

CASE REPORT

Early onset of posterior reversible encephalopathy syndrome (PRES) following postpartum eclampsia—A case report

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Key Clinical Message

Early screening and management of postpartum posterior reversible encephalopathy syndrome (PRES) can reduce hospital stay and complications. Obstetricians, gynecologists, ophthalmologists, and even general physicians should be aware of PRES since its presentation is variable.

KEYWORDS

posterior leukoencephalopathy syndrome, posterior reversible encephalopathy syndrome, postpartum period, PRES, reversible posterior leukoencephalopathy syndrome

1 | INTRODUCTION

After 20 weeks of pregnancy, gestational hypertension is common and can lead to life-threatening complications for some women.¹ In the cases where emergency interventions are made, intensive support care becomes necessary.² Unfortunately, maternal deaths following a cesarean-section (C-section) are high in low- to middle-income countries including Pakistan.³ Posterior reversible encephalopathy syndrome (PRES) is one of the diseases that are associated with eclampsia and it could co-occur with pre-eclampsia as well as with postpartum eclampsia. Its onset could be early or late while occurring with postpartum eclampsia. In the case of posterior reversible encephalopathy syndrome (PRES), delayed diagnosis could also be one of the factors that hinders the patient's quick recovery. It can give rise to chronic neurological disease since, proper management is not offered

to the patient.⁴ PRES, also known as reversible posterior leukoencephalopathy syndrome, is a neurological disorder. Its clinical manifestations span from seizures, headache, encephalopathy, vision loss, and neurologic deficits.⁵ Several factors can precipitate this syndrome, including eclampsia, chemotherapy, and autoimmune diseases.⁵ PRES can have complicated manifestations, and it varies from patient to patient.^{5,6} It can occur with acute or chronic renal damage or ocular damage. Such patients need to be treated as soon as possible because if not managed well, it can be life-threatening due to hydrocephalus and hemorrhage. If treated well, it usually subsides within a week.⁶ It could be reversible, opinions regarding that reversible in its name is a misnomer are also present. The awareness of PRES among doctors in Pakistan and the world at large is necessary to avoid misdiagnosis and delayed treatment. It is also essential for obstetricians, gynecologists, anesthesiologists, and

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clinicians including medical students in Pakistan and the world at large to know more about PRES because PRES could be confused with other diseases such as; venous-sinus thrombosis and meningitis. Radioimaging technology plays a pivotal role in differentiating between PRES and other syndromes, but it could co-exist with other syndromes as well.⁷ Many cases of PRES in preeclamptic women or late postpartum eclamptic cases have been reported. However, very few cases have been reported of onset of PRES after postpartum eclampsia in a patient who had undergone emergency lower segment C-section owing to preeclampsia. That is what this present case is about, hence, depicting its uniqueness, and the need to reveal this present case to the scientific world, in order to improve the knowledge of physicians, researchers, scientists, etc. across the universe about PRES. Since it could also turn out to be irreversible and accompanied by neurologic damage.⁸

A female patient, in her late twenties, appeared in the gynecology and obstetrics, indoor-patient department of our hospital on the 4th postoperative day after her emergency lower segment C-section with a non-improving Glasgow Score (GCS) of 5/15. She turned out to be a patient of PRES following postpartum eclampsia. To our knowledge, only a few cases have been reported regarding the early manifestation of PRES in postpartum eclampsia in patients who had emergency lower segment C-section. The case report made by CARE guidelines is as follows.

2 | CASE

2.1 | Case history/examination

A 28-year-old primigravid patient was in her 36th week of gestation when her blood pressure rose to 190/120 mmHg, and she experienced fits. She had an emergency lower segment C-section in a local hospital due to antenatal eclampsia (1st postoperative day), followed by postnatal eclampsia after an hour. Her baby was alive and healthy but she experienced fits, high blood pressure, loss of consciousness, tongue biting, frothing from the mouth, and urinary incontinence. Her GCS stayed 5/15 till the 4th postoperative day, upon which she was referred to a tertiary care hospital. Her presenting complaint was high blood pressure associated with loss of consciousness and decreased urine output. Thus, she was diagnosed with postnatal eclampsia. She had the last fit at 2:00 p.m. on the 4th postoperative day. She presented with a pulse rate of 91 beats/min, blood pressure of 140/90 mmHg, and pallor. She had no history of surgery nor was she taking any medications regularly. She had no history of allergy, smoking, hypertension,

diabetes mellitus, ischemic heart disease, or renal disease. Her blood pressure was within normal range before this event, during her pregnancy as well as before pregnancy.

