Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Radiologic Spectrum of Posterior Reversible Encephalopathy Syndrome: A Case Report and Literature Review

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DOI: https://doi.org/10.36347/sjmcr.2025.v13i11.005 | **Received:** 07.09.2025 | **Accepted:** 30.10.2025 | **Published:** 04.11.2025

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Abstract **Case Report**

Posterior Reversible Encephalopathy Syndrome (PRES) is a clinico-radiological entity characterized by acute neurological symptoms—most commonly headache, seizures, altered mental status, and visual disturbances—associated with vasogenic edema predominantly involving the posterior cerebral regions. The diagnosis relies primarily on magnetic resonance imaging (MRI), which demonstrates characteristic T2-weighted and FLAIR hyperintensities.

Keywords: Posterior Reversible Encephalopathy Syndrome, PRES, MRI, vasogenic edema, eclampsia, hypertension, reversible leukoencephalopathy.

INTRODUCTION

Posterior Reversible Encephalopathy Syndrome (PRES) is a clinico-radiological entity characterized by the acute onset of various neurological symptoms such as headache, visual disturbances, seizures, and altered consciousness. From a radiological standpoint, the diagnosis of PRES primarily relies on brain magnetic resonance imaging (MRI), which typically demonstrates vasogenic edema predominantly located in the parieto-occipital subcortical regions, often bilateral and symmetric [1]. This involvement appears as hyperintense signal on T2-weighted and FLAIR sequences, reflecting disruption of the blood–brain barrier and dysregulation of cerebral perfusion [2]. Although the parieto-occipital areas are classically affected, atypical locations may also be observed, involving the frontal cortex, cerebellum, or basal ganglia [3]. Accurate identification of these abnormalities is crucial for differential diagnosis and appropriate management.

OBSERVATION

We report the case of a 42-year-old woman hospitalized for preeclampsia complicated by eclampsia and intrauterine fetal death, who presented with lactation, signs of a complete intracranial hypertension syndrome, behavioral disturbances, and partial seizures.

An urgent brain computed tomography (CT) scan was performed and returned normal.

Subsequent brain magnetic resonance imaging (MRI) revealed patchy signal abnormalities involving the subcortical and deep white matter, predominantly in the bilateral fronto-parieto-occipital regions, as well as in the bilateral external capsules and the posterior limb of the right internal capsule, showing roughly symmetrical distribution. These lesions demonstrated isointense signal on T1-weighted images, hyperintense signal on T2-weighted and FLAIR sequences, with no restricted diffusion and no enhancement after gadolinium administration (Figure 1). These findings are consistent with Posterior Reversible Encephalopathy Syndrome (PRES).

