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CASE REPORT

Critical Management of Recurrent Seizure at 16-year-old Primigravida with Atypical Eclampsia

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ABSTRACT

Background: Atypical eclampsia can complicate the management and pose significant risks to both the mother and fetus. This case report emphasizes the critical management approach for recurrent seizures in a young primigravida. Case: A 16-year-old primigravida presented with sudden onset seizures during her third trimester of pregnancy. Initial assessments showed only a slight elevation of blood pressure and proteinuria, suggesting the presence of atypical eclampsia. Despite initially administering MgSO4, the patient still experienced a postpartum seizure. She was closely monitored and given a maintenance dose of midazolam and dexmedetomidine. After five days of treatment, the patient did not have any further convulsions and remained stable. Discussion: Teenage pregnancies increase the risk of maternal fatalities due to eclampsia. Atypical eclampsia is rare but can occur and requires a specific treatment approach. When therapy with magnesium sulfate is ineffective, midazolam and dexmedetomidine are used as alternative anti-epileptic drugs. Dexmedetomidine has a neuroprotective effect, preventing cerebral ischemia, and is effective in reducing the need for antihypertensive medication and hospitalization. Conclusion: The successful utilization of a combination of midazolam and dexmedetomidine highlights their potential as an effective therapeutic option for refractory seizures and adds to the existing treatment armamentarium for eclampsia.

Keywords: Atypical eclampsia, dexmedetomidine, midazolam, seizure, teenage pregnancy

INTRODUCTION

Eclampsia is a life-threatening hypertension disorders that develop in pregnant women. The occurrence of eclampsia varies greatly worldwide, ranging from 19.6 to 142 cases per 10,000 deliveries in middle, low, and extremely resource-poor countries. It continues to be a significant contributor to maternal mortality, especially in teenage pregnancies. Maternal age is a crucial risk factor, and teenagers are considered a high-risk group for eclampsia with a two- to six-fold higher risk than older women.[1] Eclampsia is described as a convulsive episode or altered level of consciousness that occurs in the presence of preeclampsia, with no other apparent cause for seizures. It can be diagnosed by two criteria: (1) blood pressure ≥140/90 mmHg and (2) proteinuria ≥300 mg/day.

Most women who experience eclampsia have previously had preeclampsia.[2] However, this philosophy has lately undergone a paradigm shift. There is emerging evidence that preeclampsia can develop even in the absence of proteinuria and hypertension and that eclampsia may be the first sign of hypertensive disease during pregnancy.

The term "atypical eclampsia" is increasingly being used to describe abnormal forms of hypertension diseases that occur during pregnancy. There is no clear diagnosis for atypical eclampsia, as it may involve minimal or in the absence of proteinuria accompanied by hypertension, or minimal or no elevation in blood pressure along with proteinuria. Approximately 8 percent of eclampsia cases are classified as atypical. The onset of atypical forms of eclampsia varies.[2]

Prolonged generalized tonic-clonic seizure activity during pregnancy has been linked to maternal acidosis, hypoxia, and brain trauma, including hemorrhage. The primary approach to managing neurological symptoms in patients with eclampsia involves several interventions. These interventions include ensuring airway patency and giving supplemental oxygen to address any problems with inadequate breathing and low oxygen levels during seizures. It is also important to promptly control the cessation of blood pressure, administer magnesium hydroxide ($MgSO_4$), and fetal delivery.

Magnesium hydroxide is the preferred therapeutic agent for the prevention of eclamptic convulsions. Despite receiving magnesium sulfate, certain patients continue to experience recurrent seizures despite comprehensive management to prevent eclampsia. In this report, we present a case of eclampsia of a young primigravida patient who presented with recurrent seizures and discuss their critical management.[3]

CASE

A 16-year-old primigravida at 38 weeks of gestation experienced two episodes of generalized seizures one hour apart when she arrived at the emergency room. Before this referral, her blood pressure was measured at 130/85 mmHg, and she had received inadequate antenatal care with no history of hypertension or proteinuria. She was cooperative and conscious but appeared exhausted during her presentation. Vital signs showed a temperature of 36.7°C, oxygen saturation of 97% on room air, blood pressure of 128/80 mmHg, pulse rate of 120 beats per minute, and respiration rate of 24 breaths per minute. No specific neurological deficiencies were present. An examination of the abdomen and pelvis showed a constricted uterus, full cervical dilation, a fetal heart rate of 150 beats per minute, and a uterine height equivalent to 38 weeks of gestation.

