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AUTHOR'S AFFILIATIONS
Department of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Islam Indonesia, Sleman, Indonesia[1]
General Practitioner, Nusa Medica Clinic, Bekasi Regency, West Java, Indonesia[2]

CORRESPONDING AUTHOR
Abd. Basith, Department of Anesthesiology and Intensive Care, Faculty of Medicine, Universitas Islam Indonesia, Sleman, Indonesia[1]
E-mail: abd.basith@uii.ac.id

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Anesthesia Management in Patient with Eclampsia and HELLP Syndrome: A Case Report

Abd. Basith[1], Muhammad Luthfi Adnan[2]*

Abstract

Background: Eclampsia and HELLP Syndrome is one of the emergency that occurs in pregnant women and is one of the causes of death in pregnant women and fetus. It can be a challenge for an anesthesiologist for anesthetic management during and after pregnancy termination. **Objective:** This report presents anesthetic management using combination propofol, rocuronium, and fentanyl in cases of eclampsia with HELLP syndrome and monitoring during pregnancy termination surgery. **Case Presentation:** A 24-year-old female patient with a gestation age of 36 weeks came to the emergency room with seizure. During the latest antenatal care found high blood pressure (160/100 mmHg). Based physical and laboratory findings the patients diagnosed eclampsia and HELLP syndrome. The patient was given general anesthesia with induction of propofol 2 mg/kg with a rapid bolus, rocuronium 1 mg/kg IV, and fentanyl 2 mcg/kg with endotracheal intubation. During surgery, the patient was hemodynamically stable and the baby was born with an Apgar score of 9/10. The patient was admitted to the ICU for vital signs monitoring for 4 days before being discharged after the sixth day. **Result:** Patients with eclampsia and HELLP syndrome require careful anesthetic management because it not only impacts maternal condition, but also the outcome of the neonates. **Conclusion:** This condition required special treatment including by anesthesiologists. Treatment includes how to deal with seizures, the choice of anesthesia technique, prevention of seizures and intraoperative fluids management and ensuring safety for both the mother and the fetus. Lot of controversies with regard to fluid management and monitoring still remain unanswered.

Keywords: Anesthesia, caesarean section, eclampsia, HELLP syndrome, seizure management

Case Report

INTRODUCTION

Eclampsia is a generalized tonic-clonic seizure in patients with preeclampsia without other causes (Fishel Bartal & Sibai, 2022). Eclampsia including other complication of hypertension in pregnancy which causes 50.000 maternal deaths annually almost worldwide (Susanu et al., 2024). Most common eclampsia occurs antepartum (almost 80%), while eclampsia in intrapartum and postpartum has similiar rate (Varudhini et al., 2025). Approximately 5% of patients with eclampsia will experience decreased consciousness, including coma after a seizure occurs (Fishel Bartal & Sibai, 2022). HELLP

syndrome is a disease that is often considered a variation of preeclampsia/eclampsia which is characterized by hemolysis (H), elevated liver enzymes (EL), and low platelets (LP), however, HELLP syndrome can stand alone without preeclampsia/eclampsia (Lisonkova et al., 2021). HELLP syndrome and eclampsia are challenging complications during pregnancy for both obstetricians and anesthesiologists due to the vulnerability of the condition from arrival in the emergency room to post-operative recovery.

Management of maternal delivery with eclampsia is challenging due to the high risk of mortality during cesarean section and its impact on maternal and neonatal outcomes (Devabhaktuni et al., 2023; Irene et al., 2021). In addition to anesthetic interventions, anesthesiologists play a vital role in maternal survival by maintaining airway patency, controlling seizures, and preventing more severe complications from eclampsia and HELLP syndrome (Laskowska & Bednarek, 2023). Postpartum monitoring is also essential due to the risk of hemodynamic compromise due to hematologic abnormalities such as disseminated intravascular coagulation (DIC) (Poimenidi et al., 2022). Given the severity of the condition, appropriate anesthetic management is essential to avoid the risk of worsening during hospitalization. In this case, we report a case of eclampsia with HELLP syndrome who received a combination of anesthesia types during pregnancy termination and close monitoring until discharge.

