

# Posterior Reversible Encephalopathy Syndrome after Pre-eclampsia and Eclampsia: A Case Report

## Síndrome da Encefalopatia Posterior Reversível após pré-eclâmpsia e eclâmpsia: um relato de caso

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### Abstract

**Introduction:** Posterior Reversible Encephalopathy Syndrome (PRES) is a clinical-neuroradiological condition with varied presentation and underdiagnosed in obstetric contexts. Pre-eclampsia and eclampsia are among the main etiological factors.

**Case Report:** We report the case of a previously healthy 19-year-old primigravida at 36 weeks of gestation, who presented with malaise, headache, and hypertensive episodes. After an initial tonic-clonic seizure treated with magnesium sulfate, she underwent cesarean delivery. Despite clinical stabilization, a second seizure and sudden onset of complete bilateral amaurosis occurred. Imaging studies revealed parieto-occipital changes compatible with PRES. With supportive care, the patient achieved full visual recovery within 48 hours.

**Discussion:** PRES may present with nonspecific symptoms such as headache and nausea, but neurological deficits—such as visual loss—require prompt recognition. Imaging, especially MRI, is essential for diagnosis. Early management, including seizure control and blood pressure management, is associated with favorable prognosis.

**Keywords:** Posterior Reversible Encephalopathy Syndrome; Pre-eclampsia; Eclampsia.

### Resumo

**Introdução:** A Síndrome da Encefalopatia Posterior Reversível (SEPR) é uma condição clínico-neurorradiológica com apresentação variável, frequentemente subdiagnosticada no contexto obstétrico. A pré-eclâmpsia e a eclâmpsia são causas etiológicas frequentes.

**Relato de Caso:** Descreve-se o caso de uma primigesta de 19 anos, previamente saudável, com 36 semanas de gestação, que apresentou mal-estar súbito, cefaleia e episódios hipertensivos. Após uma primeira convulsão tônico-clônica, tratada com sulfato de magnésio, foi submetida a cesariana. Apesar da estabilização inicial, desenvolveu nova convulsão e amaurose bilateral completa. Exames de imagem evidenciaram alterações parieto-occipitais compatíveis com SEPR. Com tratamento de suporte, a paciente recuperou totalmente a visão em 48 horas.

**Discussão:** A SEPR pode manifestar-se com sintomas inespecíficos como cefaleia e náuseas, mas défices neurológicos, como perda visual, exigem reconhecimento imediato. A ressonância magnética é essencial para o diagnóstico. A intervenção precoce, incluindo o controle das convulsões e da pressão arterial, está associada a um bom prognóstico.

**Palavras-chave:** Síndrome de Encefalopatia Posterior Reversível; Pré-eclâmpsia; Eclâmpsia.

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## INTRODUCTION

The Posterior Reversible Encephalopathy Syndrome (PRES) was first described in 1996<sup>1</sup>. It derives from vasogenic brain edema and is manifested by a wide range of clinical symptoms, which include headache, focal neurological deficits, seizures, visual disturbances, and even encephalopathy<sup>2</sup>.

PRES' diagnosis is carried out using complementary tests, notably Nuclear Magnetic Resonance Imaging (NMR), which typically describes hyperintense foci in the parietal and occipital lobes<sup>3</sup>. Its treatment involves medicine employment and eliminating its triggering factor<sup>4</sup>.

Many conditions are described as PRES etiologies<sup>5</sup>. Between them, special emphasis is placed on pre-eclampsia (PEC) and eclampsia (EC)<sup>5</sup>. Indeed, it is believed that they could lead to vasogenic edema and intracerebral endothelial damage, that may lead to PRES<sup>5</sup>. In this sense, some studies suggest a strong association between PEC, EC and PRES, but less than 1% of cases were diagnosed and treated<sup>3-5</sup>.

Therefore, this case report seeks to present a clinical case of a patient who presented with PRESS after an episode of PEC and EC.

## CASE REPORT

This report was approved by the Research Ethics Committee of the Bauru School of Dentistry, University of São Paulo, under protocol number 80553524.5.0000.5417. Case Reporting Guidelines (CARE) guided this research development<sup>6</sup>.

A 19-year-old patient, previously healthy, was admitted to a Maternity Hospital referring to sudden malaise. This sensation was associated with a severe headache accompanied by nausea, emesis, diarrhea, and inappetence.

