

# Epilepsy or Eclampsia in Differential Diagnosis of Recurrent Seizures in Pregnancy Aisyiyah Bojonegoro Hospital: A Diagnostic Dilemma? A Case Report

Reyfal Khaidar<sup>1</sup>, Wafa Sofia Fitri<sup>1</sup>, Hen Sania<sup>1</sup>, Mafida Wida Rahman<sup>1</sup>, Annisa Afiyatushsholihah Modjo<sup>1</sup>, Andri Subiantoro<sup>1</sup>, Ratri Dwi Indriani<sup>2</sup>, Abdurrahman<sup>2</sup>, Muhammad Ainur Rosyid Ridho<sup>1</sup>

<sup>1</sup>Department of Anesthesiology and Intensive Care, 'Aisyiyah Bojonegoro Hospital, East Java, Indonesia

<sup>2</sup>Faculty of Medicine and Health, Institut Teknologi Sepuluh Nopember, Indonesia

Corresponding Author: [ainurrosyidd@gmail.com](mailto:ainurrosyidd@gmail.com)

**Abstract** — Seizures in pregnancy can lead to adverse maternal and perinatal outcomes, often arising from various factors necessitating clear diagnosis for effective therapy. Concurrent occurrence of multiple causative factors can complicate diagnostic and therapeutic decisions. We present a case of a 32-week pregnant woman with poorly managed epilepsy who experienced eclampsia and recurrent seizures. Treatment involved multiple medications and emergency cesarean delivery with meticulous blood pressure control. Close monitoring and therapy adjustment were crucial. Managing seizures in such cases poses a dilemma, necessitating initial focus on airway, breathing, and circulation stabilization. Immediate delivery of a viable fetus and maternal health maintenance are paramount. Anesthetic goals encompass seizure and blood pressure control, hemodynamic stability, and intensive care support for potential complications. While eclampsia is a significant factor, seizures in pregnancy may arise from diverse causes, demanding early diagnosis and tailored treatment for optimal patient outcomes.

**Keywords** — Eclampsia; Epilepsy; Pregnancy; Seizure

*How to cite:* Khaidar R, Fitri WS, Sania H, Rahman MW, Modjo AA, Subiantoro A, Indriani RD, Abdurrahman, Ridho MAR. Epilepsy or Eclampsia in Differential Diagnosis of Recurrent Seizures in Pregnancy Aisyiyah Bojonegoro Hospital: A Diagnostic Dilemma? A Case Report. *Journal of Medicine and Health Technology*. 2024,1(2):15-24.

*Manuscript received 29 April 2024; revised 3 June 2024; accepted 24 August 2024. Date of publication 10 November 2024.*

*JMHT is licensed under a Creative Commons Attribution-Share Alike 4.0 International License.*



## INTRODUCTION

Neurology disorders in pregnancy may be directly associated with pre-eclampsia, eclampsia, or may be related to pre-existing conditions such as epilepsy, multiple sclerosis, myasthenia gravis, brain tumor, cardiac, metabolic, and neuropsychiatric conditions which may be exacerbated during pregnancy and the puerperium due to physiological changes associated with this period [1,2]. Multiple factors can be involved in this disorder, and its clarification is essential for establishing adequate therapy and seizure control [3]. During the pregnancy-puerperal cycle, eclampsia is the most common cause of seizure in pregnancy. However, other causes of convulsive crisis should be investigated or excluded, especially in refractory cases that do not respond to usual treatment [4]. Epilepsy is one of the most common causes of seizures during pregnancy. It is the one of neurology disorders with lifetime prevalence of 0,6% in developed countries and 1.5% in developing countries [5]. The prevalence of epilepsy in pregnant woman is estimated to 0.3%-0.7%. Six Pregnant women who have experienced seizures the year prior to conception require close monitoring for their epilepsy [2]. Our aim in reporting the case of a 28-year-old multigravida woman with recurrent seizures and hypertension, who has a history of epilepsy, is to contribute to the understanding of managing this condition during pregnancy and to emphasize the importance of accurate diagnosis and effective management in such situations.

## CASE REPORT

A 28-year-old multigravida was referred to our secondary level from a Hospital with the chief complaints of recurrent seizures and hypertension. Her family described tonic-clonic movement lasting two to three minutes. She had no previous history of hypertension, but she had a history of generalized seizure since 14-years-old and she was not taking medicine. When the patient had convulsion in her home, the midwife from the public health care facility came and gave immediate treatment of 4 grams of magnesium sulfate for 20 minutes, followed by 6 grams of maintenance and referred to the hospital. Glasgow coma scale (GCS) on admission was 8 (E2M3V3), blood pressure (BP) was 176/125 mmHg, heart rate (HR) 150 bpm, respiratory rate (RR) 20 times/minute, temperature 36.6°C. Laboratory tests on admission showed proteinuria (urine protein 3+) (laboratory test shown in table 1, urine analysis test shown in table 2). In the ER, the patient was given magnesium sulfate 1 gram per hour, oxygenation with non-rebreathing mask 15 liters per minute, and undergo emergency cesarean delivery.

