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An Unusual Trio: Eclampsia, Posterior Reversible Encephalopathy, and Takotsubo Cardiomyopathy in a Twin Pregnancy

[1]Dr. Mary Asha D, [2]Dr. Sanjana Patil, [3]Dr. Meenakshi Devermani

[1-4]Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India.

Corresponding Author: Dr. Mary Asha D, Mahadevappa Rampure Medical College, Kalaburagi, Karnataka, India.

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Abstract

Background: Eclampsia remains a leading cause of maternal morbidity and mortality worldwide. The concurrent occurrence of posterior reversible encephalopathy syndrome (PRES) and Takotsubo cardiomyopathy in eclamptic patients represents an extremely rare but life-threatening combination requiring immediate multidisciplinary intervention.

Case Presentation: We report a 31-year-old primigravida at 36 weeks and 4 days of twin gestation, conceived through intracytoplasmic sperm injection (ICSI), who presented with antepartum eclampsia complicated by PRES and Takotsubo cardiomyopathy. The patient had multiple comorbidities including gestational diabetes mellitus, hypothyroidism, and hepatitis B surface antigen positivity. She presented with generalized tonic-clonic seizures, severe hypertension (200/100 mmHg), and respiratory distress with oxygen saturation of 80% on room air. Emergency cesarean section was performed, delivering two viable late-preterm infants. Postoperative investigations revealed Takotsubo cardiomyopathy with ejection fraction of 40% and MRI findings consistent with PRES.

Management and Outcome: The patient received immediate stabilization with anticonvulsants, antihypertensives, mechanical ventilation, and targeted cardiac therapy. Multidisciplinary care involving obstetrics, cardiology, anesthesiology, and intensive care teams resulted in complete maternal recovery by postoperative day 5, with improving cardiac function and neurological status.

Conclusion: This case highlights the importance of recognizing atypical complications in eclampsia and emphasizes the need for prompt multidisciplinary management in tertiary care centers to optimize maternal and neonatal outcomes in complex obstetric emergencies.

Keywords: Eclampsia; Posterior reversible encephalopathy syndrome; Takotsubo cardiomyopathy; Twin pregnancy; Maternal morbidity

Introduction

Hypertensive disorders of pregnancy represent one of the leading causes of maternal and perinatal morbidity and mortality globally, affecting approximately 5-10% of all pregnancies.[1] Eclampsia, defined as the occurrence of generalized tonic-clonic seizures in women with preeclampsia, represents the most severe manifestation of this spectrum and constitutes a true obstetric emergency requiring immediate intervention.[2]

The pathophysiology of eclampsia involves widespread endothelial dysfunction, leading to various systemic complications. Among these, posterior reversible encephalopathy syndrome (PRES) and Takotsubo cardiomyopathy represent rare but potentially fatal complications that can occur concurrently.[3] PRES manifests as vasogenic brain edema predominantly affecting the posterior circulation territories, presenting clinically with seizures, altered consciousness, and visual disturbances.[4] Takotsubo cardiomyopathy, also known as stress-induced cardiomyopathy, is characterized by transient left ventricular dysfunction mimicking acute coronary syndrome, often triggered by severe physical or emotional stress.[5]

Multiple pregnancies, particularly those conceived through assisted reproductive technologies (ART), carry an increased risk of hypertensive disorders, with a 2-3 fold higher incidence compared to singleton pregnancies.[6] The presence of additional comorbidities such as gestational diabetes mellitus (GDM), hypothyroidism, and chronic viral infections further compounds the risk of adverse maternal and perinatal outcomes.[7]

The concurrent occurrence of eclampsia, PRES, and Takotsubo cardiomyopathy in a single patient represents an extremely rare clinical scenario with limited literature available. We present a comprehensive case report of a twin pregnancy complicated by this unusual triad, highlighting the challenges in management and the importance of multidisciplinary care in achieving favorable outcomes.

Case Presentation

A 31-year-old primigravida presented to H.K.E. Society's Basaweshwar Teaching and General Hospital (BTGH) on August 13, 2025, at 8:42 AM with a critical obstetric emergency. She was at 36 weeks and 4 days of gestation with dichorionic diamniotic twin pregnancy and presented with a history of generalized tonic-clonic seizure (GTCS) that had occurred approximately 30 minutes prior to her hospital arrival. The seizure episode was characterized by classical features including up-rolling of eyes, frothing from the mouth, and subsequent postictal drowsiness, indicating a severe neurological event requiring immediate medical intervention.

Obstetric and Medical Background

The patient's obstetric history revealed a complex fertility journey spanning 13 years of married life before conception. She had conceived the current twin pregnancy following assisted reproductive technology, specifically intracytoplasmic sperm injection (ICSI), which was necessitated due to male factor infertility with her husband having azoospermia. This background placed her pregnancy in a high-risk category from the outset, as pregnancies following assisted reproductive technologies are associated with increased complications, particularly hypertensive disorders of pregnancy.