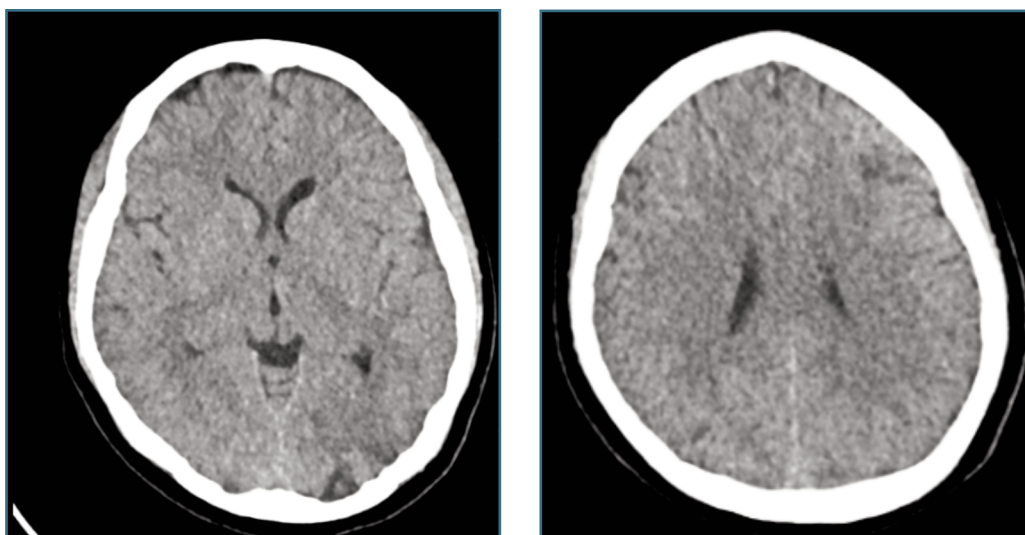
The patient was a primigravida, with an estimated gestational age of 36 + 3/7 weeks based on an ultrasound examination carried out in the first trimester of pregnancy. Previously healthy, with no relevant obstetric history, the patient was undergoing prenatal care in a basic health unit and had presented no type of complications so far.

Upon admission, the patient had a uterine height of approximately 37 centimeters, a fetal heart rate of 148 beats per minute, with fetal movement present, absent uterine dynamics, and blood pressure of 130 X 70 mmHg. No vaginal examination was performed at this moment.

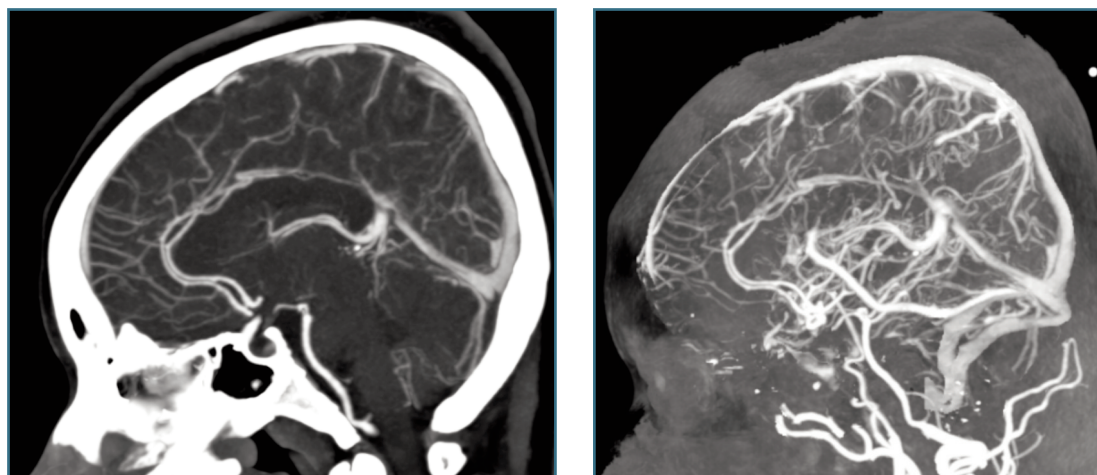
Passed roughly four hours of admission, the patient's blood systolic pressure levels reached 150 mmHg, which was handled with a Hydralazine prescription. Despite this conduct, the patient developed generalized tonic-clonic seizure, which was handled with Magnesium Sulfate in the Zuspan scheme. After patient's stabilization, an uneventful cesarian section was performed, with the child being born with good vitality, weighing about 3000 grams, without requiring any type of resuscitation maneuver. The patient remains stable for eight hours, and, despite continuous medication, she presented another generalized tonic-clonic seizure, which was handled with Magnesium Sulfate in the Zuspan scheme and antihypertensive medicines, in case Nitroprusside and Captopril.