2.2 | Differential diagnosis, investigations, and treatment

Abdominopelvic ultrasound scans showed no free fluid or retained products of conception. Her abdomen was uniformly enlarged, moved with respiration, and was soft and non-tender. She was subjected to hourly monitoring of blood pressure, temperature, respiratory rate, and urine output by nurses. Upon admission, isosorbide dinitrate was given to relieve hypertension (4th postoperative day). Before the first dose of isosorbide dinitrate, blood pressure was 160/110 mmHg, gradually falling with subsequent amounts of isosorbide dinitrate. Blood pressure and mean arterial pressure were monitored after every dose by nurses and isosorbide dinitrate was discontinued once blood pressure reached 120/80 mmHg and mean arterial pressure reached 93 mmHg, around the afternoon of the 4th postoperative day. MgSO₄ was given to relieve her seizures while monitoring urine output, respiratory rate, and reflexes after every dose. Administration of MgSO₄ was started at on the 4th and discontinued on the 5th postoperative day. She was also transfused with one pint of blood. The patient was drowsy and only responding to painful stimuli, GCS 5/15. On the 5th postoperative day, a call to the medicine department was forwarded, they reported GCS of E1V3M1, that is, 5/15, bilateral pupils reactive, normal heart sounds, and breathing with no added sounds present. Urine output was reduced and lab tests of the same day are shown in Table 1. She was given mannitol, a diuretic, to prevent permanent neurologic deficit, control convulsion, and relieve brain edema. Serum electrolytes and CT brain were advised investigations. She was shifted to the medicine unit on the same day. Her arterial blood gas showed mixed peripheral alkalosis and metabolic acidosis. The cardiac marker was high. On the 6th postoperative day, GCS was still 5/15. On the 7th postoperative day, MRI reports came to declare that there were multiple bilateral, almost symmetrical areas of T2 and FLAIR (fluid-attenuated inversion recovery), high-intensity edema in both parietal and occipital regions. Such features are highly suggestive of PRES as shown in Figures 1 and 2. Both cerebellopontine angles were normal with no mass lesion, and the 7th and 8th nerve complexes were also normal. No region of hemorrhage was seen, and the ventricular system and sulci were normal. The cerebellum, pituitary gland, calvarium, and brain stem were also normal. The midline was also normal with no mass effect. MRI turned out to be normal, so venous

TABLE 1 Labs of patient on subsequent post-operative days.

Postoperative day	CBC	Coagulation screen	Renal function tests	Liver function tests	Serum electrolyte
4th	Hemoglobin: 8.0 gm/dL WBC: 8500/cmm Platelet: 124,000/mm ³	PT: 18 s APTT: 38 s	Urea: 41 mg/dL Creatinine: 0.8 mg/dL	SGPT (ALT): 114 U/L ALP: 165 U/L	Sodium: 136 mmol/L Potassium: 4 mmol/L
5th and 6th	Hemoglobin: 13.5 mg/dL WBC: 17,500/cmm Platelet count: 730,000/mm ³	–	Urea: 91.2 mg/dL Creatinine: 3.16 mg/dL Uric acid: 8.1 mg/dL	SGPT (ALT): 128 U/L ALP: 454 U/L	Sodium: 130 mmol/L Potassium: 5.1 mmol/L
7th	Hemoglobin: 10.4 mg/dL WBC: 19,400/cmm Platelet count: 110,000/mm ³	PT: 17 s APTT: 38 s	Urea: 174 mg/dL Creatinine: 4.8 mg/dL	SGPT (ALT): 172 U/L ALP: 424 U/L	Sodium: 137 mmol/L Potassium: 4.8 mmol/L
8th and 9th	Hemoglobin: 11 gm/dL WBCs: 16,600/cmm Platelets count: 181,000/mm ³	–	Urea: 160 mg/dL Creatinine: 2.2 mg/dL	–	Sodium: 136 mEq/L Potassium: 5.4 mEq/L Chloride: 98 mEq/L



FIGURE 1 PRES visible in T2 MRI. Very visible white matter hyperintensities present in parts of the occipital, parietal, and temporal lobe. This shows the presence of PRES.

infarctions would be excluded. Upon this MRI brain report, a diagnosis of PRES was made.

