality with most injury being associated with the seizures that mark the onset of the disease. Timely provision of preventative therapy including magnesium sulphate, should commence before the onset of seizures in women at risk of eclampsia.[2,4–7] However, it is difficult to predict who will develop eclampsia as some women are normotensive before seizures.

We performed a study to determine the incidence of eclampsia, the initial pharmacological management of women with eclampsia and the relationship between the recording of and magnitude of blood pressure (BP) before the initial seizure. We did this for two reasons: first, we had observed that women transferred from the community with a diagnosis of eclampsia were not routinely given magnesium sulphate; and second, we thought the reason why women were considered to be normotensive before a seizure was that their BP had not been measured at an appropriate time before the fit thereby masking the development of hypertension.

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Methods

After institutional ethics approval (Royal Women's Hospital, Melbourne, Australia) we performed a retrospective review of data extracted from patient medical records. The medical records coding system of the Royal Women's Hospital was accessed to generate a list of patients coded for eclampsia (International Classification of Diseases (ICD)-10AM, code O15) from 1 July 2008 to 30 June 2013, as well as a list of patients coded for seizures in the same time period. The birth suite intrapartum recording system was also searched for women coded for eclampsia for the same time period. Medical records of all patients generated through these searches were then requested and their cases reviewed. In addition, all cases from 2010 onwards had their birth suite intrapartum histories digitally restored and reviewed. As the Royal Women's Hospital is a tertiary hospital, there were a number of cases who had been transferred from external sites. These facilities were contacted and records requested. The time frame was selected to coincide with the beginning of the hospital's relocation to a newly built unit in late June 2008. Data were collected over a six-month period by two investigators (EC and KS).

Cases were included if there was a documented history of a seizure in a woman at more than 20 weeks of gestation with either a documented history of preeclampsia in that pregnancy or with no previous history of neurological dysfunction.[2] Preeclampsia was defined as repeatedly high BP (systolic $\geqslant$140 mmHg and/or diastolic $\geqslant$90 mmHg) in pregnancy arising after 20 weeks of gestation and associated with proteinuria or other organ system dysfunction that resolved by three months postpartum.[8] Patients were excluded if there was a past history of seizures or other neurological disorders, if upon investigation another cause of the seizure was found or if the reported seizure event was unclear. Patient demographics data were collected as well as all information regarding the disease onset, BP recording, treatment and outcome, looking specifically at which pharmacological agents that were used for initial seizure management. Data are presented as mean $\pm$ standard deviation (SD) or percentage.

Results

From 1 July 2008 to 30 June 2013, there were a total of 33812 births. During this time, 48 eligible patients were identified (Fig. 1). Of these, 29 patients (60%) were excluded for duplicated coding in both ICD medical coding and intrapartum electronic system (n=12, 25%) or incorrect coding in ICD-10 medical coding or intrapartum electronic coding system (n=17, 35%). Preeclampsia or gestational hypertension with no eclampsia was the commonest reason for being coded incorrectly (n=11, 65%) followed by six patients incorrectly coded having the diagnosis of pseudoseizures (n=1), neurocysticerosis (n=1), epilepsy (n=1), temperoparietal stroke (n=1), adverse drug reaction (n=1) and hypertension after a caesarean section (n=1). The final analysis included 19 cases giving a rate of eclampsia of 1:1780 or 9.1:10000 births.

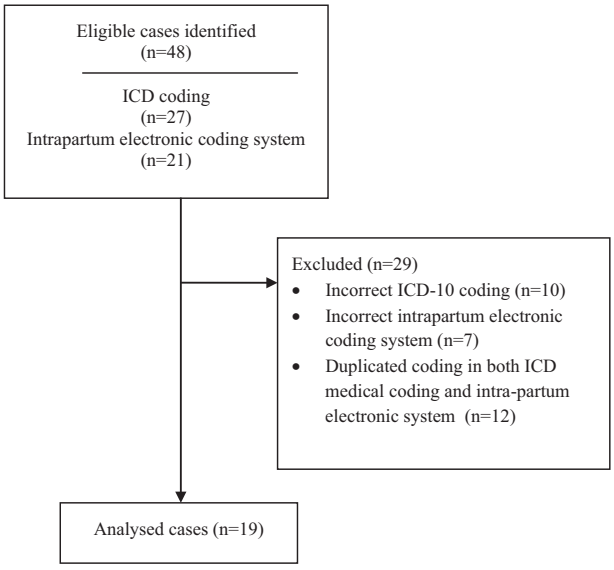

Fig. 1 Flow chart of patients with eclampsia. ICD: International Classification of Diseases

Patient characteristics and obstetric data are shown in Table 1. All were singleton pregnancies and none of the women were hypertensive at the time of booking. Four of the 19 women had been booked at hospitals other than the study hospital and were transferred during or after a seizure.

The characteristics of the onset of the seizure, BP before and after the seizure and medications used for the initial treatment of the seizure are shown in Table 2. Seizures occurred before delivery in 14/19 (74%) cases. The majority of patients who fitted did not have a BP measurement in the previous four hours; however, of those who had BP measured, 78% were hypertensive. Five women had recorded BP measurements of systolic $\geqslant$170 mmHg with diastolic $\geqslant$100 mmHg. No woman in the study was commenced on magnesium sulphate before a seizure. Five women experienced a recurrent seizure; two received no initial treatment and three had recurrent seizures after commencement of magnesium sulphate. There were two cases of late postpartum eclampsia, accounting for 10.5% of the total number of cases but 40% of those occurring postpartum.

Table 3 shows the time from seizure to delivery, the mode of birth, type of anaesthesia for birth and neonatal and maternal additional supports necessary after birth. One patient had a vaginal birth at home. Of the patients who fitted before delivery, 12/14 (86%) underwent