**Table 1.** Laboratory Examination

Examination	Result
Haemoglobin	13.8 gr/dl
Leucocyte	15,200
Hematocrit	40.3%
Platelet	407,000
ALT	31.07 U/L
AST	11.22 U/L
Sodium	134.14 mmol/L
Potassium	4.02 mmol/L
Chloride	95.53 mmol/L
Calcium	0.92 mmol/L
Creatinine	1.27 mg/dl
Ureum	23.97 mg/dl
Bleeding time	2 minutes
Clothing time	9 minutes

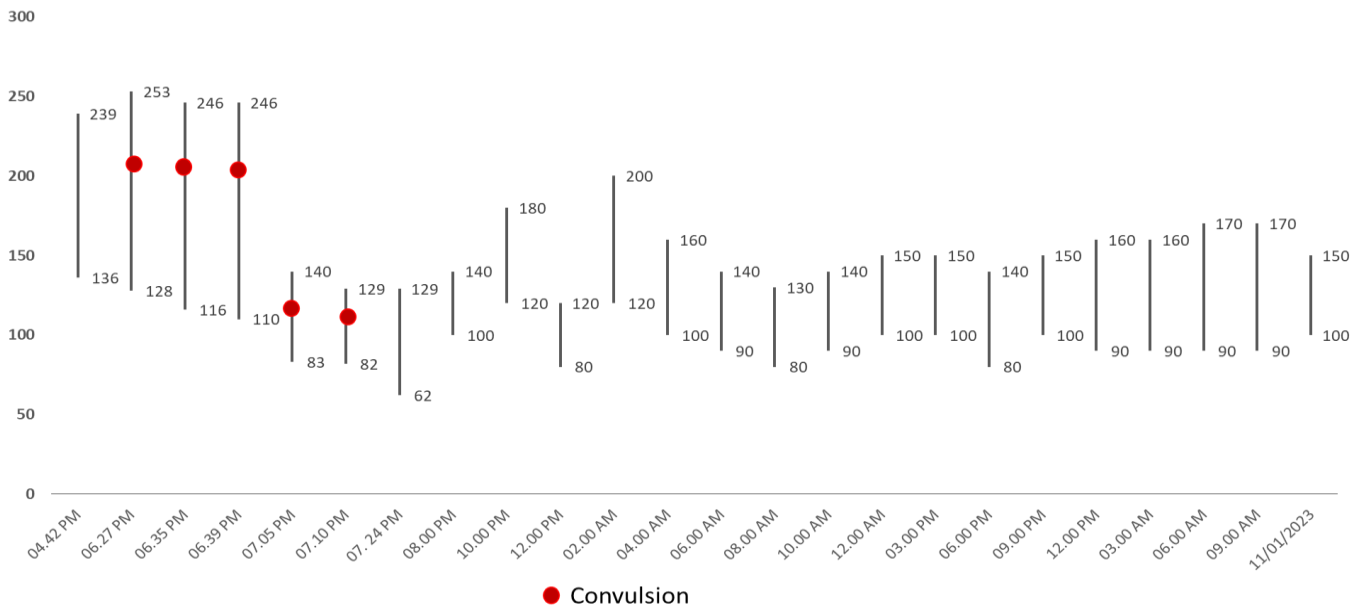
Subsequently, the patient was transferred to the operating room. The patient's preoperative condition was unstable. Basic monitoring, including BP, HR, Electrocardiogram, and pulse oximetry was applied. The initial vital signs were BP 171/101 mmHg, HR 113 beats/min, RR 29 times/minute in a semi-fowler position, and SpO<sub>2</sub> 98-99% with 15 liters/minute non-rebreathing mask oxygenation. After preoxygenation, anesthesia was induced with Rapid Sequence Intubation (RSI), with midazolam 2mg, fentanyl 50 mcg, propofol 100 mg, and rocuronium 40 mg along with cricoid pressure. The trachea was intubated with a cuffed orotracheal tube (7-mm internal diameter). Anesthesia was maintained with 0.5-1% isoflurane in oxygen 3 liter/minute. Hydration was maintained with a peripheral IV line–(Ringer's lactate). The neonate had an Apgar score of 3 at birth. The Apgar score improved to 4 at 3 minutes and 5 at 5 minutes. The neonate was transferred to the neonatal intensive care unit (NICU) for further management under the supervision of a pediatrician. The rest of the intraoperative procedures was successfully performed. After completion of the surgery, she was transferred to the intensive care unit for observation.

**Table 2.** Urine Analysis

Examination	Result
Specific gravity	1.020
pH	6.0
Urine color	Cloudy yellow
Urine bilirubin	Negative
Urine protein	+++ (3+)
Urine glucose	Negative

Urine ketone	Negative
Blood	+++ (3+)

The patient was moved to the ICU for close monitoring after undergoing an emergency C-section. The patient was treated with continuous magnesium sulfate infusion, analgesia, and furosemide pump to regulate her BP per hospital protocol. However, she was given a mechanical ventilator for her respiratory support. Over the next 30 minutes, her BP suddenly increased to 239/136 mmHg. She was given furosemide and isosorbide dinitrate (ISDN) continuous infusion, captopril 25 mg extra, hydrochlorothiazide, and spironolactone to regulate her BP with an initial target to reduce her BP to systolic blood pressure (SBP) 160 mmHg and diastolic blood pressure (DBP) 105 mmHg immediately.