Moreover, radiologists commented that the remote differential of meningoencephalitis can be considered. GCS was still 5/15 till the 8th postoperative day, and renal

function tests showed high urea and creatinine while serum electrolytes were normal. A lumbar puncture was done, and CSF was sent for an examination to confirm to rule out meningoencephalitis. Her urea and creatinine levels were high.

On the 9th postoperative day, the CSF examination report showed the absence of microorganisms. Moreover, no atypical or malignant cells were seen, and cytologic examination of the smear showed occasional RBCs against a hemorrhagic background. A hematology report on the same day showed leukocytosis and neutrophilia, while platelets were adequate in number. The hematologist commented to look for some acute inflammation. CSF analysis showed high LDH, glucose, and protein. On the 10th postoperative day, her GCS improved by 8/15, and eye movements were present. Low-grade fever was present, relieved by paracetamol and sponging. Her GCS became 15/15 on the 11th postoperative day. She became well-oriented regarding space and time and gained consciousness. She started taking oral input as well. On the 13th postoperative day, her renal function tests were repeated. These results were better than that of the 8th postoperative day, her urea levels improved from 162 to 71 mg/dL serum creatinine improved from 2.2 to 0.7 mg/dL. Her urine output became normal by this day. This showed healing of the kidney, from acute kidney injury, and showed that no permanent damage occurred to the kidney. Her serum BUN and urea were mildly high on the 13th postoperative day, owing to the heavy antibiotics she had been taking.

