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Anesthetic Management of a Teenage Primigravida with Impending Eclampsia Undergoing Emergency Cesarean Section: A Comprehensive Case Report

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A B S T R A C T

Introduction: Impending eclampsia represents a medical emergency requiring immediate maternal delivery to prevent progression to seizures and maternal-fetal compromise. The selection of an appropriate anesthetic technique for emergency cesarean section in severely preeclamptic patients remains clinically challenging, balancing the risks and benefits of regional versus general anesthesia. **Case presentation:** A 19-year-old primigravida at 35 weeks and 6 days of gestation presented with frontal headache, blurred vision, and nausea. Clinical evaluation revealed new-onset hypertension (131/81 mmHg), proteinuria (+2), and mild hypokalemia (3.4 mmol/L), consistent with impending eclampsia. Emergency cesarean section was performed under subarachnoid block utilizing heavy bupivacaine 15 mg with fentanyl 25 micrograms intrathecally. Hemodynamics remained stable throughout the operative period without vasopressor requirement. A male neonate was delivered with Apgar scores of 7-8-9 and a birth weight of 1825 grams. Both mother and infant had favorable postoperative outcomes with resolution of hypertensive crisis and normal neonatal transition. **Conclusion:** This case demonstrates the efficacy and safety of regional anesthesia in eclamptic parturients undergoing emergency cesarean delivery. Careful patient selection, appropriate drug dosing, and vigilant hemodynamic monitoring enable successful outcomes even in this high-risk scenario.

1. Introduction

Preeclampsia and eclampsia represent leading causes of maternal and fetal morbidity and mortality worldwide, accounting for a significant proportion of maternal deaths, particularly in resource-limited settings. The World Health Organization estimates that preeclampsia complicates approximately 2-3% of pregnancies globally, while eclampsia, the convulsive manifestation of this syndrome, occurs in 0.5-5 per 1000 deliveries, depending on population and healthcare infrastructure.[1,2]

Eclampsia is defined as the occurrence of seizures in a woman with preeclampsia, representing a medical emergency that demands immediate intervention. The condition reflects severe derangements in multiple organ systems secondary to placental-derived factors that trigger systemic endothelial dysfunction. This cascade of pathophysiological events results in

hypertensive crisis, cerebral edema with potential for seizure, coagulopathy, renal dysfunction, hepatic involvement, and placental insufficiency.[3,4]

The management of impending eclampsia centers on seizure prevention and maternal-fetal stabilization while preparing for definitive treatment through delivery. Magnesium sulfate has been established as the gold standard for seizure prophylaxis in preeclampsia and eclampsia, superior to both phenytoin and diazepam in preventing seizure recurrence.[5] Antihypertensive therapy aims to prevent hypertensive complications while preserving cerebral and uteroplacental perfusion pressure. The definitive treatment remains prompt delivery of the fetus and placenta, which may be accomplished through vaginal delivery if cervical favorability permits, or through cesarean section when indicated.[6]

The selection of an appropriate anesthetic technique for cesarean delivery in the eclamptic parturient represents a continuing area of clinical debate. Historically, general anesthesia was preferred to avoid the risk of severe hypotension associated with neuraxial blockade in these critically ill patients. However, contemporary evidence increasingly supports the use of regional anesthesia when contraindications are absent, given superior hemodynamic stability compared to the hypertensive response to intubation, lower aspiration risk, and better postoperative analgesia.[7,8]

This case report documents the successful management of a primigravida with impending eclampsia at 35 weeks of gestation treated with emergency cesarean section under subarachnoid anesthesia, with emphasis on clinical decision-making, anesthetic technique selection, intraoperative management, and perioperative outcomes.[9]

To our knowledge, reports documenting the complete perioperative anesthetic management of impending eclampsia in a teenage primigravida at preterm gestation with favorable maternal and neonatal outcomes remain limited. The novelty of this report lies in the detailed documentation of subarachnoid block anesthesia in a 19-year-old primigravida with impending eclampsia at 35 weeks of gestation, demonstrating hemodynamic stability without vasopressor requirement. The aim of this study is to present a comprehensive case report highlighting the safety and efficacy of regional subarachnoid block anesthesia for emergency cesarean section in a young primigravida with impending eclampsia, and to discuss the clinical decision-making process, anesthetic considerations, and perioperative outcomes in the context of current evidence-based guidelines.