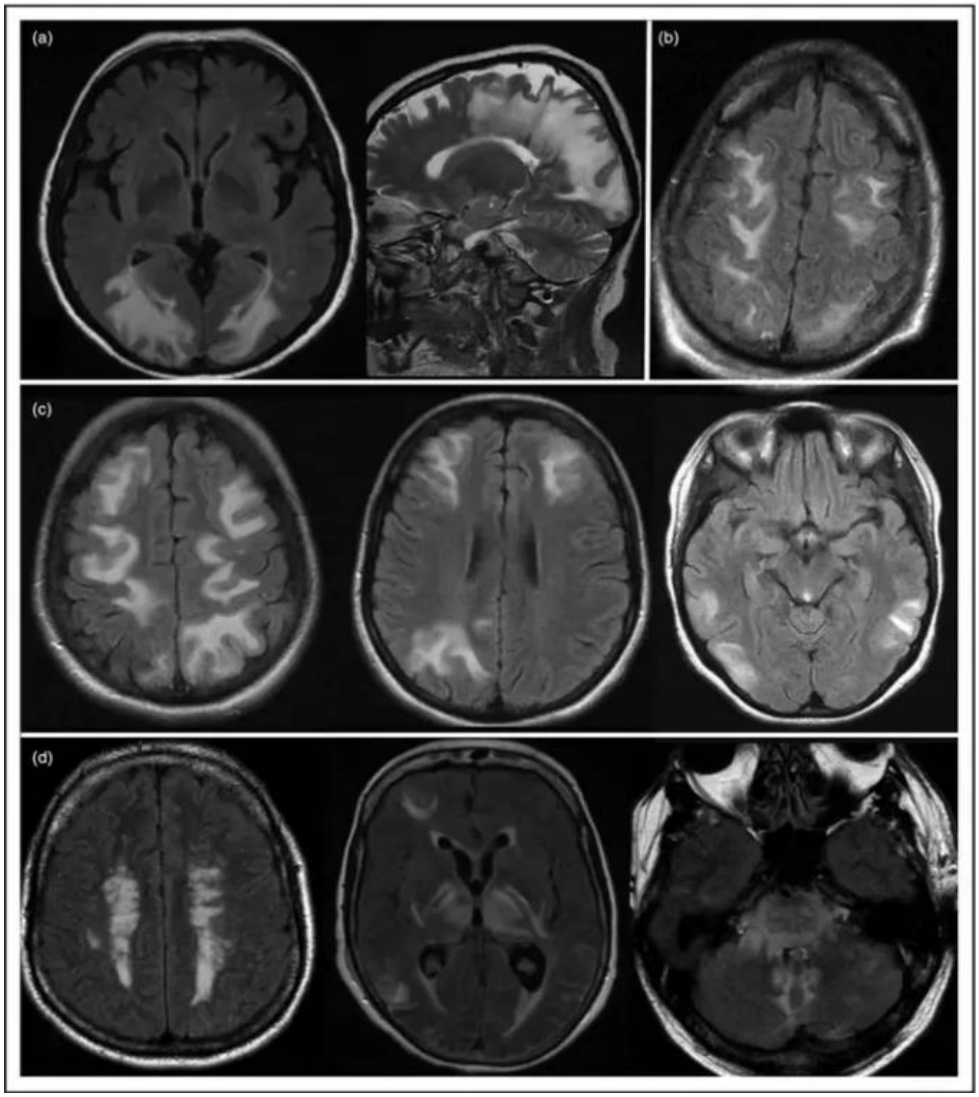

Figure 1:
(A) FLAIR hyperintense area in the parieto-temporal region.
(B) FLAIR hyperintense area in the superior frontal region.
(C) FLAIR hyperintense area involving the thalamus and brainstem.

DISCUSSION

Posterior Reversible Encephalopathy Syndrome (PRES) is a rare clinico-radiological entity, first described in 1996, characterized by the association of neurological manifestations and vasogenic cerebral edema, typically bilateral, posterior, and reversible.

Several factors are implicated in the pathophysiology of PRES, including hypertension, eclampsia, renal failure, and Guillain–Barré syndrome. Other etiologies have also been described, notably drug-induced cases (chemotherapy, targeted therapies, and anti-inflammatory agents), as well as inflammatory conditions such as sepsis, autoimmune diseases, thrombotic microangiopathies, hypervolemia, and sickle cell disease.

The clinical presentation is usually acute or subacute (within 1–2 days), often nonspecific, and commonly includes hypertension (75%), seizures (70%)—most often partial followed by postictal confusion—diffuse, treatment-resistant headaches (50%), and visual disturbances (35%). Focal neurological deficits have also been reported (10%) and vary according to lesion location, including hemiparesis, aphasia, and ataxia.

Despite the absence of a strict clinico-radiological correlation, brain magnetic resonance imaging (MRI) should be performed whenever PRES is suspected, as it remains the imaging modality of choice.

MRI studies of patients diagnosed with PRES have shown characteristic findings: T2-weighted and FLAIR sequences typically reveal bilateral and symmetric hyperintense signals, mainly involving the parieto-occipital subcortical regions, observed in more than 85% of cases, consistent with vasogenic edema.[1] The absence of diffusion restriction in most cases

suggests a predominantly reversible process without significant cytotoxic injury.[4]

Lesion extension to other cerebral regions has been frequently reported, particularly the frontal cortex (45%), cerebellum (30%), and basal ganglia (15%).[3] Although rare, brainstem involvement has also been described, highlighting the possible topographic variability of PRES. [2] In approximately 10% of patients, focal areas of restricted diffusion have been identified, correlating with potential ischemic complications.[4]

Follow-up MRI has confirmed the reversibility of these abnormalities in nearly all reported cases, with partial or complete resolution of hyperintensities within a median delay of 2 to 4 weeks, correlating with management of the underlying cause. [1] No significant correlation has been observed between the extent of initial radiological findings and the clinical severity or long-term functional outcome.[3]

Diagnostic pitfall: PRES may pose a diagnostic challenge, as it can mimic cerebral infarction.

CONCLUSION

Early recognition of the radiological features of Posterior Reversible Encephalopathy Syndrome (PRES) is crucial for guiding clinical management, identifying triggering factors (such as hypertension, immunosuppressive therapy, and preeclampsia), and preventing potential complications, including intracerebral hemorrhage or infarction. The reversibility of radiological abnormalities following appropriate treatment represents a key prognostic feature.

In conclusion, thorough understanding of the radiological characteristics of PRES enables not only early and accurate diagnosis but also effective monitoring of disease progression and therapeutic response, thereby reinforcing the central role of imaging in the management of this condition.

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