**Fig 1.** Blood Pressure and Seizure Monitoring (Summary graphs of seizure-related blood pressure (in red).

Nevertheless, it was challenging to regulate her BP. Thus, treatment with titrated nicardipine infusion was added. During her BP spike, the patient had 3 episodes of seizures. She was given intravenous magnesium sulfate 2 gram (g) followed by continuous infusion of 1 g every hours and midazolam 5 mg intravenously for every seizure episode. However, the seizure continue to persist despite having her BP decreased to 140/83 mmHg (Fig. 1). After achieving her BP target, the patient had two more episodes of seizure, therefore we presume that the seizure wasn't purely caused by eclampsia. Treatment with a loading dose of phenytoin was added to control her seizure. Fortunately, after phenytoin administration, her seizures stop and did not recur (Table 3).

**Table 3.** Blood Pressure and Seizure Management and Monitoring

Date	Time	Systolic	Diastolic	Note
	04.42 pm	239	136	Furosemide pump 10mg/h, ISDN pump 0,5 mg/h, Captopril 25 mg, Lisinpril 1x10 mg, Amiodipin 1x10 mg, HCT 3x25 mg, Spironolactone 2x25 mg
8/1/2023	06.27 pm	253	128	MgSO <sub>4</sub> 2 gr Bolus, MgSO <sub>4</sub> 1 gr/hour, Midazolam 5 mg
	06.35 pm	246	116	MgSO <sub>4</sub> 2 gr Bolus, MgSO <sub>4</sub> 1 gr/hour, Midazolam 5 mg
	06.39 pm	246	110	MgSO <sub>4</sub> 2 gr Bolus, MgSO <sub>4</sub> 1 gr/hour, Midazolam 5 mg, Nicardipine pump 1

				mikro/kgbw/minute
07.05 pm	140	83		MgSO <sub>4</sub> 2 gr Bolus, MgSO <sub>4</sub> 1 gr/hour, Midazolam 5 mg, Nicardipine pump stop
07.10 pm	129	82		MgSO <sub>4</sub> 2 gr Bolus, MgSO <sub>4</sub> 1 gr/hour, Midazolam 5 mg, Fenitoin 3x1 amp
07.24 pm	129	62		MgSO <sub>4</sub> 1 gr/hour, ISDN Stop

On the next day, the patient's vital signs were stable, as follows: Blood pressure 156/104 mmHg, HR 103, RR 20, SpO<sub>2</sub> 98% with a GCS level E4VxM6, thus she was weaned from the ventilator and extubated. BP management was tapered off as shown in graphic 1. The patient was moved to the regular ward on the same day. On subsequent follow-up the next day, the seizure did not recur and the vital signs were stable, then she was scheduled to have an electroencephalogram (EEG) procedure. The EEG test revealed no epileptogenic wave was found (Fig. 1). We evaluated the patient's hemodynamic and clinical condition day by day until the patient reaches stable conditions under oral medication. The patient was stable hemodynamically and clinically, then she was discharged home. Her last medications were as follows: amlodipine, spironolactone, hydrochlorothiazide, cefadroxil, mefenamic acid, phenytoin, iron tablet, pyridoxine, and folic acid. The patient was advised to do a regular check-up with an obstetrician, cardiologist, and neurologist. Cefadroxil is a first-generation  $\beta$ -lactam antibiotic belonging to the cephalosporin class. Its spectrum of activity is effective against Gram-positive bacteria such as *Staphylococcus* sp., *Streptococcus* sp., and *Pneumococcus* sp. This broad-spectrum activity makes cefadroxil capable of killing various types of microorganisms, both Gram-positive and Gram-negative [36].