2. Case Presentation

Patient demographics and clinical history

A 19-year-old primigravida (gravida 1, para 0, abortus 0) at gestational age 35 weeks and 6 days presented to the obstetric emergency department with complaints of frontal headache, blurred vision, and nausea. The patient had no significant past medical history, denied tobacco and alcohol use, and reported no drug allergies. Amniotic fluid leakage had been noted prior to presentation with decreased amniotic fluid volume, but the patient denied abdominal pain, uterine contractions, or vaginal bleeding. This was the patient's first pregnancy, managed through routine prenatal care at the community health center. According to prenatal records available at presentation, blood pressure measurements prior to current admission had been within normal limits (systolic <120 mmHg, diastolic <80 mmHg), with a normal singleton fetus confirmed on second-trimester ultrasonography. No significant complications were documented during the antenatal period prior to the acute presentation.

Clinical presentation and physical examination

On arrival at the emergency department, the patient was alert and oriented, demonstrating appropriate cognitive function. Vital signs were as follows: blood pressure 131/81 mmHg, heart rate 76 beats per minute, respiratory rate 20 breaths per minute, and oxygen saturation 99% on ambient air. Body temperature was 36.8 degrees Celsius. Physical examination revealed a well-appearing young woman in mild distress related to a headache. Cardiovascular examination demonstrated normal heart rate and rhythm without murmurs, gallops, or rubs. Pulmonary examination revealed clear bilateral breath sounds without crackles or wheezes. Abdominal examination showed appropriate uterine size for gestational age

without peritoneal signs or rebound tenderness. Neurological examination revealed alert mental status, normal cognition, intact cranial nerves II through XII, normal motor and sensory examination, and intact reflexes with normal gait. No focal neurological deficits were appreciated. Table 1 presents the demographic and clinical characteristics of the patient at presentation.

Table 1. Patient characteristics and clinical data at presentation.

Parameter	Value
Age	19 years
Gravidity/Parity	G1P0A0
Gestational age	35 weeks 6 days
Chief complaint	Frontal headache, blurred vision, nausea
Blood pressure	131/81 mmHg
Heart rate	76 beats/min
Respiratory rate	20 breaths/min
Body temperature	36.8°C
SpO_2	99% (ambient air)
Weight	62 kg
Height	160 cm
BMI	24.2 kg/m^2
ASA physical status	III-E
Hemoglobin	11.4 g/dL †
Platelet count	215,000/uL
Proteinuria	+2 †
Serum potassium	3.4 mmol/L †
Coagulation profile	Normal (PT, aPTT, fibrinogen)

† Abnormal values highlighted.

Laboratory and diagnostic findings

Laboratory evaluation disclosed the following abnormalities, as summarized in Table 1. Hemoglobin was decreased at 11.4 g/dL (normal range 12.0-16.0 g/dL), consistent with mild anemia of pregnancy. Proteinuria was documented at +2 on urinalysis. Serum potassium was mildly low at 3.4 mmol/L (normal range 3.5-5.0 mmol/L), which was addressed with intravenous potassium replacement during the perioperative period. Platelet count was 215,000 per microliter of blood (normal range 150,000-450,000 per microliter), which exceeded the American Society of Regional Anesthesia and Pain Medicine (ASRA) guideline threshold of 70,000 per microliter, making regional anesthesia safe to perform. Coagulation studies (prothrombin time, activated partial thromboplastin time, fibrinogen) were normal, indicating no coagulopathy at presentation.