Her medical history was significant for multiple comorbidities that further complicated her pregnancy management. She had been diagnosed with gestational diabetes mellitus and was being managed with oral hypoglycemic therapy using Tablet Glycomet 500 mg twice daily. Additionally, she had hypothyroidism requiring hormone replacement therapy with Tablet Thyronorm 37.5 micrograms once daily. Her infectious disease status included hepatitis B surface antigen (HBsAg) positivity, which necessitated special precautions for both maternal care and neonatal management to prevent vertical transmission. As a preventive measure against pregnancy-related complications, she had been prescribed low-dose aspirin therapy with Tablet Ecosprin 75 mg daily since the second month of gestation, which is standard practice for high-risk pregnancies to reduce the risk of preeclampsia and intrauterine growth restriction.

Initial Clinical Assessment and Physical Examination

Upon arrival at the emergency department, the patient's clinical condition was critically compromised. She presented with altered sensorium and drowsiness, indicating significant neurological involvement. During the initial assessment, she experienced another episode of generalized tonic-clonic seizure, confirming the diagnosis of active eclampsia. Her vital signs revealed severe systemic compromise with a blood pressure reading of 200/100 mmHg, indicating severe hypertension that posed immediate risks to both maternal and fetal well-being. Her pulse rate was recorded at 84 beats per minute, which, while within normal range, needed continuous monitoring given the overall clinical picture.

The respiratory system examination revealed bilateral crepitations on auscultation, suggesting pulmonary edema secondary to severe preeclampsia and cardiac involvement. Her oxygen saturation was critically low at 80% on room air, indicating severe respiratory compromise that required immediate intervention. Cardiovascular examination revealed audible S1 and S2 heart sounds without any obvious murmurs on initial assessment, though this would later prove significant when cardiac complications became apparent. The combination of severe hypertension, seizures, altered consciousness, and respiratory compromise painted a picture of severe eclampsia with multi-organ involvement.

Emergency Management and Stabilization

Given the severity of her presentation with uncontrolled seizures, severe hypertension, and respiratory compromise, immediate emergency management was initiated. The patient received injection Levetiracetam 1 gram stat as an anticonvulsant to control ongoing seizure activity. Magnesium sulfate loading dose was administered as the standard first-line treatment for eclampsia, which serves both as an anticonvulsant and neuroprotective agent. For blood pressure control, injection Labetalol 20 mg was given intravenously to achieve rapid but controlled reduction in blood pressure, avoiding precipitous drops that could compromise placental perfusion.

Due to her deteriorating respiratory status with oxygen saturation of only 80% on room air, combined with altered consciousness and uncontrolled seizures, the decision was made to secure her airway through endotracheal intubation. This intervention was crucial not only for respiratory support but also to ensure adequate oxygenation during the anticipated emergency surgical procedure. The severity of her condition, with persistent seizures despite initial anticonvulsant therapy,

severe hypertension, and respiratory compromise, indicated that immediate delivery was necessary to prevent further maternal deterioration and ensure fetal safety.

Surgical Intervention and Delivery

An emergency lower segment cesarean section (LSCS) was performed under general anesthesia given the patient's compromised neurological status and the need for controlled ventilation. The surgical procedure proceeded without intraoperative complications despite the challenging clinical circumstances. The delivery resulted in the birth of dichorionic diamniotic twins, both presenting in vertex position, which simplified the surgical approach.

Twin 1 was a live late-preterm female infant weighing 2.4 kilograms, while Twin 2 was a live late-preterm male infant weighing 2.5 kilograms. Both neonates, despite being born at 36 weeks and 4 days gestation, were in relatively good condition considering the circumstances of their delivery. However, given their prematurity and the maternal complications that necessitated emergency delivery, both infants required immediate neonatal intensive care unit (NICU) admission for specialized care and respiratory support with bubble CPAP (Continuous Positive Airway Pressure) and ventilatory CPAP as needed.

Postoperative Intensive Care Management

Following the successful delivery, the patient was transferred to the intensive care unit with the endotracheal tube in situ for continued mechanical ventilation and close monitoring. The immediate postoperative period (POD 0) required comprehensive medical management with multiple therapeutic interventions. Antibiotic prophylaxis was initiated with injection Tazobactam-Piperacillin 4.5 grams intravenously twice daily and injection Metronidazole 100 ml intravenously three times daily to prevent postoperative infections. Injection Gentamicin 80 mg intravenously was added for broader antimicrobial coverage.