The laboratory results revealed a low hemoglobin level of 9.9 g/dl, a normal platelet count, +3 proteinuria in urinalysis, and normal results for liver and renal function tests. The blood coagulation profile was also normal. After a thorough evaluation, the final diagnosis was determined to be G1P0A0 at 38 weeks, presenting with Second Stage of Labor and Atypical Eclampsia. The patient experienced a third episode of generalized tonic-clonic seizures within 15 minutes of arriving at the emergency department and receiving a 4 grams bolus of $MgSO_4$. She received a 2 mg bolus of intravenous (IV) midazolam, which ended the seizure, and the patient was still unconscious during delivery. The infant was born with forceps

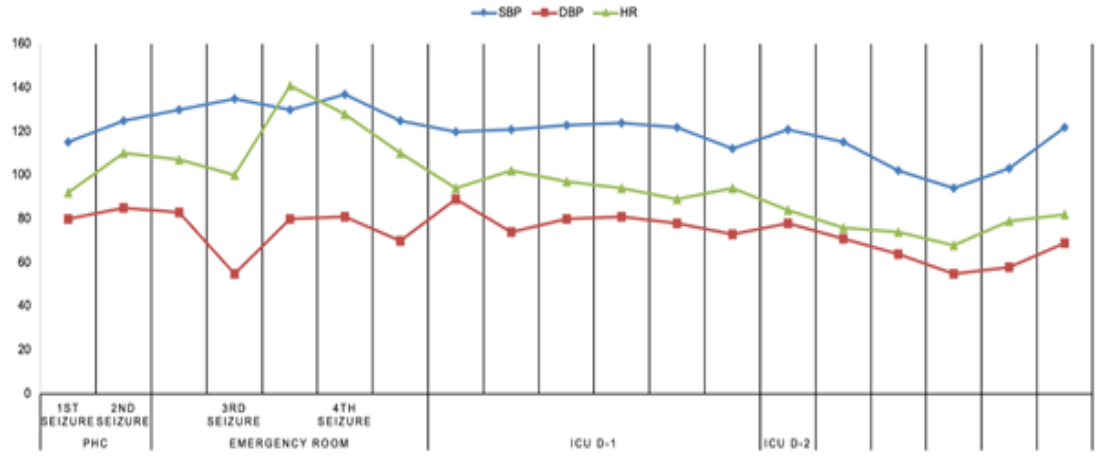

Figure 1. Timeline of vital signs measurements. SBP=systolic blood pressure; DPB=diastolic blood pressure; HR=heart rate; PHC=primary health center; ICU=intensive care unit

and had an Apgar score of 7/8.

The patient experienced convulsions once again after delivery. As a result, 2 grams bolus of $MgSO_4$ was repeatedly administered, but the seizure persisted. Midazolam (1 mg/hour) was then continuously administered. After delivery, the patient became unconscious and was taken to the intensive care unit (ICU). She was started on 2 grams of ceftriaxone IV once daily, and a maintenance dose of 1 gram of $MgSO_4$ every hour was continuously infused for the next 12 hours. Following this, a maintenance dose of dexmedetomidine (0.2 cc/kg BW/hour) was given, along with injections of dexketoprofen (40 mg/8 hours), omeprazole (40 mg/24 hours), ondansetron (4 mg/8 hours), furosemide (24 hours), citicoline 500 mg/12 hours, piracetam (2 g/12 hours), and supplementary oxygen via nasal cannula.