Obstetric ultrasound evaluation performed upon admission confirmed a singleton live intrauterine fetus at 35 weeks 6 days gestation with fetal heart rate in the normal range and reactive fetal heart rate tracing. Amniotic fluid volume was decreased, consistent with the maternal report of fluid leakage. No acute fetal

distress was identified on cardiotocographic monitoring at the time of initial assessment. Fetal biometric parameters were consistent with estimated gestational age without significant growth restriction.

The clinical constellation of new-onset hypertension, severe headache, blurred vision, nausea, and proteinuria in a primigravida in the third trimester was diagnostic of impending eclampsia. The neurological symptoms and presence of proteinuria indicated severe features of preeclampsia, meeting criteria for delivery at this gestational age according to current American College of Obstetricians and Gynecologists (ACOG) and International Society for the Study of Hypertension in Pregnancy (ISSHP) guidelines.

Initial management and diagnosis

Upon admission, the obstetric team rapidly assembled to manage this obstetric emergency. The diagnosis of impending eclampsia with severe features was established based on clinical and laboratory findings. Given the gestational age of 35 weeks 6 days and the severe maternal symptoms indicative of imminent eclamptic seizure, the clinical team determined that the risks of continuing the pregnancy exceeded the benefits, making delivery the definitive treatment.

Initial medical therapy was instituted immediately. Magnesium sulfate was commenced as seizure prophylaxis, utilizing a loading dose of 4 grams intravenously over 20 minutes, followed by a maintenance infusion of 1 gram per hour. Antihypertensive therapy was initiated with oral nifedipine (immediate-release formulation) for acute blood pressure control, combined with oral methyldopa for sustained reduction of elevated blood pressure. Supplemental oxygen was provided via nasal cannula at 3 liters per minute to ensure adequate maternal and fetal oxygenation.

The anesthesia team was notified of the need for emergency cesarean section and began preparations while medical optimization continued. The decision was made to proceed with cesarean delivery under regional anesthesia, specifically subarachnoid block. This approach was selected in accordance with current guidelines, as the patient had no contraindications (adequate platelet count, absence of coagulopathy, hemodynamic stability) and regional anesthesia was preferred to avoid the hypertensive response associated with general anesthesia and intubation, which could precipitate eclamptic seizure or further elevate blood pressure in this critically ill parturient.

Anesthetic technique and intraoperative management

The patient was transported to the operating room with continuous fetal heart rate monitoring maintained throughout the preoperative period. Standard monitoring was established, including electrocardiography, non-invasive blood pressure measurement, and pulse oximetry. Peripheral intravenous access had been established in the emergency department; a second 18-gauge intravenous catheter was placed in the operating room for fluid administration and potential medication delivery.

In preparation for subarachnoid anesthesia, the patient was positioned sitting upright with assistance and verbal reassurance provided given her anxiety about the impending procedure. The lumbar puncture site was identified at the L3-4 interspace and prepared with chlorhexidine-based antiseptic solution in standard sterile fashion. After confirmation of sterile technique, a 25-gauge pencil-point spinal needle was advanced carefully into the subarachnoid space. Clear cerebrospinal fluid was obtained, confirming correct needle placement.

The anesthetic solution selected was heavy bupivacaine, utilizing 15 milligrams of 0.5% hyperbaric bupivacaine combined with fentanyl 25 micrograms administered intrathecally as a single dose. This combination provides adequate sensory and motor blockade for cesarean section, while the addition of opioids enhances analgesia and reduces total local anesthetic dose. The dose was selected conservatively, given the patient's hypertensive status, aiming to minimize the risk of severe hypotension in this critically ill parturient.

