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CASE REPORT

# Posterior Reversible Encephalopathy Syndrome in Women with Eclampsia—Report of Three Cases

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## Introduction

Posterior reversible encephalopathy syndrome (PRES) is a distinctive clinical and radiological syndrome recognized in a number of conditions such as preeclampsia, eclampsia, severely high blood pressure, renal failure and autoimmune disease like systemic lupus erythematosus, with the treatment of immunosuppressive agents or high dose chemotherapy. The clinical presentation of this syndrome is characterized by symptoms of headache, nausea, vomiting, seizures, altered consciousness and visual disturbances. The radiological findings on magnetic resonance imaging (MRI) or computed tomography (CT) are characterized by symmetrical white matter abnormalities suggestive of edema predominantly in the posterior parietal–occipital regions of the cerebral hemispheres. We present three cases of PRES in eclamptic women, with particular attention to the obstetric management.

## Case 1

Mrs. CD, 20 yrs, G-1, referred as severe pre-eclampsia at 38 weeks of gestation. Referral BP was 180/110 mm of Hg. On admission, she was conscious, oriented. On referral, she received the initial dose of magnesium sulfate (MgSO4) as with the current hospital referral protocol (Pritchard regimen). On obstetric examination, fetal heart sound was absent, and she was in active phase of labor. She was started antihypertensive drug (labetalol, 20 mg IV bolus) and maintenance dose of magnesium sulfate. She delivered a still born baby vaginally by another one and half hour time. Suddenly, she complained of visual impairment and headache in the immediate postpartum period. Her BP was 180/130 mm of Hg. Her condition deteriorated rapidly, became unconscious after one episode of convulsion and was shifted to the HDU. She was examined by neurologist, and her GCS (Glasgow Coma Scale) was 3/15. She remained unconscious for next 2 days. She received an additional 2 gm magnesium sulfate injection to control convulsion, labetalol injection (20 mg IV bolus followed by infusion 1 mg/min) to control blood pressure and other supportive care. MRI on the 3rd day diagnosed extensive area of vasogenic edema (diffuse hypo-dense areas) in the region of parietal, occipital, frontal and temporal lobes of the brain (Fig. 1). She was reevaluated by neurologist, and PRES was diagnosed. Mannitol 20% was added in intravenous route; on 4th postpartum day, her consciousness improved. She had complete loss of vision and developed hemiparesis. She was shifted to ITU and was under the care of a multidisciplinary team involving the physician, neurologist, ophthalmologist and the physiotherapist. Later on, she developed squint and bed sores. She recovered with conservative management over a period of another 21 days. Gradually, she became oriented and ambulatory. She had no residual motor weakness or visual problems and was discharged fit. On follow-up visits, she recovered completely and remained normotensive.

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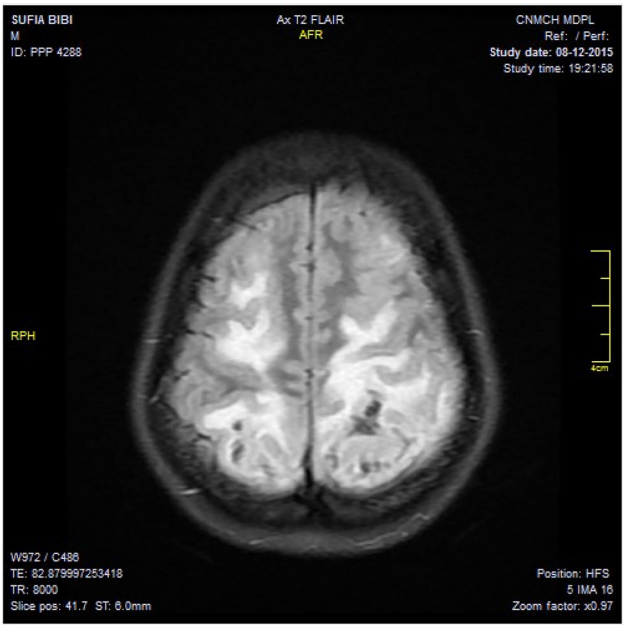


**Fig. 1** MRI of the brain, axial view—extensive areas of vasogenic edema (diffuse hypo-dense areas) in the region of parietal, occipital, frontal and temporal lobes of the brain

While on follow-up, she conceived after a period of 8 months, unplanned though. She continued ante natal checkup, with the same hospital unit. She remained normotensive all throughout the pregnancy. Parameters regarding well-being of her health and that of the fetus remained satisfactory. Major part of her second pregnancy, she was in the hospital for close and direct supervision. She was delivered electively by cesarean section after 38 completed weeks. Live baby boy, weighing 2570 g, was born. The baby and the mother were discharged well from the hospital.