CASE PRESENTATION

A 24-year-old female patient with a gestation age of 36 weeks came to the emergency room with first seizure 3 hours before coming to the hospital with a duration of 3-5 minutes, a seizure with clinical eyes rolling upwards and a slump throughout the body. During the journey, the patient had another seizure 20 minutes before arriving at the ER. History of ANC at the midwife 3 times, never had an ultrasound, no contractions or discharge of mucus or blood, history of ruptured amniotic fluid denied, fetal movement active. The morning before the seizure, the patient had ANC at the midwife and found a BP of 160/100 mmHg. The patient had no previous history of high blood pressure. When he arrived at the emergency room, the patient was unconscious for a while, but after that, the patient returned to consciousness. History of asthma, allergies, diabetes, hypertension before pregnancy, and history of other comorbidities were denied.

From the physical examination in the emergency room, patient has loss of consciousness (E3M5V3), high blood pressure (160/110 mmHg), tachycardia (Heart rate113 x/minute), with respiratory rate 20 x/minute, SpO2 95-97% on nasal cannula 3 liters per minute (lpm). Physical examination revealed no abnormalities or edema in the extremities. Laboratory examination showed thrombocytopenia (99,000 µL), leukocytosis (23,520/uL), normal PT and aPTT, LDH (B) 1478, and increased liver enzymes (SGOT=318, SGPT=84). During transfer from emergency room to operating room, patient has seizure again. The patient's physical status was assessed as ASA 4E with diagnosis of post-seizure loss of consciousness due to Eclampsia with HELLP Syndrome. The patient received MgSO4 therapy at a dose of 4-gram bolus IV, the antiemetic Metoclopramide 10 mg IV, Ranitidine 50 mg IV with Ringer acetate solution, pre-oxygenation was carried out with 100% oxygen, the patient was planned for general anesthesia, planned for preoperative fasting, and post-operative care in the ICU.

The patient experienced seizures again while being transferred to the operating room and stopped when he arrived at the operating room but the patient was in an agitated condition and the intravenous access was removed. In the operating room, vital signs showed blood pressure 180/110 mmHg, pulse 116 bpm, RR 28 x/minute, and SpO2 98%. After re-insertion of intravenous access, general anesthesia is chosen to avoid the potential for spinal or epidural hematoma, then induction is performed using the anesthetic agent propofol 2 mg/kg with a rapid bolus, rocuronium 1 mg/kg IV, and fentanyl 2 mcg/kg. The patient was intubated with standard endotracheal tube No. 7 with fixation at 21 cm. Ventilation was provided with a tidal volume of 400, RR 12 x/minute, PEEP 5 cmH2O, with an oxygen fraction of 50%. Post-intubation blood pressure 130/90 mmHg, HR 103 x/minute.

Maintenance anesthesia is given with sevoflurane at 0.8-1 MAC. The choice of sevoflurane is preferred because it is safer in maintaining hemodynamic stability, especially in patients who have unstable blood pressure fluctuations.

The baby was born with Apgar score of 9/10. After the baby was born, the patient was then given oxytocin 40 mg IV drip as a uterotonic. Intraoperative hemodynamically stable with anesthesia duration of 1 hour 30 minutes and operation duration of 1 hour 10 minutes, total bleeding was found to be 800 ml, urine output was 2 ml/kg/hour, crystalloid fluid intake was 350 ml. During surgery, systolic blood pressure was 120-170 mmHg, and diastolic 80-100 mmHg, pulse 80-100 x/minute, SpO2 99-100%. Fluid management is carried out conservatively with careful administration of crystalloids accompanied by close monitoring of blood pressure, intraoperative bleeding, and urine production.

After termination, the patient was strictly in the ICU. The patient was treated for 4 days in the ICU, then 2 days in the inpatient room with serial laboratory evaluations are performed to assess trends in platelets, hemoglobin, liver enzymes, and coagulation parameters, given the potential for these conditions to rapidly progress to multi-organ dysfunction. The patient was discharged on the 6th day of treatment. The patient's child was discharged on the 2nd day of treatment