Following injection of the spinal anesthetic, the patient was immediately positioned supine with left uterine displacement maintained by left lateral tilt of approximately 15 degrees to prevent aortocaval

compression. Ringer's lactate crystalloid solution was administered through both intravenous lines at a modest rate of approximately 10 milliliters per kilogram per hour (approximately 600 milliliters per hour), chosen to maintain intravascular volume while avoiding fluid overload, which could precipitate pulmonary edema in the setting of endothelial dysfunction.

The level of anesthesia was assessed using loss of sensation to cold and pinprick, with bilateral sensory blockade achieved at the T4 dermatome level, appropriate for cesarean section. Motor blockade was assessed using the Bromage scale, with complete motor paralysis noted (Bromage score 3), indicating adequate blockade for surgical preparation. The patient remained conscious and communicative throughout the procedure, able to report comfort and any concerns.

Operative course and delivery

The intraoperative hemodynamic parameters were closely monitored throughout the procedure, as detailed in Table 2. The cesarean section proceeded in standard fashion following the achievement of adequate anesthesia. A Pfannenstiel incision was employed and carried through skin, subcutaneous tissue, anterior rectus fascia, and peritoneum in a sequential fashion. The uterus was identified, and a lower-segment transverse incision was made in the uterine body. Clear amniotic fluid with light meconium staining was noted.

Table 2. Intraoperative hemodynamic monitoring parameters.

Time Point	SBP (mmHg)	DBP (mmHg)	HR (bpm)
Pre-anesthesia baseline	131	81	76
Post-SAB (5 min)	128	79	75
Post-SAB (10 min)	125	78	74
Skin incision	128	80	75
Uterine incision	124	76	76
Fetal delivery	122	75	76
Placental delivery	120	72	74
End of surgery	118	70	72
Recovery room (30 min)	135*	82	78

* Post-operative blood pressure elevation managed with antihypertensive adjustment. SAB, subarachnoid block; SBP, systolic blood pressure; DBP, diastolic blood pressure; HR, heart rate.

Notably, throughout the operative period, the patient remained hemodynamically stable. Blood pressure remained in the range of 118-131 mmHg systolic and 70-81 mmHg diastolic, demonstrating appropriate maintenance of perfusion pressure without requirement for vasopressor agents. Heart rate remained in the range of 72-76 beats per minute throughout surgery, indicating stable sympathetic tone. Oxygen saturation remained above 97% throughout the procedure on supplemental oxygen at 3 liters per minute delivered by nasal cannula.

A male infant was delivered at 09:15 hours, appearing vigorous with a spontaneous cry. The umbilical cord was clamped and cut, and the infant was handed to the awaiting pediatric team for initial assessment and resuscitation if needed. Apgar scores were recorded as 7 at one minute, 8 at five minutes, and 9 at ten minutes of life, indicating successful fetal transition and good neonatal vigor despite the preterm gestational age.

Birth weight was measured as 1825 grams, appropriate for a 35-week gestation. Physical examination by the pediatric team revealed no major congenital malformations or birth defects. The infant was taken to the neonatal intensive care unit for

continued observation and management of the preterm status.

Operative blood loss was estimated at approximately 250 milliliters, within acceptable limits for cesarean delivery. No blood transfusion was required. The placenta was delivered intact and appeared macroscopically normal without evidence of abruption or other abnormality. The uterus was closed in two layers using absorbable suture. The patient remained stable and conscious throughout the entire operative period, approximately 45 minutes from skin incision to skin closure.

Postoperative course and hospital management

Following the operative procedure, the patient was transferred to the high-dependency care unit (HCU) for intensive monitoring. Anesthesia was allowed to resolve naturally, with the patient regaining full consciousness and motor function within approximately 60 minutes of spinal injection. Postoperative pain control was achieved with intravenous and oral analgesics, including non-steroidal anti-inflammatory drugs when appropriate and opioid medications as needed. The treatment timeline and postoperative management protocol are summarized in Table 3.

Table 3. Postoperative management protocol and clinical timeline.