## Case 2

25 yrs, $G_2P_{1+0,\ L\text{-}1}$, was admitted with a history of 5–6 episodes of convulsion antenatally and was deeply drowsy. Her BP was 230/120 mmHg. Her legs were noted to have edema and bedside urinalysis indicated 2+ proteinuria. On obstetric examination, uterine height corresponded to 36 weeks of gestation with cephalic presentation and fetal heart sound was absent. Cervix was 4 cm dilated with station of head at − 1. She was started magnesium sulfate regimen (Pritchard regimen) with antihypertensive—labetalol (20 mg IV bolus followed by infusion 1 mg/min). Oxytocin drip was started to augment labor. She delivered a still born baby vaginally after 4 h of admission. Her blood pressure was controlled without any further convulsion; however, she remained drowsy and developed torticollis and quadriparesis. She was shifted to intensive therapy unit (ITU) immediately after

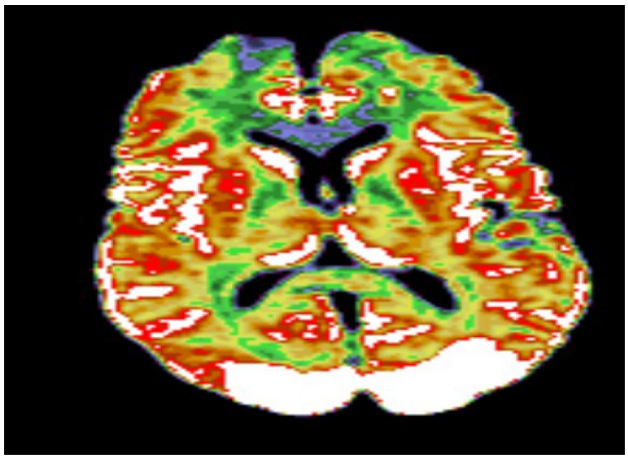

**Fig. 2** MRI of the brain, axial view wide areas of the parietal and occipital lobes edema involving both the lobes

delivery. She was examined by neurologist and her GCS was 4/15 and her motor strength of all limbs was uniformly decreased. On her second day of puerperium, she could communicate only through incomprehensible sounds and could not form sentences. MRI, on 3rd day, showed wide areas of the parietal and occipital lobes edema involving both the lobes (Fig. 2). Diagnosis of PRES was made on clinical and imaging studies. She was about 12 days on ITU support and managed conservatively. Her hospital stay was of 19 days. Although she had ante grade amnesia since the incidence, she had no other features of neurological deficit. She recovered completely, and she is under follow-up.

## Case 3

33 yrs, $G_{2,\ A\text{-}1,\ L\text{-}0}$, admitted with the history of repeated (4 times) convulsions at 36 weeks of gestation with fetal demise. She was diagnosed as hypertensive in her 1st antenatal visit (16 weeks). On admission, her blood pressure (BP) of 200/110 mm of Hg, GCS (E1V1M1), was 3/15, edema was present with plantar and pupillary reflexes preserved. Her chest was clear without any cardiac abnormality. On obstetrical examination uterus was 36 weeks size with cephalic presentation and absent fetal heart sound. On per vaginal examination, external os of cervix was closed. Bedside urine examination revealed 3+ proteinuria, and ultrasonography confirmed intra-uterine fetal death. She was started on magnesium sulfate therapy (Pritchard regimen), labetalol injection, and vaginal delivery was achieved within 6 h following induction of labor with intra-vaginal misoprostol tablets. She remained unconscious for first 24 h and was examined by neurologist, and intravenous mannitol was added. MRI revealed bioccipital foci of high signal intensity involving the cortex and subcortical white matter