DISCUSSION

The occurrence of eclampsia in the final trimester of pregnancy resembles other neurological disorders, such as epilepsy, encephalitis, meningitis, brain tumors, or aneurysm rupture (Fishel Bartal & Sibai, 2022; Wesley et al., 2024). If other neurological disorders can be excluded, then seizures that occur in pregnant or postpartum women can be suspected to occur due to eclampsia (Fishel Bartal & Sibai, 2022; Wesley et al., 2024). In cases of eclampsia, there is a high risk of multiorgan failure which causes an increased risk of death (Susanu et al., 2024). Some significant predictor factors for maternal and fetal outcomes such as uncontrolled blood pressure from first trimester and not having an ultrasound evaluation during antenatal care increase worsening risk (Jain et al., 2025). In this case, the patient had risk factors. systolic blood pressure ≥ 160 mmHg, increased liver enzymes, thrombocytopenia, and inadequate quality of antenatal care. In this case, there is a challenge where the patient's profile does not have factors associated with preeclampsia/eclampsia such as advanced maternal age or a history of hypertension or previous preeclampsia (Weningtyas et al., 2024). Another challenge in managing eclampsia is to rule out other differential diagnoses that can mimic it, such as brain tumors and intracranial hemorrhage as complications of eclampsia, so close monitoring is required between arrival at the ER and discharge from the hospital. In some cases, repeated seizures after cesarean delivery followed by radiological examination (CT scan or MRI) can point to the cause (El Abbassi et al., 2023; Mazur et al., 2025).

The main goal of treating eclampsia is to prevent maternal injury and maintain cardiovascular function for both mother and fetus (Laskowska & Bednarek, 2023). Maternal hypoxemia and hypercarbia due to seizures can cause changes in the fetal pulse in the form of bradycardia and uterine activity in the form of increased frequency and tone of contractions. Stabilizing the mother with antiseizure medications and oxygen and treating severe hypertension can help the fetus recover from the effects of maternal hypoxia, hypercarbia, and uterine tachysystole (Laskowska & Bednarek, 2023). However, if during monitoring the fetal heart rate does not improve after fetal and maternal resuscitation, termination of pregnancy by caesarean section is a condition that must be carried out (Akre et al., 2022).

Anesthetic management in patients with eclampsia is chosen based on the patient's condition. In patients with eclampsia and patients with severe preeclampsia, seizure status, and neurological function are assessed (Katsi et al., 2024). The possibility of increased intracranial pressure is not a cause for concern if the patient remains conscious, alert, and seizure-free although close monitoring is required. However, persistent coma and the presence of signs and symptoms indicating a primary intracranial pathological process may affect anesthetic management (Katsi et al., 2024). Fluid intake should be limited to 75 to 100 mL per hour to minimize the risk of worsening cerebral edema (Katsi et

al., 2024). Control blood pressure with antihypertensive drugs if blood pressure is found to be ≥ 160 mmHg, or if diastolic blood pressure is ≥ 110 mmHg (Laskowska & Bednarek, 2023).

Many experts consider that epidural anesthesia technique is the best choice for treating preeclampsia/eclampsia patients if there are no contraindications (Katsi et al., 2024). However, in life-threatening conditions for the mother and fetus, the general anesthetic approach is useful for shortening the decision-to-delivery interval (DDI), although its effects on maternal and neonatal complications still require further elucidation (Pečlin et al., 2024). In this case, the general anesthesia technique was chosen because this patient had coagulation disorders and instability condition. The assessment of thrombocytopenia condition is observed based on the safe limit of platelet count, in the majority of studies it is above 100,000/µL, where values below this number are at risk of developing post-operative coagulation disorders (Seymour et al., 2023).

Hazards arising from general anesthesia include airway problems, excessive hemodynamic response from endotracheal intubation, and difficulties associated with the use of muscle relaxants (Katsi et al., 2024). In pre-eclamptic patients, edema in the airway can be found which will make intubation difficult, so it can be considered to use a small endotracheal tube or if this is not possible, then a laryngeal mask can be used, although it does not completely guarantee the safety of the airway if there is regurgitation, it is better instead of using a facemask (Katsi et al., 2024). If this is not possible, the awake intubation technique can be used with topical local anesthesia. Failed intubation, ventilation, and oxygenation, and pulmonary aspiration caused by gastric contents are still the highest causes of death in pregnant women undergoing anesthesia procedures (Katsi et al., 2024). Therefore, the selection of induction and maintenance anesthetic agents is carefully selected based on their potential to provide safety during the operating room.

Thiopental is the most frequently used induction agent. It is a standard induction agent that can be used in patients with pre-eclampsia (Sabetian et al., 2021). If it is not available, propofol can be used as alternative induction agents (Sabetian et al., 2021). Propofol is now commonly used as an induction agent for general anesthesia in cesarean delivery (Sabetian et al., 2021). Propofol, in doses sufficient to induce and prevent maternal consciousness, may cause hemodynamic changes and respiratory depression in the infant compared with thiopental (Delgado et al., 2020; Sabetian et al., 2021). In patients with hemodynamic instability, ketamine or etomidate may be given to replace propofol. Intravenous propofol or ketamine may also be given to maintain the depth of anesthesia (Delgado et al., 2020).