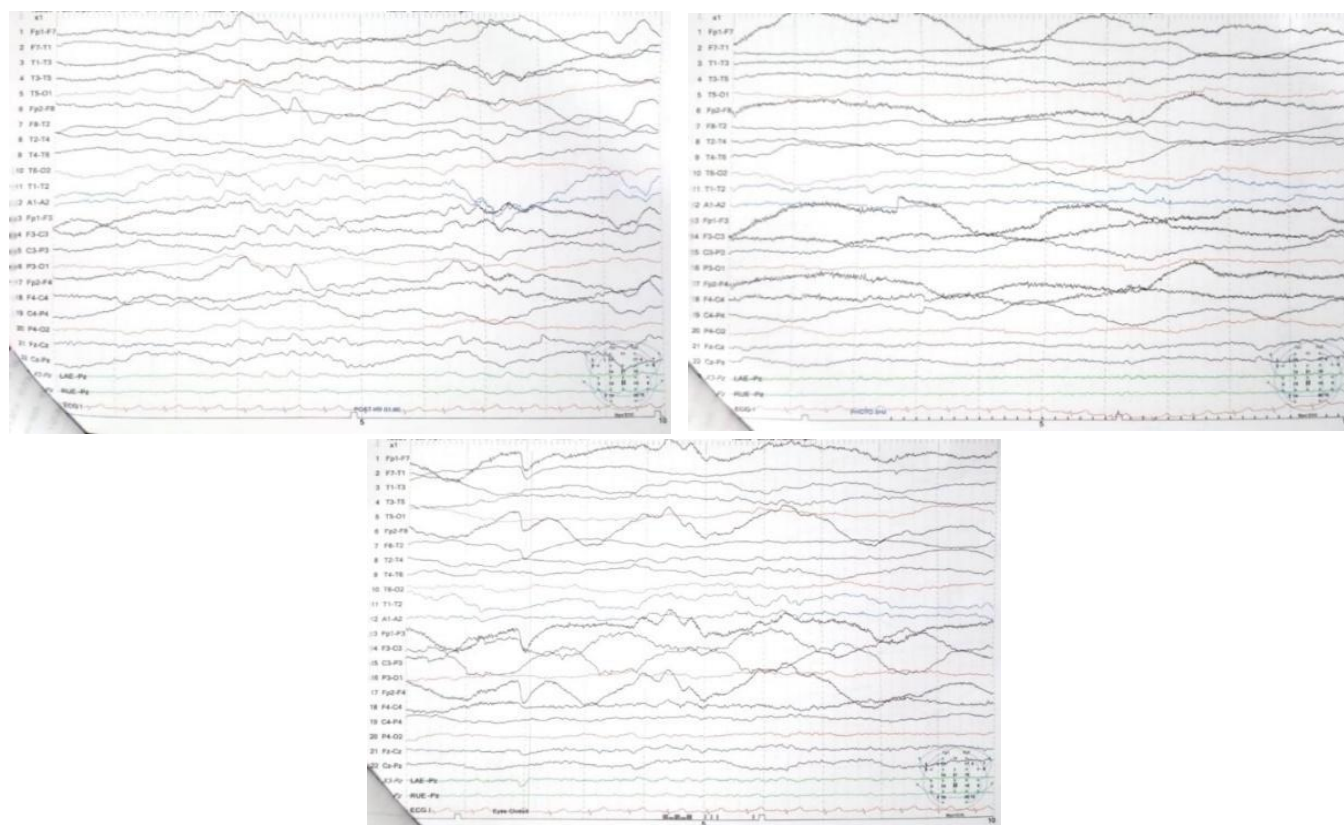


Fig 2. Graphic Electroencephalogram (EEG) wave.

**DISCUSSION**

Epilepsy is diagnosed in individuals who have experienced two unprovoked seizures or one seizure with indications of a high risk of recurrence. Confirming and diagnosing epilepsy can be challenging, primarily depending on the detailed description

of the seizures. Various conditions can lead to epilepsy, though frequently, no specific cause is identified. These conditions include brain infections, brain injuries, brain malformations, metabolic disorders, stroke, dementia, and genetic abnormalities. Epilepsy and eclampsia are two medical conditions that can cause seizures, but they have different causes, symptoms, and management. Epilepsy is a chronic neurological disorder characterized by a tendency to experience recurrent seizures that are not triggered by an acute cause. Seizures in epilepsy can be caused by various factors, including genetic abnormalities, brain injuries, infections, or developmental brain disorders. Diagnosis of epilepsy is usually made through a medical history evaluation, neurological examination, and additional tests such as an electroencephalogram (EEG) and brain imaging (like MRI or CT scans) [4].

In preventive healthcare, it is important for women to receive guidance from knowledgeable healthcare professionals regarding healthy practices during pregnancy. This includes gaining a better understanding of warning signs related to pregnancy and childbirth, as well as obtaining social, emotional, and psychological support during this crucial stage of their lives. This version emphasizes the importance of preventive healthcare for women during pregnancy without focusing on specific medical histories or diagnoses. Additionally, antenatal care offers pregnant women access to supplements containing essential micronutrients, treatment for hypertension to avert eclampsia, and vaccination against tetanus. Moreover, it includes HIV screening and provision of medications to prevent HIV transmission from mother to child. In regions where malaria is prevalent, healthcare providers can offer pregnant women medication and insecticide-treated mosquito nets to prevent this debilitating and potentially fatal disease.

Eclampsia, on the other hand, is a serious complication of preeclampsia, which occurs during pregnancy. Eclampsia is characterized by seizures in pregnant women who already have high blood pressure and signs of organ damage, such as protein in the urine [9]. Eclampsia can be life-threatening for both the mother and the fetus. Diagnosis of eclampsia is based on the presence of seizures in a woman with known preeclampsia, and often does not require further neurological tests like an EEG because of its clear association with pregnancy conditions [6].

In terms of management, epilepsy is often treated with antiepileptic drugs to control seizures in the long term. In contrast, eclampsia requires emergency and immediate treatment to manage seizures and prevent further complications, often through the administration of magnesium sulfate and medical interventions to stabilize blood pressure and terminate the pregnancy if necessary. Understanding the differences between epilepsy and eclampsia is crucial for providing appropriate care and avoiding serious complications [7].