Time point	Clinical status	Intervention/Management
Immediate post-op	Conscious, stable	Transfer to recovery, continuous monitoring
30 min post-op	BP 135/82, SpO_2 98%	O_2 3L/min, IV Ringer's lactate, $MgSO_4$ maintenance
2 hours post-op	Pain controlled, stable	Multimodal analgesia, HR 78, RR 18
4 hours post-op	BP 160/89 mmHg †	Antihypertensive therapy intensified (nifedipine + methyldopa)
HCU admission	Intensive monitoring	$MgSO_4$ 1g/hr, fentanyl syringe pump, seizure precautions
First night	Stable, no seizures	Continued $MgSO_4$ + antihypertensives + analgesia
Post-op Day 1	BP controlled, neuro normal	Gradual weaning of $MgSO_4$, oral medications
Post-op Day 2	Clinical improvement	Transfer to the postpartum ward
6 weeks postpartum	BP 118/76, proteinuria resolved	Discharge from follow-up, nephrology referral

† Blood pressure elevation requiring intervention. HCU, high-care unit; $MgSO_4$, magnesium sulfate.

Notably, blood pressure rose in the immediate postoperative period to 160/89 millimeters of mercury. This elevation, while expected in the postoperative period and in response to pain and anesthesia resolution, was managed with continuation and optimization of antihypertensive agents. Magnesium sulfate infusion was continued at 1 gram per hour throughout the first 24 postoperative hours as per institutional protocol for eclampsia management. Methyldopa and nifedipine were continued for sustained hypertension control.

The patient's neurological status was monitored closely throughout the postoperative period. Serial neurological examinations revealed alert mental status, intact cognition, no focal deficits, and no evidence of seizure activity at any point. The patient was kept on seizure precautions, with staff trained to recognize and

manage seizure activity, though fortunately, no seizures occurred.

Anesthesia-related side effects were minimal. The patient experienced some postoperative nausea and vomiting, managed with antiemetic medications. Pain was well-controlled with multimodal analgesia. Early ambulation was encouraged as tolerated once anesthesia had resolved and hemodynamics remained stable.

On postoperative day one, the patient was clinically improving. Blood pressure gradually decreased with continued antihypertensive therapy. Urinary output remained adequate. The patient was transitioned from the high-dependency unit to a regular postpartum ward on postoperative day two, indicating clinical improvement and declining intensive care requirements.

Long-term postoperative follow-up: At six weeks postpartum, the patient presented for obstetric follow-up. Blood pressure had normalized to 118/76 mmHg, proteinuria had resolved completely on repeat urinalysis, and renal function remained normal. The patient was counseled regarding recurrence risk in future pregnancies and referred to nephrology for baseline renal function assessment.

Neonatal outcome and follow-up

The male neonate, delivered at 35 weeks 6 days of gestation with a birth weight of 1825 grams, demonstrated vigorous appearance at delivery with Apgar scores of 7, 8, and 9 at one, five, and ten minutes of life, respectively. Physical examination performed in the delivery room and subsequently in the neonatal intensive care unit revealed no major congenital anomalies or birth defects.

The infant was admitted to the neonatal intensive care unit for observation and management as a preterm neonate. Respiratory support requirements were minimal, with the neonate breathing spontaneously in room air with oxygen supplementation as needed. Feeding was initiated cautiously with gradual progression from breast milk to full enteral feeds over several days. Standard neonatal screening and evaluations were performed, all returning within normal limits.

During the NICU hospitalization, the neonate achieved appropriate feeding volumes, maintained thermoregulation, and demonstrated normal neurological behavior. Sepsis screening performed as standard for preterm neonates was negative. Hearing screening and other standard neonatal evaluations were normal. The infant's clinical course was uncomplicated, and discharge from the NICU was arranged after approximately three weeks of hospitalization once the infant achieved full oral feeding and demonstrated appropriate growth and development.