Rocuronium can provide similar intubation conditions to that of succinylcholine for cesarean delivery and is a suitable alternative given in situations where succinylcholine should be avoided (eg, malignant hyperthermia, myotonic dystrophy, spastic paraparesis) (Choi, 2022). Some studies suggest that its use in cesarean delivery may be associated with a lower frequency of myalgia compared with succinylcholine (Choi, 2022). The use of priming preinducrelaxant dosage is not recommended in pregnant patients, because it can result in total paralysis and increase the risk of aspiration. Increased activity of nondepolarizing agents may also be observed in patients receiving magnesium sulfate (e.g., for seizure prophylaxis in women with preeclampsia or for fetal neuroprotection) (Benette et al., 2025).

Administration of intravenous opioids is often delayed until after the baby is born to minimize the potential for respiratory depression in the neonate (Baldo, 2022). However, opioids can be given if hemodynamic stability and to reduce the hemodynamic response during airway manipulation or endotracheal intubation and the response of surgical stimulation (Gerbershagen & Baagil, 2024). Fat-soluble intravenous agents with rapid onset (e.g., remifentanil, fentanyl, alfentanil) may be administered to reduce airway response to laryngoscopy and intubation.(Gerbershagen & Baagil, 2024) Long-acting liphopobic opioids such as morphine may be administered to reduce the use of volatile anesthetic agents and for intraoperative and postoperative analgesia (Gerbershagen & Baagil, 2024). Highly lipid-soluble fentanyl is 60% to 80% protein-bound, thus, approximately one-third of the dose can rapidly crosses the placental barrier (Gerbershagen & Baagil, 2024).

In cases with HELLP syndrome, the choice of drug type also needs to be determined based on the condition of liver and kidney damage, where some opioid drugs such as remifentanil are not metabolized in the kidneys or liver, thus avoiding the risk of accumulation and organ impairment (Gunaydin et al., 2022). In some cases of preeclampsia accompanied by pulmonary edema, the choice of medication can also provide benefits in reducing edema through vasodilatory effects (Tavianto et al., 2021). In this case, the use of fentanyl was a strategic choice for induction, as it can reduce oxygen demand and induce bradycardia, resulting in a slower heart rate (Tavianto et al., 2021). Although fentanyl is associated with the risk of respiratory depression in the fetus, in this case, the fetus had a normal Apgar score, which may have been influenced by maternal physiological factors.

The most critical problem for anesthesiologists is how to maintain optimum blood pressure as the therapy target mentioned previously, in addition to considering how to reduce the reflex increase in blood pressure as a result of laryngoscopy and intubation (Aksu & Palas Karaca, 2021). Another important thing is to control blood pressure after the patient is intubated and after the baby is born.(Aksu & Palas Karaca, 2021) Preoperative blood pressure assessment by an anesthesiologist is carried out on patients to assess whether hypertension medication is adequate and also assess whether there are drugs that interact with hypertension or anti-seizure medications such as MgSO4, and how the parturient responds to the medication given (Katsi et al., 2024). However, this study only limited in the single-patient design, which can limited the generalizability of the findings. Further study needed to increase effectivity and establish anesthetic management in eclampsia patients.

CONCLUSION

Management of eclampsia patients with or without HELLP syndrome involves multidisciplinary knowledge. In every case of pre-eclampsia that requires treatment, optimal patient preparation is required. Improvement of blood volume, control of hypertension, and improvement of kidney function, as well as the use of anti-seizures, will make it easier to handle anesthesia in patients with these conditions. The choice of anesthesia technique needs to be adjusted to the patient's condition. Generally, the first choice is regional anesthesia, but for patients with coagulopathy or regional contraindications, general anesthesia can be performed. Close monitoring of vital signs during treatment is necessary to prevent worsening of the patient's condition. Further studies in the form of case series or cross-sectional studies with a larger and more diverse number of patients can help provide an overview of the challenges of anesthetic management in cases of eclampsia.

CONFLICT OF INTEREST

There is no conflict of interest between authors.