Individuals with epilepsy (PwE) face a heightened risk of experiencing acute myocardial infarctions and sudden cardiac death compared to the general population. Various factors contribute to the increased likelihood of cardiovascular illness and death in PwE, including the adverse effects of anti-seizure medications on the electrical properties of heart muscle cells and circulating blood components (such as lipids and related proteins, which are significant risk factors for coronary artery disease). Additionally, epilepsy-related negative impacts on the autonomic nervous system (ANS) can result in heightened sympathetic activity, thereby promoting heart rhythm disturbances and disrupted control of arterial blood pressure (BP). Furthermore, seizures frequently lead to disruptions in cardiac function, which are often associated with different seizure types and may contribute to mortality in a considerable portion of individuals with epilepsy. This article focuses on systemic BP, its changes in PwE, and its role in cardiovascular illness, death, and potentially sudden unexpected death in epilepsy (SUDEP).

Seizure disorder in pregnancy affects both maternal and perinatal complications. Apart from the idiopathic cause, there are several causes of seizures in pregnancy such as eclampsia, antiphospholipid syndrome, cerebral infarction, drug and alcohol withdrawal, and hypoglycemia [7]. Peripartum seizure is a common manifestation of eclampsia and/or epilepsy. The incidence of seizure disorder in pregnancy is estimated at 0.3% to 0.5% of all births. Usually, seizures that occurred during pregnancy are

thought to be eclampsia. Eclampsia is defined by new-onset tonic-clonic, focal, or multifocal seizures in the absence of other causative conditions, and it is seen after 20 weeks of gestation and 48 hours after delivery [8,9]. In the western world, the incidence of eclampsia is estimated 1 in 2000 to 1 in 3000 pregnancies, but the incidence is 10 times higher in undeveloped countries where there is poor antenatal care [11]. Typically, eclamptic seizures do not last for more than 3 to 4 minutes. Most patients become responsive within 10 to 20 minutes [11]. Epilepsy is also a common neurological disorder occurred in pregnancy. There are over 2.5 million women with epilepsy in India and up to 25% of them are in the reproductive age group, whereas in Indonesia, there is no exact data regarding the incidence of epilepsy during pregnancy. Though the majority of cases are uncomplicated but there are increased obstetric risks and adverse neonatal outcomes, compared to the general population. The frequency of seizures is increased during pregnancy in one-third of women with epilepsy [8,12]. Our patient has poor antenatal care, the patient never checked her pregnancy so the history of illness during pregnancy was not recorded, including hypertension. The patient came to ER with two episodes of generalized seizure with features suggestive of eclampsia along with a history of epilepsy. We were in dilemma to determine the management of seizures in this case.

Eclampsia is considered one of the most serious acute complications of pregnancy, as it carries high maternal and neonatal morbidity. The pathogenesis of eclamptic seizures is not well understood. One proposed model for eclampsia is the alteration of autoregulation in the cerebral circulation similar to hypertensive encephalopathy with blood-brain barrier (BBB) disruption and passage of fluid, ions, and plasma proteins into the brain parenchyma [13]. Eclamptic convulsions onset may happen during the antepartum, intrapartum, or postpartum period. Classically, preeclampsia and eclampsia were believed to occur only within 48 hours postpartum. Nonetheless, recent studies found that late or delayed postpartum eclampsia may occur >48 hours but <6 weeks after delivery [14,15].

Epilepsy may deteriorate during pregnancy. Reasons for deterioration during pregnancy include poor compliance, nausea and vomiting, increased volume of distribution, changes in protein binding, increased drug clearance, lack of sleep, reduction of absorption of antiepileptic drugs from the gastrointestinal tract, hyperventilation during labor, and hormonal changes [19]. Pregnancy is associated with changes in metabolic hormones. Hormones that have an influence on seizure occurrence in pregnancy are estrogen and progesterone. In pregnancy, blood estrogen level will decrease so that it will stimulate the activity of glutamate decarboxylase enzyme, and therefore the synthesis of gamma amino butyric acid (GABA) in brains will be decreased. This decrease in the concentration of brain GABA will excite the epileptic seizure. The physiologic alteration during pregnancy will cause hemodilution. Because of decreased glomerulus filtration will cause fluid retention and edema. The fluid retention will cause hyponatremia. This condition will produce partial disturbance of the sodium pump that causes increased neuronal excitability and precipitates seizure [12,20,21].

Imaging is interesting for a better understanding of the pathophysiology of eclampsia. In the clinical practice the decision to perform CT or MR imaging as first choice in order to exclude haemorrhagic lesions or other major complications should be more restrictive. CT or MR imaging should undergo in patients with focal neurologic deficit, or signs of mass effect, or decrease in the level of consciousness. Abnormal findings on neuroimaging have been noted in as many as 80-90% of women with eclampsia. Most common lesions are seen in parieto-occipital lobes in the distribution of posterior cerebral arteries. This lesion occurs as result of vasogenic oedema induced by endothelial damage and other damages contributing to pathophysiology of eclampsia. Varied picture of cerebral pathology showing evidences of cerebral oedema, micro infarct, cortical petechiae and pericapillary hemorrhages which clinically manifest as headache, confusion, seizures, visual disturbances [28]. As we seen in our patient that had decreased level of consciousness, CT or MR imaging could be done to exclude other causes or complications, but we can not do CT imaging because we had limitation of facility.