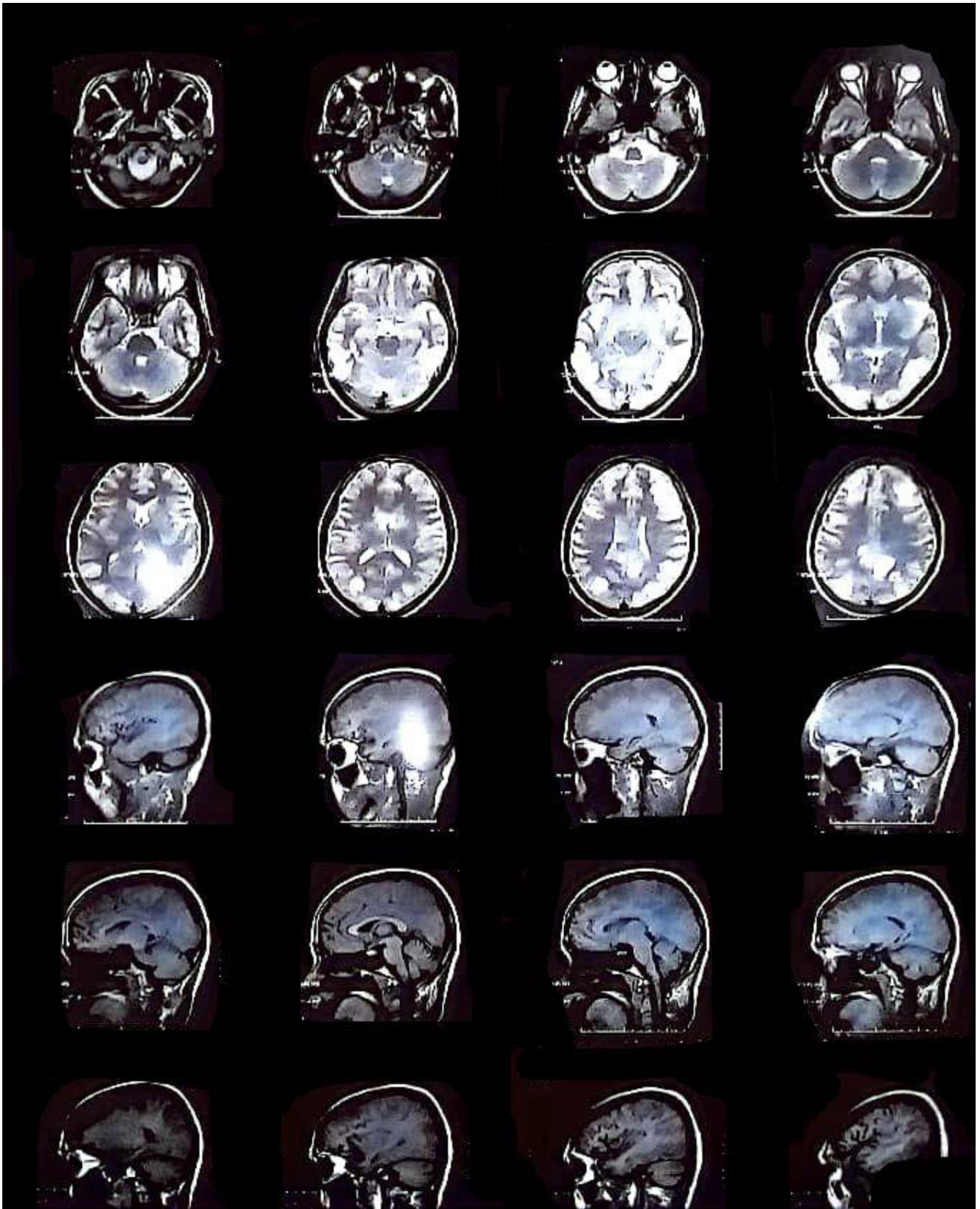


FIGURE 2 MRI with T2 signals. There are multiple bilateral and nearly symmetrical areas of T2 shown in MRI. Indeed it is playing a pivotal role in making the diagnosis of PRES.

2.3 | Outcome and follow-up

She was discharged on the 14th postoperative day with the advice of follow-up after 4 days. She was prescribed ceftriaxone for antibiotic cover, alpha-keto analogs of essential amino acids to normalize the BUN and urea levels, sodium bicarbonate, proton pump inhibitor, gastroprokinetic agent and methyl-dopa, amlodipine, and valsartan to avoid chances of hypertension. Drugs for hypertension were readjusted and discontinued according to the normal blood pressure of the patient in follow-ups.

3 | DISCUSSION

PRES, reversible posterior cerebral edema syndrome, posterior leukoencephalopathy syndrome, hyperperfusion encephalopathy, or brain capillary leak syndrome, all are synonymous terms. PRES has a wide range of signs and symptoms that vary from patient to patient ranging from headaches, neurogenic-stunned myocardium, and transient complete vision loss associated with it, etc.⁹⁻¹¹ PRES has shown strong relation with hypertension or chemotherapeutics.¹² In women with eclampsia, PRES should always be ruled out, and if present, treatment should be directed to the cause of PRES. Hossain et al. showed that of 34 eclamptic women, 22 went for neuroimaging and PRES was present in 9 of the 22 women in Karachi, Pakistan.¹³ Usually, it is reversible and recovery occurs in a couple of weeks. Naqi et al, in Pakistan, reported three cases of PRES following emergency C-section, first in the 24th week, second in the 35th week, and third the in 37th week of gestation and recovery, as well as resolution of MRI signs, happened in 5, 7, and 7 weeks, respectively, in Karachi, Pakistan.¹⁴ Some patients undergoing C-sections owing to preeclampsia last as postpartum eclampsia, such patients should indeed be subjected to keen vigilance as well as vitals monitoring.

While considering PRES, it is, however, mandatory to rule out related conditions like HELLP syndrome (the syndrome of hemolysis, elevated liver enzymes, and low platelets) and AFLP (acute fatty liver of pregnancy) in such patients, to formulate an effective management plan for the patient. Based upon the laboratory criteria as defined by Tennesse Classification for the diagnosis of HELLP, the platelets of this patient were not less than 100,000 U/L, serum LDH was not raised, and no peripheral smear was done.¹⁵ Only ALP was high as per the 4th postoperative day, which ruled out the possibility of HELLP syndrome. Moreover, in AFLP, as per Swansea criteria, this patient did not have six or more clinical features as mentioned, which rules out ALFP. Although the patient had some of

the mentioned features like encephalopathy, raised ALT, coagulopathy (i.e., 14 s PT and >34 s APTT), and signs of renal impairment as traced on the 4th postoperative day.¹⁶