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REFERENCES

Akre, S., Sharma, K., Chakole, S., & Wanjari, M. B. (2022). Eclampsia and Its Treatment Modalities: A Review Article. *Cureus*. https://doi.org/10.7759/cureus.29080

Aksu, S., & Palas Karaca, P. (2021). The Effect of Reflexology on Lactation in Women Who Had Cesarean Section: A Randomized Controlled Pilot Study. *Complementary Medicine Research*, *28*(4), 336–343. https://doi.org/10.1159/000513924

Baldo, B. A. (2022). Current research in pathophysiology of opioid-induced respiratory depression, neonatal opioid withdrawal syndrome, and neonatal antidepressant exposure syndrome. *Current Research in Toxicology*, *3*, 100078. https://doi.org/10.1016/j.crtox.2022.100078

Benette, G., Braga, A., Ribeiro, C., Fernandez, A. P., & Carvalho, V. H. (2025). Influence of magnesium sulfate on the pharmacodynamic characteristics of rocuronium. A randomized clinical trial. *Anaesthesiology Intensive Therapy*, *57*, e11–e17. https://doi.org/10.5114/ait.2025.148299

Choi, S. U. (2022). General anesthesia for cesarean section: Are we doing it well? *Anesthesia and Pain Medicine*, *17*(3), 256–261. https://doi.org/10.17085/apm.22196

Delgado, C., Ring, L., & Mushambi, M. C. (2020). General anaesthesia in obstetrics. *BJA Education*, *20*(6), 201–207. https://doi.org/10.1016/j.bjae.2020.03.003

Devabhaktuni, P., Ponnuru, M., & Vangala, L. R. (2023). HELLP syndrome, associated with eclampsia, preeclampsia, in one hundred cases, the complications, maternal morbidity and mortality—The near miss and missed obstetric scenarios. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *12*(10), 2954–2965.

El Abbassi, I., Benaaguida, H., Jalal, M., Lamrissi, A., & Bouhya, S. (2023). Cerebral meningioma during pregnancy mimicking eclampsia: About a rare case. *International Journal of Surgery Case Reports*, *111*, 108786. https://doi.org/10.1016/j.ijscr.2023.108786

Fishel Bartal, M., & Sibai, B. M. (2022). Eclampsia in the 21st century. *American Journal of Obstetrics and Gynecology*, *226*(2), S1237–S1253. https://doi.org/10.1016/j.ajog.2020.09.037

Gerbershagen, M. U., & Baagil, H. (2024). Caesarean Delivery: A Narrative Review on the Choice of Neuraxially Administered Opioid and Its Implications for the Multimodal Peripartum Pain Concept. *Medicina*, *60*(3), 358. https://doi.org/10.3390/medicina60030358

Gunaydin, D. B., Güngör, İ., Bagcaz, D., Buyukgebiz, B., & Bozkurt, N. (2022). Retrospective Analysis of Maternal and Neonatal Outcomes in Pregnant Women with HELLP Syndrome Under General and Spinal Anesthesia. *Journal of Gazi University Health Sciences Institute*, *4*.

Irene, K., Amubuomombe, P. P., Mogeni, R., Andrew, C., Mwangi, A., & Omenge, O. E. (2021). Maternal and perinatal outcomes in women with eclampsia by mode of delivery at Riley mother baby hospital: A longitudinal case-series study. *BMC Pregnancy and Childbirth*, *21*(1), 439. https://doi.org/10.1186/s12884-021-03875-6

Jain, D. S., Makwana, D. V. B., R, D. A. M., & Patil, D. B. (2025). Doppler Ultrasound in Preeclampsia and Eclampsia: Predicting Complications and Guiding Management. *International Journal of Environmental Sciences*, *11*(6s), 571–578. https://doi.org/10.64252/8h59fx35

Katsi, V., Svigkou, A., Dima, I., & Tsioufis, K. (2024). Diagnosis and Treatment of Eclampsia. *Journal of Cardiovascular Development and Disease*, *11*(9), 257. https://doi.org/10.3390/jcdd11090257

Laskowska, M., & Bednarek, A. (2023). Optimizing Delivery Strategies in Eclampsia: A Comprehensive Review on Seizure Management and Birth Methods. *Medical Science Monitor : International Medical Journal of Experimental and Clinical Research*, *29*, e941709-1-e941709-8. https://doi.org/10.12659/MSM.941709