The initial management of patient with active seizure in pregnancy should include maintaining the airway, breathing, and support adequate perfusion. Close attention to the fetus must be applied, immediate delivery of a viable fetus and maintenance of maternal health are the therapeutic goals. Administration of parenteral magnesium sulfate, followed by an emergency C-section is a reasonable approach in this patient [7]. The choice of anesthetic technique in patient with pre-eclampsia and eclampsia depends of various factors, including mode of termination (vaginal/cesarean section), the patient's medical status (coagulopathy, respiratory problems), and the patient's consciousness. In mild or moderate pre-eclampsia, the patient may be allowed to proceed with normally. In severe pre-eclampsia or eclampsia, the patient should deliver the baby immediately. Regional and general anesthesia can be considered as the management of anesthesia for cesarean section. Regional anesthesia can be given if the patient is conscious, seizure free with stable vital signs and no signs of raised intracranial pressure (ICP). General anesthesia (GA), is the choice of unconscious patient e.g eclampsia or immediately post ictal, or the following problems; imminent eclampsia, serious coagulation abnormalities, anatomical problems with insertion regional block, sepsis at the site of regional block [29,30]. In this patient we choose GA with the RSI technique because the patient was unconscious and need immediate c-section. RSI is a technique that is used when rapid control of the airway is needed as a precaution for patients that may have risks of reflux and aspiration of gastric contents. RSI is almost universally applied in emergency situations such as unfasted patient or unknown fasting status e.g trauma patients, emergency surgery, resuscitation situations, and in patient with reduced conscious level [31,32].

**Table 4.** This table highlights the key diagnostic differences between epilepsy and eclampsia, including causes, symptoms, diagnostic methods, management, and affected populations.

Aspect	Epilepsy	Eclampsia
<b>Definition</b>	A chronic neurological disorder with a tendency for recurrent, unprovoked seizures.	A serious complication of preeclampsia during pregnancy, characterized by seizures.
<b>Primary Causes</b>	Genetic abnormalities, brain injury, infections, developmental brain disorders.	High blood pressure and organ damage associated with pregnancy.
<b>Key Symptoms</b>	Seizures, which may include loss of consciousness, behavioral changes, or uncontrolled movements.	Seizures, high blood pressure, proteinuria, severe headaches, visual disturbances.
<b>Timing</b>	Can occur at any time in individuals with epilepsy.	Occurs only during pregnancy, labor, or shortly after delivery.
<b>Diagnostic Tests</b>	EEG, MRI or CT scan, medical history evaluation.	Clinical diagnosis based on symptoms; neurological tests like EEG not typically necessary.
<b>Management</b>	Antiepileptic drugs for long-term control, lifestyle modifications.	Magnesium sulfate, blood pressure stabilization, and sometimes delivery of the baby.
<b>Affected Population</b>	All ages and genders.	Pregnant women with preeclampsia.

Women with eclampsia should be closely monitored for at least 72 hours [16]. Magnesium sulfate is used to prevent recurrent convulsions in women with eclampsia. Maintenance infusion of 1–2 g/hour following either a 4- or a 6-g loading dose over 20–30 minutes is recommended. Magnesium sulfate infusion should ideally begin before surgery and continue during surgery, as well as for 24 hours afterward [9]. However, despite receiving maintenance infusion of magnesium sulfate the seizure in our patient recurred 2 hours following delivery. Thus, our patient received 2 g of magnesium sulfate bolus that can be given intravenously (IV) over 3 to 5 minutes for recurrent seizure. Our patient creatinine level is higher than 1.2 mg/dL, therefore the loading dose of magnesium sulfate should be followed by a maintenance dose of only 1 g/h [16]. Nevertheless, our patient was given mechanical ventilator for her respiratory support, hence anxiety, agitation, and restlessness can negatively impact the

hemodynamic stability. Thus, midazolam administration is reasonable in our patient as a fast-acting benzodiazepine and has been used for sedation and as an anticonvulsant including eclampsia [17]. Midazolam is a benzodiazepine which is now the recommended first-line drug for treating seizure and status epilepticus. In cases refractory to magnesium sulfate (still seizing at 20 minutes after the bolus or more than two recurrences), a health care provider can use sodium amobarbital (250 mg IV in 3 minutes), thiopental, or phenytoin (1.250 mg IV at a rate of 50 mg/minute) [9].

Globally, the prevalence of hypertension in pregnancy is 5%–10%. A hypertensive emergency is the association of substantially elevated BP with acute hypertension-mediated organ damage (HMOD). Labetalol or nifedipine and magnesium sulfate is the first-line treatment for the management of hypertensive emergencies in eclampsia. The initial target in the management of hypertensive emergencies in eclampsia is to decrease the BP to SBP <160 mmHg and DBP <105 mmHg immediately. During her BP spike following delivery, our patient was given furosemide and isosorbide dinitrate (ISDN) continuous infusion, captopril, hydrochlorothiazide, spironolactone, and nifedipine continuous infusion to reach her BP target immediately. However, despite achieving her BP target, the patient had two more episodes of seizure, therefore we presume that the seizure wasn't purely caused by eclampsia. Epilepsy may contribute to the occurrence of seizures in our patient [18].