Since the childbirth, the patient began to report a reduction in her visual acuity. Approximately 20 hours after delivery, she reported complete amaurosis, referring to seeing only a "flash" in her both eyes. The patient was transferred to a tertiary reference hospital where she received specialist care with the local clinical neurology team. No disruption was referred in the patient's physic exam, with the exception of an alteration in confrontation perimetry, in which was noted a bilateral amaurosis.

After laboratorial tests ruled out metabolic and infectious differential diagnosis (there was no alteration in patient's hemogram, creatinine, urea, blood glucose, liver enzymes, potassium, sodium, calcium and magnesium levels), a tomography scan revealed hypodense subcortical areas in the occipital and parietal regions – Figures 1 and 2. In addition, a tomography angiography describes no signs of cerebral venous thrombosis, ruling out this stroke hypothesis, and suggesting PRES – Figures 3 and 4. A skull NMR in Fluid-Attenuated Inversion Recovery (FLAIR) revealed hypersignal areas in parieto-occipital regions compatible with PRES syndrome, closing this diagnosis – Figures 5 to 8.



**FIGURES 1 and 2 .** Non-contrast brain CT scans showing hypodense subcortical areas in the parietal and occipital lobes, bilaterally. These findings are suggestive of vasogenic edema, which is characteristic of Posterior Reversible Encephalopathy Syndrome (PRES).

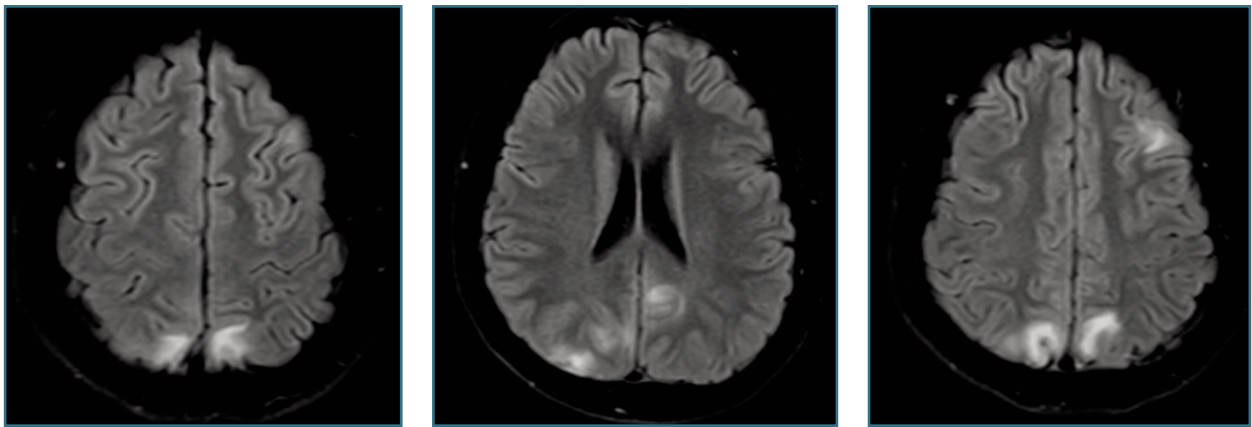


**FIGURES 3 and 4.** Cerebral CT angiography demonstrating normal vascular anatomy without evidence of arterial occlusion, stenosis, or venous thrombosis. These findings help to exclude vascular causes such as ischemic stroke or cerebral venous sinus thrombosis in the differential diagnosis.