Neurological management continued with injection Levetiracetam 500 mg intravenously three times daily to maintain seizure control and prevent recurrence. Given the patient's continued altered consciousness and the need for sedation during mechanical ventilation, a Midazolam infusion was initiated at 3 ml per hour to provide controlled sedation while allowing for neurological assessments. This comprehensive approach to immediate postoperative care was crucial in stabilizing the patient and preventing further complications.

Diagnostic Investigations and Specialist Consultations

As the patient's immediate condition stabilized, comprehensive investigations were undertaken to assess the extent of organ involvement and guide further management. Two-dimensional echocardiography revealed a significant and unexpected finding of Takotsubo cardiomyopathy with a reduced ejection fraction of 40%. This stress-induced cardiomyopathy, also known as broken heart syndrome, is characterized by transient left ventricular dysfunction typically triggered by severe physical or emotional stress. In this case, the combination of eclampsia, severe hypertension, seizures, and the stress of emergency surgery likely precipitated this cardiac complication.

Following the cardiac findings, immediate cardiology consultation was obtained, and targeted cardiac therapy was initiated. The cardiologist recommended a comprehensive cardiac management regimen including

Tablet Digoxin 0.25 mg in a divided dose (half tablet in morning and evening), injection Ivabradine 5 mg in a similar divided dosing schedule to control heart rate, injection Lasix 20 mg twice daily for fluid management and to reduce cardiac preload, and Tablet Labetalol 100 mg twice daily for continued blood pressure control with cardiac protection.

Magnetic resonance imaging (MRI) of the brain was performed to evaluate the neurological complications associated with eclampsia. The imaging findings were consistent with posterior reversible encephalopathy syndrome (PRES), characterized by vasogenic edema predominantly affecting the posterior circulation territories. This finding explained the patient's seizures and altered consciousness and confirmed the diagnosis of PRES as a complication of severe eclampsia. The identification of PRES was crucial for understanding the neurological aspects of her condition and for monitoring recovery.

Clinical Recovery and Progress

The patient's recovery followed a gradual but steady trajectory over the subsequent days. On postoperative day 2, there was significant neurological improvement with her Glasgow Coma Scale (GCS) improving to E4V4M6 (Eye opening to command, verbal response with confusion, motor response obeying commands), indicating recovery of consciousness and neurological function. This improvement allowed for successful extubation, and she was transitioned to oxygen support via face mask at 5 liters per minute.

Postoperative days 3 and 4 demonstrated continued clinical improvement with stable vital signs and gradual tapering of oxygen support as her respiratory function improved. The bilateral crepitations noted on initial examination resolved, indicating improvement in pulmonary edema and overall cardiac function. Her blood pressure gradually stabilized with antihypertensive therapy, and there were no further seizure episodes, suggesting effective control of the eclamptic process.

By postoperative day 5 (August 18, 2025), the patient had achieved remarkable recovery. She was fully conscious and oriented, hemodynamically stable, and no longer required supplemental oxygen, breathing comfortably on room air. Her bowel and bladder functions had returned to normal, indicating overall systemic recovery. She was able to tolerate oral soft diet, marking another milestone in her recovery process. Most importantly, repeat 2D echocardiography showed improving cardiac function, confirming the reversible nature of Takotsubo cardiomyopathy and the effectiveness of cardiac management strategies.

Multidisciplinary Care Coordination

Throughout her hospital course, the patient remained under close multidisciplinary monitoring and care coordination involving multiple specialist departments. The obstetrics and gynecology team managed her pregnancy-related complications and postoperative care. The cardiology team provided specialized management for Takotsubo cardiomyopathy with regular cardiac monitoring and appropriate pharmacological interventions. The anesthesiology team managed her perioperative care, including airway management and pain control. The intensive care team provided critical care support during the most unstable period of her illness.

This collaborative approach was essential in managing the complex interplay of complications and ensuring that all aspects of her care were optimally addressed. Regular interdisciplinary rounds and communication ensured that treatment decisions were coordinated and that any

changes in her condition were promptly recognized and managed. The success of this case demonstrates the importance of having experienced multidisciplinary teams available in tertiary care centers for managing complex obstetric emergencies.

Final Diagnosis and Clinical Outcome

The comprehensive final diagnosis encompassed the full spectrum of her conditions: primigravida at 36 weeks 4 days gestation with antepartum eclampsia, gestational diabetes mellitus, hypothyroidism, dichorionic diamniotic twin gestation, hepatitis B surface antigen positive status, Takotsubo cardiomyopathy, and posterior reversible encephalopathy syndrome. This complex constellation of conditions represented one of the most challenging obstetric emergencies, requiring expertise across multiple medical specialties.

The successful maternal and neonatal outcomes in this case highlight several important factors: the importance of prompt recognition and immediate intervention in eclamptic emergencies, the value of having comprehensive diagnostic facilities available for identifying complications such as PRES and Takotsubo cardiomyopathy, the critical role of multidisciplinary team management in complex cases, and the significance of intensive care capabilities in tertiary centers. Both the mother and neonates showed steady recovery, with the mother achieving complete neurological and cardiac recovery and the twins progressing well in the NICU.