Lisonkova, S., Bone, J. N., Muraca, G. M., Razaz, N., Wang, L. Q., Sabr, Y., Boutin, A., Mayer, C., & Joseph, K. S. (2021). Incidence and risk factors for severe preeclampsia, hemolysis, elevated liver enzymes, and low platelet count syndrome, and eclampsia at preterm and term gestation: A population-based study. *American Journal of Obstetrics and Gynecology*, *225*(5), 538.e1-538.e19. https://doi.org/10.1016/j.ajog.2021.04.261

Mazur, N. K., Fercho, J. M., Kałas, M., Szaruta-Raflesz, K., Grzybowska, M. E., Siemiński, M., & Wydra, D. G. (2025). Intracranial Hemorrhage During Pregnancy: An Interdisciplinary Literature Review and a Rare Case Report of Early-Onset Eclampsia with Intracranial Hemorrhage and HELLP Syndrome. *Journal of Clinical Medicine*, *14*(4). https://doi.org/10.3390/jcm14041361

Pečlin, P., Pavlica, M., Druškovič, M., Kavšek, G., Verdenik, I., & Pintarič, T. S. (2024). Effect of Anesthetic Modality on Decision-to-Delivery Interval and Maternal–Neonatal Outcomes in Category 2 and 3 Cesarean Deliveries. *Journal of Clinical Medicine*, *13*(24), 7528. https://doi.org/10.3390/jcm13247528

Poimenidi, E., Metodiev, Y., Archer, N. N., Jackson, R., Bangash, M. N., & Howells, P. A. (2022). Haemolysis, elevated liver enzymes and low platelets: Diagnosis and management in critical

care. *Journal of the Intensive Care Society*, *23*(3), 372–378. https://doi.org/10.1177/17511437211025410

Sabetian, G., Zand, F., Mirhadi, F., Hadavi, M. R., Asadpour, E., Dehghanpisheh, L., Fattahi Saravi, Z., & Razavi, S. M. (2021). Adequacy of maternal anesthesia depth with two sodium thiopental doses in elective caesarean section: A randomized clinical trial. *BMC Anesthesiology*, *21*, 201. https://doi.org/10.1186/s12871-021-01421-7

Seymour, L. M., Fernandes, N. L., Dyer, R. A., Smit, M. I., van Dyk, D., & Hofmeyr, R. (2023). General Anesthesia for Cesarean Delivery for Thrombocytopenia in Hypertensive Disorders of Pregnancy: Findings From the Obstetric Airway Management Registry. *Anesthesia & Analgesia*, *136*(5), 992. https://doi.org/10.1213/ANE.0000000000006217

Susanu, C., Vasilache, I.-A., Harabor, A., Vicoveanu, P., & Călin, A.-M. (2024). Factors Associated with Maternal Morbidity in Patients with Eclampsia in Three Obstetric Intensive Care Units: A Retrospective Study. *Journal of Clinical Medicine*, *13*(21), 6384. https://doi.org/10.3390/jcm13216384

Tavianto, D., Sudjud, R. W., Barliana, P. C., & Wijaya, I. (2021). Anesthetic Management of Patient with Preeclampsia, Pulmonary Edema, and Peripartum Cardiomyopathy in Pregnancy Undergoing Caesarean Section: A Case Report. *Journal of Health and Medical Sciences*, *4*(3). https://doi.org/10.31219/osf.io/j364s

Varudhini, L. N., Singh, A., Mahalakshmi, G., Sindhuri, C., Supriya, V., Zabeen, M., & Haripriya, D. (2025). Eclampsia and its effects on fetal and maternal outcomes: A retrospective study. *Journal of Contemporary Clinical Practice*, *11*, 326–334. https://doi.org/10.61336/jccp/25-06-48

Weningtyas, V. S., Adnan, M. L., Pramaningtyas, M. D., & Wahyana, E. B. (2024). Karakteristik Pasien Preeklampsia di Rumah Sakit Umum Daerah Soediran Mangun Soemarso Wonogiri Jawa Tengah. *Inisiasi*, 1–12. https://doi.org/10.59344/inisiasi.v13i1.233

Wesley, S. R., Vates, G. E., & Thornburg, L. L. (2024). Neurologic Emergencies in Pregnancy. *Obstetrics & Gynecology*, *144*(1), 25. https://doi.org/10.1097/AOG.0000000000005575