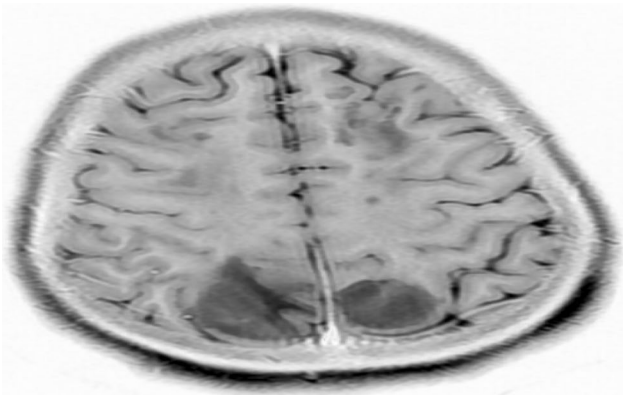

**Fig. 3** MRI of the brain, axial view—high signal intensity involving the cortex and subcortical white matter of both occipital lobes

suggestive of PRES (Fig. 3). She remained deeply drowsy for next 7 days. With ITU care for 14 days, she gradually improved. She suffered quadriparesis for around 3–4 weeks and gradually gained back her power. On discharge, GCS was 15/15. On follow-up, she recovered completely and can perform her daily activities as before.

## Discussion

Patients were diagnosed for PRES on clinico-radiological background. Neuroimaging findings in the brain were characteristic (described above). All the patients were treated with a multidisciplinary team approach. The consultants from the sub-specialties involved were: critical care unit physicians, neurologists, cardiologists, nephrologists, ophthalmologists and the physiotherapists. One patient (case 1) conceived during the period of follow-up and delivered uneventfully. This is the first report of successful obstetric outcome for a woman with PRES, as we could find through literature search.

PRES was originally described by Hinchey et al. in 1996, and its exact incidence is unknown [1]. The exact pathophysiological mechanism of PRES is still unclear. Three hypotheses have been proposed till now, which include (1) cerebral vasoconstriction causing subsequent infarcts in the brain, (2) failure of cerebral auto-regulation with vasogenic edema and (3) endothelial damage with blood–brain barrier disruption further leading to fluid and protein transudation in the brain [2]. In women with eclampsia, PRES may be present due to all three mechanisms simultaneously or independently. PRES is characterized by headache, confusion, nausea, vomiting, visual changes, seizures and altered sensorium. Cortical blindness is considered a typical and characteristic symptom of this syndrome [3]. Lesions are typically found in the posterior parieto-temporo-occipital areas, but also in the anterior regions, basal ganglia, brain stem and cerebellum [4]. An imaging study (CT or MRI) is needed to exclude other diagnoses like cerebral venous thrombosis, or acute cerebrovascular accident, or tumor [1]. However, cerebral MRI is the gold standard diagnostic tool; neuroimaging performed shows diffuse edema of the white matter, which selectively involves the parieto–occipital regions of the brain; edema usually shows iso- or hypo-intensity in diffusion weighted imaging (DWI) [1]. MRI was carried out in all of our cases, when patient remained unconscious for a period of about 12 h, despite management. Imaging studies (MRI), in our cases, predominately showed parieto–occipital white matter changes.

Therapy is usually the same as for eclampsia: removal of the underlying cause with the performance of a rapid termination of pregnancy (either induction or CS), after a mandatory attempt of fast stabilization of the mother's status by means of antihypertensive drugs, especially labetalol, nifedipine and magnesium sulfate [1]. Early and late complications such as pulmonary edema, dissection of extracranial internal left carotid artery, cerebral herniation, short-term memory loss, subarachnoid hemorrhage, permanent mild dysmetria, visual impairment and death have been described [1]. Though posterior reversible encephalopathy syndrome is an integral component of eclamptic encephalopathy, it does not adversely affect the prognosis. In majority of the patients, posterior reversible encephalopathy syndrome resolves spontaneously and the patients show a remarkable clinical improvement [5].

## Conclusion

PRES syndrome should always be considered in women with severe form of eclampsia associated with coma or other neurological features. All our patients were benefitted with the support of MRI, making the diagnosis early.

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### Compliance with ethical standard

**Conflict of interest** There was nothing to disclose regarding financial, personal, political, intellectual or religious interests. There is no conflict of interests.

**Informed Consent** The study was approved by Institutional Ethics Committee of National Medical College and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all patients for being included in the study.

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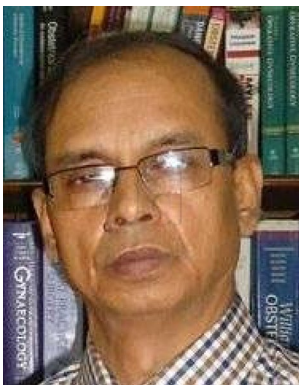

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