No doubt that MRI, instead of CT, is pivotal in the diagnosis and the MRI findings of this case are typical findings of PRES.^{17,18} By providing a clear picture, MRI plays a pivotal role in the diagnosis of PRES. MRI showed hyperintensity on T2 in previous studies as well, especially in the parietal and occipital regions of the brain.^{19,20} Acute renal damage reported in patients of PRES is thought to be due to the dysfunction of the renin-angiotensin-aldosterone system.¹⁹ Hyperintensified fluid-attenuated recovery images are findings of PRES. Thus, diffusion-weighted MRI scans should be used as quickly as feasible to provide a diagnosis and separate the disease from other causes of altered sensorium, such as seizures, meningitis, and psychosis.¹⁸ Diffusion-weighted MRI scans are necessary for making the condition of patients better as well as saving their lives. In pregnant females with eclampsia, the risk and probability of PRES should not be ignored and proper screening should be provided to eclamptic patients in this regard. Otherwise, it will lengthen the patient's hospital stay, burden her family financially, and place workload and pressure on the hospital's staff and infrastructure. Additionally, it could result in psychological issues for the patient and her family. Hence, MRI should be mandatory for preeclamptic as well as eclamptic women to avoid harsh complications of PRES.

Talking about treatment, no trials have been reported yet for the treatment of PRES. Depending upon the etiology, it is treated by treating the underlying situation. Whether the trigger is hypertension, renal dysfunction, or chemotherapeutics, the treatment lies in treating the same condition, respectively. For instance, hypertension-triggered PRES is managed well by strict blood pressure management, and likewise, in pregnancy-associated PRES, instant delivery and magnesium sulfate used to control seizures have been found effective.¹⁹ Magnesium sulfate showed its magical effects in our case as well. Induction of labor in cases of eclampsia, removal of immunosuppressant in case of drug-induced, proper hydration and electrolyte balance, gradual blood pressure correction, prevention of seizures in pregnant women, dialysis for renal failure patients is beneficial to cure cases of PRES.¹⁸ Besides that, the airway should be managed adequately especially if the patient is having poor Glasgow coma score. Usually, patients of PRES have good prognoses because clinical symptoms are reversible. However, recurrences can also occur.^{7,17}

Early recognition and management can prevent complications as well as accelerate recovery. In the case of this patient, she was kept in a private clinical in her hometown till the 4th postoperative day yet the GCS

was 5/15. After that, she was referred to a tertiary care hospital, which also created a delay and complicated the case. This highlights the lag in the decision-making of doctors at private clinics regarding referring patients to tertiary care hospitals. This unveils the loopholes in the healthcare system of Pakistan along with emphasizing the importance of timely diagnosis and prompt management of patients. Patients who are prone to such development of PRES should be kept under strict supervision along with vitals monitoring. Obstetrics, gynecologists, ophthalmologists, and even general physicians should be aware of PRES and its complications as its presentation varies. There is a need for vigilance monitoring of postpartum eclampsia patients and puerperium where better health care can be provided to patients. The researchers also need to carry out future research about PRES, especially on the KAP survey.

AUTHOR CONTRIBUTIONS

Kaleem ullah: Conceptualization; data curation; formal analysis; investigation; project administration; resources; supervision; visualization. **Hussain Haider Shah:** Investigation; project administration; supervision; validation; writing – review and editing. **Maryam Tariq:** Conceptualization; methodology; visualization; writing – original draft; writing – review and editing. **Malik Olatunde Oduoye:** Funding acquisition; project administration; software; validation.

FUNDING INFORMATION

There was no financial support for this study.

DATA AVAILABILITY STATEMENT

The datasets used and analyzed during the current study including lab reports, patient files, medicine charts, and imaging are available from the corresponding author on reasonable request. These are not included in additional files in order to respect patient privacy. Rest, all information relevant to the case has been listed in the report.

ETHICS STATEMENT

The consent form provided by BMC Journal of Case Report (in Urdu) was filled, giving consent to participate and publish.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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