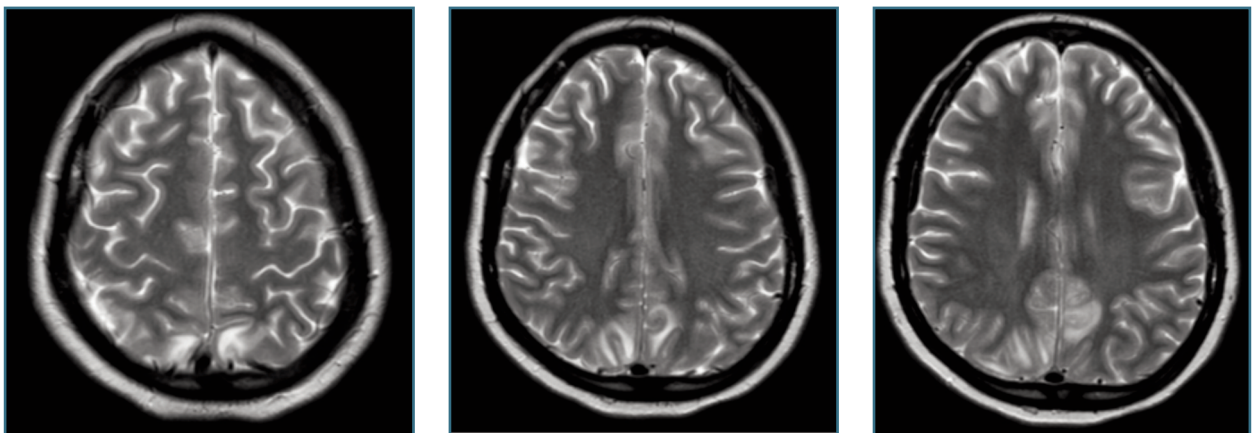
The patient remained stable throughout her hospitalization, without any alterations. She reported visual recovery and, 2 days after her admission, she reported a total vision recovery. The patient was counter-referred to the Maternity Hospital and a follow-up reassessment was scheduled with the neurology team. After an outpatient evaluation, as the patient did not present any type of neurological deficit, she was discharged with instructions to seek the service again if necessary.

## DISCUSSION

PEC is highly prevalent worldwide and is considered the leading cause of maternal and perinatal mortality.<sup>8</sup> Some conditions presented by the patient in this case report, such as nulliparity and maternal age below 20 years, are recognized risk factors for PEC development.<sup>9</sup> Other known risk factors – although not observed in this case - include autoimmune diseases,



**FIGURES 5, 6 and 7.** Axial FLAIR MRI sequences revealing hyperintense lesions in the bilateral parieto-occipital white matter, consistent with vasogenic edema. These are typical radiological findings in patients with PRES.



**FIGURE 8, 9 and 10 .** Axial T2-weighted MRI images showing hyperintensities in the same parieto-occipital regions as seen on FLAIR, further supporting the diagnosis of PRES. No evidence of hemorrhage or diffusion restriction was observed.

diabetes, chronic hypertension, and a prior history of PEC<sup>9</sup>.

EC is particularly prevalent in developing countries like Brazil, where an increasing incidence has been noted in recent years, ranging from 50 to 151 cases per 10,000 births.<sup>10</sup> Key risk factors include maternal age under 20, primiparity, preterm birth before 32 weeks of gestation, and inadequate prenatal care<sup>1</sup>. Most seizures occur in the prepartum period, though about 25% may occur postpartum, requiring ongoing monitoring and reassessment to prevent recurrence<sup>12</sup>. Maternal mortality due to EC can reach up to 14% in some regions, and approximately 25% of affected women may experience long-term sequelae, including recurrent eclampsia in future pregnancies, increased car-

diovascular risk, and additional convulsive episodes<sup>13,14</sup>.

PRES tends to present non-specific clinical symptoms, such as the presented by the patient report<sup>1-5,15</sup>. Its diagnosis is suggested by a strong headache, presented in more than 80% of patients; encephalopathy, which is presented in almost 90% of patients and currs with aphasia and/or hemiparesis; high blood pressure levels; and visual symptoms, as amaurosis tha can evolve to an amaurosis in almost 40% of cases<sup>1-5,15</sup>.

The complementary evaluation of PRES involves evaluation with neuroimaging exams, notably NMR. Among the main findings of this examination, it is noted that up to 65% of patients with PRES present diffuse microbleeds associated with symmetrical

hemispheric vasogenic edema that affects subcortical white matter of frontal sulcus, holo-hemispheric watershed, and parieto-occipital. Some imaging patterns such as corpus callosum bleeding, extensive cerebral edema, the presence of encephalic hemorrhage, and restrictive diffusion on imaging, that are considered as worse prognosis factors in PRES, were not found in the patient. A common complement to the evaluation of PRES' patients is the reevaluation of their neuroimaging after contrast injection, which usually presents an increase in focal hyperdensity in cortical regions in up to 50% of the patients evaluated. Given the patient's evolution, she was discharged without carrying out this reevaluation, not allowing a comparison with other studies. Finally, it is worth highlighting the follow-up imaging may find structural lesions in 40% of cases, which are described as residual images derived from the previous edematous process<sup>15,16</sup>.