Throughout the ICU stay, the patient remained consistently normotensive, ranging from 114/80 to 132/84 mmHg. The midazolam and dexmedetomidine were stopped on the second day because the patient showed no signs of imminent or recurrent seizure, and blood pressure was below 140/90 mmHg. After three days of therapy in the intensive care unit, the patient's condition significantly improved (Figure 1). She experienced no further convulsions and remained stable, displaying no signs or symptoms of deterioration. Consequently, she was transferred to the ward. The patient was then discharged from the hospital on the fifth day after delivery.

DISCUSSION

Our patient is a 16-year-old primigravida who is currently 38 weeks pregnant. This case shares similarities with previous research, which suggests that teenage pregnancies increase the risk of both eclampsia and maternal fatalities related to eclampsia. It has been found that seventy-six percent of patients who develop eclampsia after 20 weeks of gestation are primigravidas.[4] This young mother consistently maintained a blood pressure below 140/90 mmHg during her referral, regardless of whether she was in the emergency room or the intensive care unit. In 16% of cases, hypertension may not have been present in atypical eclampsia. However, most antepartum eclamptic individuals experienced significant hypertension. Eclampsia is usually associated with proteinuria. Among the 399 women in the series who had eclampsia, only 48% exhibited proteinuria (3+ on the test), while 16% did not have it.[2,4]

None of the symptoms commonly associated with preeclampsia, such as headache, blurred vision, and epigastric pain, were present in our patient. In a classic form of eclampsia, the arterial and renal systems are initially affected, resulting in symptoms like hypertension and proteinuria before other organ systems are

affected. However, in atypical eclampsia, cerebral involvement may occur before another organ system malfunctions. In our case, the initial characteristic was brain involvement.[5] A systematic review also reported that visual disturbance (27%), headache (66%), and epigastric pain (25%) are common symptoms preceding eclampsia. However, our patient only experienced sudden generalized seizures with proteinuria, without prior high blood pressure or any other signs of preeclampsia.[6]

Based on the literature, 80% of eclampsia cases occur during pregnancy and delivery, although in some instances, eclampsia has been observed during the postpartum phase. In our particular case, the seizure occurred both before and after delivery, with the individual experiencing recurrent seizures that led to unconsciousness for approximately five to six minutes before the seizures would recur. Status epilepticus is defined as either a single, uninterrupted seizure lasting more than five minutes or recurrent seizures without regaining consciousness for more than five minutes in between.[7]

In this case, the patient was unresponsive to magnesium sulfate. Despite being treated with a loading dose of 4 grams, the patients experienced a third episode of generalized tonic-clonic seizures. Midazolam, an alternative anti-epileptic drug, became an alternative choice. Benzodiazepines are the preferred medication for treating status epilepticus during pregnancy. Levetiracetam and phenytoin are the most appropriate second-line options. When status epilepticus becomes refractory, anesthetic drugs such as propofol, midazolam, and dexmedetomidine are required as the preferred treatment.[3,8]

Recurrent seizures can result in various complications such as rhabdomyolysis, neuronal death, metabolic acidosis, neurogenic pulmonary edema, aspiration pneumonitis, and respiratory failure. The preferred medication for preventing seizures is magnesium sulfate. It is primarily used for preventing recurrent seizures rather than controlling initial seizures. Approximately 10% of patients are prone to experiencing recurrent seizures.[9]

The use of a maintenance dose of dexmedetomidine in this patient enables the physician to easily awaken the patient for communication. Previous studies have indicated that the neuroprotective effect of dexmedetomidine is mediated through the activation of the α2A-adrenergic receptor subtype. Additionally, other research has demonstrated that dexmedetomidine possesses a neuroprotective effect following transient global cerebral ischemia. In patients with eclampsia, sedation with dexmedetomidine has proven effective in reducing the need for antihypertensive medication and the length of stay in the ICU.[9,10]

CONCLUSION

In conclusion, this case emphasizes the importance of prompt recognition and appropriate management strategies for atypical eclampsia in young pregnant patients. The successful utilization of a combination of midazolam and dexmedetomidine highlights their potential as an effective therapeutic option for refractory seizures and adds to the existing treatment armamentarium for eclampsia. Further research is warranted to explore the long-term outcomes and safety of both medications in eclamptic patients.

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