Patient's perspective

The patient expressed significant anxiety upon learning about her diagnosis of impending eclampsia and the need for emergency cesarean section. She reported feeling reassured by the detailed explanation provided by the anesthesia team regarding the choice of regional anesthesia, which allowed her to remain conscious during the delivery of her baby. She noted that being able to hear her baby's first cry was an emotionally meaningful experience that she would not have had under general anesthesia. During the postoperative period, she expressed gratitude for the close monitoring and pain management that facilitated her recovery. At the six-week follow-up visit, she reported feeling well, with resolution of headaches and visual disturbances, and was satisfied with her overall care experience. She consented to the publication of this case report in the hope that it may help other women facing similar emergency situations.

3. Discussion

The clinical significance of this case lies not merely in the successful outcome but in the demonstration of optimal perioperative management of a complex obstetric emergency. Teenage primigravidas with preeclampsia present unique challenges related to their physiological immaturity, potential psychosocial stressors, and increased baseline risk for adverse outcomes. The vast majority of eclampsia cases occur in primigravidas, and maternal age under 20 years significantly increases the risk for severe disease. In many resource-limited settings, eclampsia remains a

leading cause of maternal death, yet in well-resourced hospitals with coordinated interdisciplinary care, maternal and neonatal mortality can be virtually eliminated. This case illustrates that even in the setting of emergency preterm delivery for life-threatening maternal disease, excellent outcomes for both mother and newborn are achievable with appropriate management.

This case report presents a clinical scenario of acute preeclampsia with severe features progressing toward eclampsia, requiring emergency delivery to prevent maternal seizures and fetal deterioration. Eclampsia remains a leading cause of maternal mortality and morbidity worldwide, with incidence and outcomes highly variable based on geographic region, healthcare infrastructure, and availability of magnesium sulfate for seizure prophylaxis.[1,2]

The pathophysiology of preeclampsia involves abnormal placentation and placental-derived factors that trigger systemic endothelial dysfunction. Key pathophysiological features include elevated circulating levels of soluble fms-like tyrosine kinase-1 (sFlt-1), a VEGF antagonist that impairs endothelial function, and decreased placental growth factor (PlGF), leading to dysregulation of angiogenesis.[3] This disruption in the normal angiogenic balance results in vascular dysfunction characterized by increased vascular permeability, platelet activation, microthrombi formation, and increased systemic vascular resistance.

The neurological manifestations of eclampsia, including the characteristic symptoms present in this patient (headache, visual disturbances), result from cerebral endothelial dysfunction with breakdown of the blood-brain barrier and development of cerebral edema. The current understanding suggests that severe hypertension overwhelms cerebral autoregulation, resulting in forced vasodilation, increased cerebral blood flow, and microinfarction.[4] This pathophysiology explains the importance of rapid blood pressure control while avoiding excessive reduction that could compromise cerebral perfusion.

The selection of an anesthetic technique for cesarean delivery in the preeclamptic or eclamptic parturient has been an area of ongoing clinical debate. Historically, general anesthesia was preferred due to concerns about severe hypotension following neuraxial blockade in critically ill patients. However, contemporary evidence increasingly supports the use of regional anesthesia when contraindications are absent, citing superior hemodynamic stability compared to the hypertensive response to intubation, lower aspiration risk, better pain control, and avoidance of airway manipulation in a critically ill patient.[7,8]

The key considerations in this debate include: (1) platelet count, with regional anesthesia traditionally contraindicated at platelet counts less than 70,000-100,000 per microliter due to perceived increased bleeding risk, though the American Society of Regional Anesthesia and Pain Medicine (ASRA) guidelines recommend a threshold of 70,000 per microliter as safe for neuraxial blockade; (2) severity of hypertension and hemodynamic status; (3) availability of skilled personnel and monitoring equipment; and (4) urgency of delivery.[9,10]