Most pregnant woman with epilepsy has greater risk of complications due to seizure. Complications of pregnancy and labor for mothers with epilepsy significantly increase. Woman with epilepsy demonstrated increased risk of bleeding in pregnancy, pre-eclampsia, induction of labor, low birth weight <2500 g, low Apgar score < 5 after 1 minute and <7 after 5 minutes, and higher mortality rate in the neonatal period [33]. Asphyxia occurred in infants of mothers with epilepsy. 60% of infants with low 1-min Apgar scores developed asphyxia as did 40% of infants with low 5-min Apgar scores. Asphyxia of the infants suggests the possibility that the infants may be vulnerable to the effect of anticonvulsant medication too. Physicians should be alerted to this possibility and standby support by pediatrician [34]. As we seen in our patient that the baby had a poor Apgar score at delivery the baby had severe asphyxia with an Apgar score 3 and improved by adequate resuscitation, even after resuscitation the Apgar score was still low and indicated severe asphyxia. After resuscitation, the baby was transferred to the neonatal intensive care unit (NICU) for further management under the supervision of a pediatrician.

To differentiate between eclampsia and epilepsy in pregnant patients, it is crucial to consider several key factors. Eclampsia usually occurs following preeclampsia and is characterized by sudden seizures accompanied by other symptoms such as hypertension and proteinuria. Seizures in eclampsia are typically not related to a prior history of epilepsy and often occur after the pregnancy has entered the third trimester. In contrast, epilepsy is a neurological disorder that can occur in pregnant women independently of preeclampsia, and its seizures may have a history or specific pattern consistent with an existing epileptic condition. A thorough medical evaluation, including medical history, physical examination, and additional tests such as electroencephalogram or blood tests, is often necessary to distinguish between these two conditions and provide appropriate management.

Perinatal asphyxia is a lack of blood flow or gas exchange to or from the fetus in period immediately before, during, or after birth process which may lead to progressive hypoxemia and hypercapnia. Generalized tonic clonic seizures are harmful to the fetus due to an increase blood pressure, oxygenation, and electrolyte changes during a seizure. Increase in intrauterine pressure during seizure also decrease uteroplacental blood flow. It leading to changes in umbilical arterial blood gas. Fetal damage may be caused by metabolic changes attributable to prolonged generalized tonic clonic seizures. Prolonged generalized tonic-clonic seizures may even result in fetal bradycardia and fetal death, even in the absence of maternal hypoxia. According to the American College of Obstetricians and Gynecologists, it is also a clinical situation of damaging hypoxia and metabolic acidosis. Asphyxia may also occur temporarily without causing pathologic sequelae. However, when a fetus is severely affected by asphyxia, it may result in a decrease in oxygenation of tissues, acid accumulation, and metabolic acidosis [35].



## CONCLUSION

Seizure disorders in pregnancy are associated with an increase in the risk of maternal and neonatal outcomes. Current article stated that not all seizures in pregnancy are caused by eclampsia. When atypical features present and clinical status deteriorated is crucial to differentiate from other causes such as epilepsy. A multidisciplinary approach with early diagnosis and prompt management strategy plays important roles to a better outcome. The case of a 28-year-old multigravida woman with recurrent seizures and hypertension, who has a history of epilepsy, aims to contribute to the understanding of managing this condition during pregnancy and to emphasize the importance of accurate diagnosis and effective management in such situations.

## ACKNOWLEDGEMENT

The authors would like to thank all those who have assisted in the process of accomplishing the case report, especially the health workers in 'Aisyiyah Bojonegoro Hospital, dr. Pramono and dr. Nurcholis that guides us during the internship period in the hospital.