General PRES management involves conservative measures that seeks to remove the PRES basic cause and proposed patient's stabilization<sup>2-5,15-17</sup>. In this sense, it is recommended a gradual reduction in blood pressure levels in PRES patients<sup>2-5,15-17</sup>. The aim is to avoid iatrogenic events, such as renal and brain ischemia, by establishing a pressure target close to 105 to 125 mmHg of systolic blood pressure<sup>2-5,15-17</sup>. Furthermore, it is recommended to avoid Nitroglycerin, which could have the harmful adverse effect of aggravating brain edema<sup>2-5,15-17</sup>. Another recommendation is made for the management of patients who enter status epilepticus, through the use of benzodiazepines and anti-convulsants, such as valproate, for example<sup>2-5,15-17</sup>. Finally, the literature recommends that professionals who deal with PRES cases correctly refer their patients<sup>2-5,15-17</sup>. Up to 70% of cases require intensive care in specialized Care Units, with up to 40% of patients with PRES requiring support with mechanical ventilation during their evolution<sup>2-5,15-17</sup>.

PRES is fundamentally described as a benign condition, fully reversible and with a good prognosis, being its mortality of less than 20% of cases and its recurrence chance of less than 4% of cases<sup>2,16,17</sup>. However, some conditions, such as having previous comorbidities, presenting severe encephalopathy, hyperglycemia, coagulopathy throughout the condition, having neoplastic and/or a hypertensive cause, requi-

re more time to control the causative factor, are considered as poor prognosis factors<sup>2,16,17</sup>. In this case, it is estimated that sequelae occurs in up to 44% of PRES' patients. Possible deleterious effects following PRES include the recurrence of seizures and a possible greater cardiovascular risk in the future<sup>2,16,17</sup>. However, the impact of these sequelae on the length of hospital stay, morbidity, mortality or nursing home placement on discharge is widely discussed, with some studies reporting that such conditions are rare and have no real significance in the long-term assessment of patients<sup>2,16,17</sup>.

The Malignant PRES is observed when the patient's Glasgow Coma Scale score is lower than 8, and/or in patients who keep presenting symptoms despite the control measures, and /or when there is evidence of an edema or a hemorrhage exerting mass effect on the brain<sup>18</sup>. Its occurrence is extremely rare and its management involves aggressive medical support, which may include mechanical ventilation, transfusion of blood products for reversal of coagulopathy and corticosteroids for those with autoimmune disorders, osmotherapy, blood drainage by external ventricular drain and even craniectomy<sup>18</sup>. Although this was not the case discussed here, it is worth reporting the existence of a similar condition in favor of drawing attention to its possible occurrence and complexity of development<sup>18</sup>.

## CONCLUSION

PRES is a potentially reversible neurological condition that can arise in the context of hypertensive disorders of pregnancy, particularly pre-eclampsia and eclampsia. The case presented highlights the importance of early clinical suspicion and prompt neuroimaging in patients with acute neurological symptoms, even after apparent stabilization. Timely recognition and management—especially blood pressure control and seizure treatment – are essential to prevent long-term complications and ensure complete recovery. This case reinforces the need for multidisciplinary vigilance in obstetric care and underscores the role of magnetic resonance imaging as a crucial diagnostic tool in the evaluation of postpartum neurological events.

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## AUTHOR CONTRIBUTIONS

LCPL and EGR: conceptualization, methodology, investigation, and writing original draft. TFS: conceptualization and writing original draft. MNN and ELD: conceptualization, writing review and editing, visualization, supervision, and project administration. Authors order was defined by a commun agreement between authors. LCPL, Lucas Casagrande Passoni Lopes; EGR, Enzo Gonsales Rodrigues; TFS, Thais Francielle de Souza; MNN, Mariane Nunes de Nadai; ELD, Ênio Luis Damaso.

## CONFLICT OF INTEREST

None.

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