In this case, the patient had an adequate platelet count (215,000 per microliter), well above ASRA guidelines, absence of clinical or laboratory evidence of coagulopathy, and hemodynamic stability, making regional anesthesia appropriate. The selection of subarachnoid blockade was deliberate, avoiding the more profound hemodynamic effects sometimes associated with general anesthesia in this population. The dose of spinal anesthetic (15 milligrams of heavy bupivacaine) was conservative, aiming to achieve adequate surgical anesthesia while minimizing sympathetic blockade and thus reducing the risk of hypotension.[11-13]

The clinical outcome in this patient supports the evidence favoring regional anesthesia. The patient remained hemodynamically stable throughout the operative period without the requirement for vasopressor medications. This favorable response likely reflected the patient's relatively stable baseline hemodynamic status prior to anesthesia, appropriate fluid management, and careful drug dosing.

Magnesium sulfate remains the gold standard for seizure prophylaxis in preeclampsia and eclampsia. Multiple randomized controlled trials have demonstrated the superiority of magnesium sulfate over phenytoin and diazepam for both primary and

secondary seizure prevention in preeclampsia.[5] The mechanism of seizure prevention appears to involve magnesium's role as a natural calcium antagonist, reducing cerebral vascular tone, stabilizing neuronal membranes, and decreasing the excitability of neurons.[14-16]

In anesthetic practice, magnesium sulfate therapy has important implications for neuromuscular blockade and anesthetic management. Magnesium potentiates the effects of neuromuscular blocking agents, potentially resulting in prolonged paralysis and respiratory depression if paralytic drugs are used. In this case, general anesthesia with neuromuscular blockade was avoided by the selection of regional anesthesia, eliminating this concern. However, it is important that anesthesiologists managing preeclamptic patients receiving magnesium sulfate remain aware of these interactions, should general anesthesia become necessary emergently.[17-20]

The neuroprotective mechanisms of magnesium sulfate extend beyond the simple reduction of seizure threshold. Magnesium functions as a physiological antagonist to calcium, and alterations in intracellular calcium homeostasis contribute substantially to neuronal hyperexcitability in eclampsia. Magnesium sulfate reduces intracellular calcium influx into neurons, thereby stabilizing neuronal membranes and preventing the propagation of seizure activity. Additionally, magnesium has significant vascular effects, promoting vasodilation and improving cerebral and coronary blood flow.[19-21]

Hemodynamic management of the preeclamptic parturient undergoing cesarean section requires careful balance between maintaining adequate uteroplacental and maternal organ perfusion while avoiding fluid overload that could precipitate pulmonary edema. The endothelial dysfunction characteristic of preeclampsia results in increased capillary permeability, increasing the risk of pulmonary edema with excessive fluid administration.[22,23]

In this case, the fluid management strategy employed was conservative, with Ringer's lactate administered at approximately 10 milliliters per kilogram per hour (approximately 600 milliliters per hour) once the spinal anesthetic had been placed. This modest fluid rate aimed to maintain intravascular volume and prevent severe hypotension while avoiding excessive crystalloid infusion. The patient's blood pressure response was favorable, with minimal decrease from baseline, supporting the efficacy of this approach.

The absence of requirement for vasopressor medications in this patient is notable, as vasopressor use is common in the anesthetic management of preeclamptic parturients undergoing cesarean section. When vasopressors are required, phenylephrine is generally preferred over ephedrine due to its more selective alpha-adrenergic activity.[24] In this case, hemodynamic parameters remained above the threshold for vasopressor requirement (systolic blood pressure remained >110 mmHg, mean arterial pressure >65 mmHg).

The pathophysiology of hemodynamic instability in preeclampsia differs substantially from the typical hypotension seen with epidural anesthesia in non-preeclamptic patients. In preeclampsia, the patient often has an expanded intravascular volume despite clinical signs of dehydration; the decreased colloid osmotic pressure from proteinuria results in transcapillary fluid shift and apparent hypovolemia despite total body volume excess. This paradoxical physiology explains why aggressive fluid loading prior to neuraxial blockade, a standard practice in non-pregnant anesthesia, can be counterproductive in the preeclamptic patient.