## REFERENCES

- [1] Paula JCR, Aquino LO, Padua BJ, Leite HV, Cabral ACV, Brandão AHF. Neurological syndromes during pregnancy. *Femina*. 2015;43(3):119-124.
- [2] Green Top Guideline No.68. Epilepsy in pregnancy. Royal College of Obstetricians & Gynaecologists; 2016.
- [3] Beach RL, Peter WK. Seizures in pregnancy: diagnosis and management. *International review of neurobiology*. 2008;83:259-271.
- [4] Simon RH. Brain tumors in pregnancy. *Semin Neurol*. 1988;8(3):214-221.
- [5] Borthen I. *Obstetrical Complications in Women with Epilepsy*. Elsevier. 2015;28:32-34.
- [6] Borthen I, Eide M, Veiby G, Daltveit A, Gilhus N. Complications during pregnancy in women with epilepsy: population-based cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2009;116(13):1736-1742.
- [7] Pandey R, Garg R, Darlong V, Punj J, Khanna P. Recurrent seizures in pregnancy-Epilepsy or eclampsia: A diagnostic dilemma? A case report. *AANA J*. 2011;79(5):388-390.
- [8] Sharma A, Gupta V, Sarda P, Singh P, Gupta N, Kohli S. Seizure disorders in pregnancy: an insight beyond eclampsia and epilepsy. *Int J Reprod Contraception, Obstet Gynecol*. 2021;10(11):4201.
- [9] American College of Obstetricians and Gynecologists. *ACOG Practice bulletin-Obesity in Pregnancy*. 2016;123(5):1118-1132.
- [10] Cipolla MJ, Kraig RP. Seizures in women with preeclampsia: Mechanisms and management. *Fetal Matern Med Rev*. 2011;22(2):91-108.
- [11] Wright WL. Neurologic complications in critically ill pregnant patients [Internet]. *Handbook of Clinical Neurology*. Elsevier B.V. 2017;141:657-674.
- [12] Wiradnyana IMBKAAGP. Management of Pregnancy with Epilepsy: A Case Report. *Int J Sci Res*. 2018;7(5):925-929.
- [13] Hauspurg A, Jeyabalan A. Postpartum preeclampsia or eclampsia: defining its place and management among the hypertensive disorders of pregnancy. *American Journal of Obstetrics and Gynecology*. 2022;226(2):S1211-S1221.
- [14] Chames MC, Livingston JC, Ivester TS, Barton JR, Sibai BM. Late postpartum eclampsia: A preventable disease?. *American Journal of Obstetrics and Gynecology*. 2002;186(6):1174-1177.
- [15] Matthys LA, Coppage KH, Lambers DS, Barton JR, Sibai BM. Delayed postpartum preeclampsia: An experience of 151 cases. *American Journal of Obstetrics and Gynecology*. 2004;190(5):1464-1466.
- [16] Fishel BM, Sibai BM. Eclampsia in the 21st century. *American Journal of Obstetrics and Gynecology*. 2022;226(2):S1237-S1253.
- [17] Rashid MR, Najeeb R, Mushtaq S, Habib R. Comparative evaluation of midazolam, dexmedetomidine, and propofol as Intensive Care Unit sedatives in postoperative electively ventilated eclamptic patients. *Journal of anaesthesiology, clinical pharmacology*. 2017;33(3):331-336.
- [18] Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et.al. International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*. 2020;75(6):1334-1357.
- [19] Calderwood C, Nelson-Piercy C. Medical disorders complicating pregnancy. *Anaesth Intensive Care Med*. 2004;5(8):256-263.
- [20] O'Connor SE, Zupanc ML. Women and Epilepsy. *J Pediatr Pharmacol Ther*. 2009;14(4):212-220.
- [21] Taubøll E, Sveberg L, Svalheim S. Interactions between hormones and epilepsy. *Seizure*. 2015;28:3-11.
- [22] EURAP Study Group. Seizure control and treatment in pregnancy: Observations from the EURAP Epilepsy Pregnancy Registry. *Neurology*. 2006;66(3):354-360.
- [23] National Institute for Health and Care Excellence. The 17. epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care. NICE clinical guideline 137. [Manchester]: NICE; 2012.
- [24] Niedermeyer E, Lopes da Silva F. *Electroencephalography: Basic Principles, Clinical Applications, and Related Fields*. Baltimore: Williams & Wilkins; 1999.

- [25] Panayiotopoulos CP. *The Epilepsies: Seizures, Syndromes and Management*. Oxfordshire (UK): Bladon Medical Publishing; 2005.
- [26] Binnie CD, Prior PF. Electroencephalography. *J Neurol Neurosurg Psychiatry*. 1994;57:1308-1319.
- [27] Benbadis SR, Tatum WO. Overinterpretation of EEGs and misdiagnosis of epilepsy. *J Clin Neurophysiol*. 2003;21:42-44.
- [28] Gurjar B, Rawat RP. CT scan findings in patients of Eclampsia. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2017;6(8):3405.
- [29] Wima T, Agustina Br. Haloho. Anesthesia Management in Caesarean Section with Preeclampsia and Partial HELLP Syndrome. *J Anesthesiol Clin Res*. 2020;1(1):8-14.
- [30] Parthasarathy S, Ravishankar M, Sripriya R, Hemanth KV. Anesthetic management of a patient presenting with eclampsia. *Anesth Essays Res*. 2013;7(3):307.
- [31] Ross W, Ellard L, Baitech L. Anaesthesia Tutorial. World Congress of Anaesthesiologists; 2016. p. 1-8. Available from: [www.wfsahq.org/resources/anaesthesia-tutorial-of-the-week](http://www.wfsahq.org/resources/anaesthesia-tutorial-of-the-week) G E N E R A L Tutorial 331 Key Points Rapid Sequence Induction.
- [32] Klucka J, Kosinova M, Zacharowski K, De Hert S, Kratochvil M, Toukalkova M, et al. Rapid sequence induction: An international survey. *Eur J Anaesthesiol*. 2020;37(6):435-442.
- [33] Northern I. *Obstetrical Complications in Women with Epilepsy*. Elsevier. 2015;28:32-33.
- [34] Yerby M, Koepsell T, Daling J. Pregnancy complications and outcomes in a cohort of women with epilepsy. *Epilepsia*. 1985;26:632-635.
- [35] Ozdemir O, Sari ME, Ertuğrul FA, Kurt A, Selimova V, Atalay CR. The effects of a history of seizures during pregnancy on umbilical arterial blood gas values in pregnant women with epilepsy. *J Turk Ger Gynecol Assoc*. 2014;15(3):135-139.
- [36] Hauser AR. *Antibiotic basics for clinicians: Choosing the right antibacterial agent*. Lippincott Williams & Wilkins; 2007.