This case represents a rare and complex clinical scenario involving the simultaneous occurrence of three serious complications in a high-risk pregnancy. The management challenges and successful outcomes provide several important insights for clinical practice.

Eclampsia and PRES Association

The close association between eclampsia and PRES has been well-documented, with neuroimaging studies showing PRES in up to 98% of women with eclampsia.[8] The pathophysiology involves endothelial dysfunction and impaired cerebral autoregulation, leading to vasogenic edema predominantly in the parieto-occipital regions.[4] In our patient, the clinical presentation with generalized tonic-clonic seizures, severe hypertension, and characteristic MRI findings confirmed this association. Early recognition and aggressive blood pressure control are crucial to prevent permanent neurological sequelae.

Takotsubo Cardiomyopathy in Pregnancy

Takotsubo cardiomyopathy, though rare in pregnancy, represents a potentially life-threatening complication that can be precipitated by the severe stress of eclampsia, hypertension, or surgical intervention.[5] The characteristic features include transient left ventricular dysfunction with apical ballooning, mimicking acute coronary syndrome but in the absence of significant coronary artery disease.[9] Our patient's 2D echocardiography revealed the typical findings with an ejection fraction of 40%. The condition is generally reversible, as demonstrated by the improving cardiac function observed by postoperative day 5. This highlights the importance of routine echocardiographic evaluation in eclamptic women presenting with respiratory distress or hemodynamic compromise.

Impact of Multiple Comorbidities

The presence of gestational diabetes mellitus and hypothyroidism in our patient significantly complicated the clinical management. Both conditions are established risk factors for hypertensive disorders of pregnancy and are associated with increased perinatal morbidity.[10]

Additionally, the patient's hepatitis B surface antigen positivity necessitated strict infection control measures and consideration for neonatal prophylaxis to prevent vertical transmission.[11]

Twin Gestation and ART

This pregnancy resulted from ICSI treatment for male factor infertility (azoospermia) after 13 years of marriage. Multiple pregnancies, particularly those following assisted reproductive technologies, carry a significantly increased risk of hypertensive disorders, with studies showing a 2-3 fold higher incidence compared to singleton pregnancies.[6] The physiological stress of twin gestation likely contributed to the severity of complications observed in this case.

Multidisciplinary Management Approach

The successful maternal and neonatal outcomes in this case underscore the critical importance of coordinated multidisciplinary care. The management team included specialists from obstetrics and gynecology, cardiology, anesthesiology, and intensive care medicine. Key interventions included:

1. **Immediate stabilization:** Anticonvulsant therapy with levetiracetam and magnesium sulfate
2. **Blood pressure control:** Antihypertensive therapy with labetalol
3. **Airway management:** Intubation and mechanical ventilation for respiratory compromise
4. **Surgical intervention:** Emergency cesarean section for fetal safety and maternal stabilization
5. **Cardiac support:** Targeted therapy for Takotsubo cardiomyopathy
6. **Intensive monitoring:** Continuous surveillance in the ICU setting

Clinical Significance and Literature Context

The concurrent occurrence of eclampsia, PRES, and Takotsubo cardiomyopathy in a single patient is extremely rare, with limited case reports available in the literature.[12] This case contributes to the growing body of evidence regarding the complex interplay between hypertensive disorders of pregnancy and their cardiovascular and neurological complications. The successful management demonstrates that with prompt recognition, appropriate interventions, and coordinated care, favorable outcomes can be achieved even in the most challenging clinical scenarios.

Risk Factors and Prevention

Several factors in this case contributed to the development of severe complications:

- Advanced maternal age (31 years)
- Primigravida status
- Twin gestation following ART
- Multiple medical comorbidities
- Late presentation to tertiary care

Future management strategies should focus on enhanced antenatal surveillance, early recognition of warning signs, and timely referral to tertiary care centers for high-risk pregnancies.

Conclusion

This case report highlights the extraordinary challenges of managing a high-risk primigravida with the unusual triad of antepartum eclampsia, PRES, and Takotsubo cardiomyopathy in a twin pregnancy. The successful maternal and neonatal outcomes were achieved through prompt recognition, immediate stabilization, emergency delivery, and coordinated multidisciplinary care.

The case emphasizes several key clinical points:

1. The need for heightened vigilance in high-risk pregnancies with multiple comorbidities.

2. The importance of recognizing atypical complications such as Takotsubo cardiomyopathy in eclamptic patients presenting with respiratory distress or hemodynamic instability.
3. The value of comprehensive neuroimaging and cardiac evaluation in severe preeclampsia/eclampsia, and
4. The critical role of multidisciplinary team management in tertiary care centers.

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