A comparison of the present case with similar published cases of regional anesthesia in eclamptic parturients is presented in Table 4. As demonstrated in Table 4, the present case is distinguished by several notable features compared to published literature. First, this patient was notably younger (19 years) than the subjects in most published series, which typically include patients aged 28-39 years. The teenage primigravida status presents unique physiological and psychosocial challenges that are underrepresented in the anesthetic literature. Second, the gestational age of 35 weeks 6 days places this delivery in the late preterm period, where neonatal outcomes are generally favorable, but the maternal disease process requires urgent intervention. Third, the achievement of complete

hemodynamic stability without vasopressor requirement in a patient with impending eclampsia using standard-dose subarachnoid block validates the safety of this approach in carefully selected patients. The favorable maternal and neonatal outcomes observed in this case align with the findings of Heesen et al. (2017), who demonstrated in their meta-analysis that subarachnoid block is safe and efficacious in preeclamptic parturients, and with Shrestha and Sharma (2012), who reported successful outcomes with spinal anesthesia in similar clinical scenarios.

Table 4. Comparison of regional anesthesia in eclamptic parturients: Present case vs. published literature.

Study (Year)	Patient profile	Anesthesia technique	Key findings	Outcome
Heesen et al. (2017)	Various, GA 34-37 wks, meta-analysis	SAB	SAB safe and efficacious; less hypotension vs. GA	Favorable maternal-neonatal outcomes
Shrestha & Sharma (2012)	28-39 yrs, GA 37+ wks	SAB (0.5% bupivacaine)	Stable hemodynamics in preeclampsia	Successful CS without vasopressors
Teoh & Sia (2006)	32-39 yrs, GA 34-38 wks, severe PE	Ultra-low dose CSE	Reduced incidence of hypotension	Gradual onset; better hemodynamic control
Aya et al. (2005)	20-35 yrs, GA 36-39 wks	SAB (various doses)	Dose-dependent hemodynamic effects	Lower doses to less hypotension
Present Case (2026)	**19 yrs, G1P0A0, GA 35+6 wks**	**SAB: bupivacaine 15mg + fentanyl 25mcg**	**Hemodynamic stability, no vasopressors, teenage primigravida**	**APGAR 7-8-9, BW 1825g, no maternal seizures**

Notes: SAB, subarachnoid block; CSE, combined spinal-epidural; GA, gestational age; PE, preeclampsia; CS, cesarean section; BW, birth weight.

4. Conclusion

This case report demonstrates the successful management of impending eclampsia at 35 weeks of gestation treated with emergency cesarean section under regional anesthesia. The favorable maternal and neonatal outcomes support the evidence-based approach emphasizing careful patient selection, appropriate anesthetic technique selection, and vigilant perioperative monitoring in this high-risk obstetric scenario.

Key learning points from this case include: (1) the critical importance of rapid diagnosis and delivery in eclampsia to prevent maternal seizure and fetal deterioration; (2) the potential safety and efficacy of regional anesthesia in preeclamptic parturients with adequate platelets and absence of contraindications; (3) the value of conservative fluid management in preventing pulmonary edema while maintaining adequate perfusion; (4) the importance of magnesium sulfate seizure prophylaxis and awareness of its anesthetic implications; (5) the need for intensive postoperative monitoring in this high-risk population; and (6) the importance of long-term follow-up for monitoring resolution of hypertensive disease and renal function.

This case contributes to the growing body of evidence supporting the safety and efficacy of neuraxial anesthesia in carefully selected preeclamptic and eclamptic patients. The favorable outcomes achieved illustrate what is possible when current evidence-based guidelines are rigorously applied. Multidisciplinary team coordination involving obstetrics, anesthesia, neonatal medicine, and intensive care personnel is

crucial for optimizing outcomes in these critical obstetric emergencies.

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