



CLINICAL SPECTRUM AND OUTCOMES OF PRES SYNDROME IN ICU AT TWO TERTIARY CARE CENTERS IN CENTRAL INDIA

General Medicine

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ABSTRACT

Background: Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiological condition characterized by acute neurological symptoms and reversible cerebral edema, commonly encountered in critically ill patients. **Objective:** To study the clinical spectrum, associated risk factors, and outcomes of PRES in patients admitted to the intensive care unit (ICU) at two tertiary care centers in Central India. **Methods:** This hospital-based cross-sectional observational study was conducted in the Department of General Medicine at RKDF Medical College Hospital and Research Centre and Bundelkhand Medical College. A total of 48 patients with clinically and radiologically confirmed PRES were included. Clinical features, risk factors, and outcomes were analyzed. **Results:** Seizures (83.3%) and altered sensorium (66.7%) were the most common presentations. Hypertension (70.8%) was the most frequent risk factor, followed by renal failure and sepsis. Most patients (75%) recovered completely, while 12.5% had residual deficits and 12.5% succumbed to the illness. Mechanical ventilation was required in 20.8% of cases. **Conclusion:** PRES is a reversible but potentially serious neurological condition in ICU patients. Early diagnosis and prompt management are essential for favorable outcomes and reducing mortality.

KEYWORDS

Posterior reversible encephalopathy syndrome (PRES), Seizures, Hypertension, Intensive care unit (ICU), Neuroimaging

INTRODUCTION

Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiological entity characterized by acute onset neurological symptoms accompanied by characteristic neuroimaging findings of vasogenic edema, predominantly involving the posterior cerebral regions^[1]. First described in 1996, PRES is increasingly recognized in critical care settings due to widespread availability of magnetic resonance imaging (MRI) and improved clinical awareness^[2]. The syndrome commonly presents with seizures, headache, visual disturbances, altered sensorium, and focal neurological deficits, often evolving over a short duration^[3].

The pathophysiology of PRES is not completely understood; however, it is widely attributed to failure of cerebral autoregulation and endothelial dysfunction leading to disruption of the blood-brain barrier and development of vasogenic edema^[4]. Several precipitating factors have been identified, including severe hypertension, renal failure, sepsis, autoimmune disorders, eclampsia, and exposure to immunosuppressive or cytotoxic drugs^[5]. These risk factors are frequently encountered in critically ill patients, making PRES an important differential diagnosis in intensive care units (ICUs).

Although traditionally considered a reversible condition, recent evidence suggests that PRES may be associated with significant morbidity and mortality, with up to 40% of patients developing residual neurological deficits and mortality rates approaching 10–19% in severe cases^[6]. Patients admitted to the ICU often represent a more severe spectrum of the disease, presenting with status epilepticus, coma, or requiring mechanical ventilation.

Despite increasing recognition, data on the clinical spectrum and outcomes of PRES in ICU settings, particularly in developing countries like India, remain limited. Therefore, this study aims to evaluate the clinical profile, radiological features, and outcomes of PRES in patients admitted to two tertiary care Centers in Central India.

Materials and Methods

This hospital-based ambispective study was conducted in the Department of General Medicine at RKDF Medical College Hospital and Research Centre, Bhopal and Bundelkhand Medical College Sagar including data over a period of 12 months from February 2025 to February 2026 (including 10 months data from hospital records and 2 months of direct observational data). A total of 48 patients diagnosed with posterior reversible encephalopathy syndrome (PRES) and admitted to the intensive care unit (ICU) were included in the study.

Diagnosis of PRES was based on clinical presentation along with radiological confirmation on magnetic resonance imaging (MRI) of the brain demonstrating features of vasogenic edema, predominantly in the posterior cerebral regions. The study aimed to evaluate the clinical spectrum, associated risk factors, and outcomes in these patients.

Inclusion Criteria

- Patients aged ≥ 18 years
- Patients presenting with acute neurological symptoms such as seizures, headache, altered sensorium, or visual disturbances
- Radiological confirmation of PRES on MRI brain
- Patients admitted to ICU during the study period
- Patients/attendants providing informed consent

Exclusion Criteria

- Patients with pre-existing structural brain lesions (e.g., tumors, intracranial hemorrhage)
- Patients with central nervous system infections
- Known cases of primary epilepsy or seizure disorders
- Patients with incomplete clinical or radiological data
- Patients not willing to participate in the study

Data Collection and Procedures

The details of hospital records were analyzed for 10 months from February 2025 to December 2025 and Detailed history and clinical examination was done during a period of 2 months jan-feb 2026 for all patients using a predesigned proforma. Demographic details, presenting symptoms, comorbidities, and potential precipitating factors such as hypertension, renal failure, sepsis, eclampsia, and use of immunosuppressive drugs were recorded. Laboratory investigations including complete blood count, renal and liver function tests, and serum electrolytes were performed in all cases. MRI brain was done to confirm diagnosis and assess the extent and distribution of lesions.

All patients were managed according to standard ICU protocols. Outcome measures included duration of ICU stay, need for mechanical ventilation, neurological recovery at discharge, and in-hospital mortality. Data were entered into Microsoft Excel and analyzed using appropriate statistical methods, with results expressed as mean $\pm$ standard deviation and percentages. A p-value <0.05 was considered statistically significant.

RESULTS:

TABLE – 1 Demographic and Clinical Profile of Patients (n = 48)

Variable	Number (n)	Percentage (%)
Age Group (years)		
18–20	4	8.3%
21–40	20	41.7%
41–60	16	33.3%
>60	8	16.7%
Presenting Symptoms		
Seizures	40	83.3%
Altered sensorium	32	66.7%
Headache	26	54.2%
Visual disturbances	18	37.5%

TABLE-2 Risk Factors and Outcomes of Patients (n = 48)

Variable	Number (n)	Percentage (%)
Risk Factors		
Hypertension	34	70.8%
Renal failure	20	41.7%
Sepsis	16	33.3%
Eclampsia	10	20.8%
Immunosuppressive drugs	6	12.5%
Outcomes		
Recovered completely	36	75.0%
Residual neurological deficit	6	12.5%
Required mechanical ventilation	10	20.8%
Visual disturbances	6	12.5%

Seizures were the most common presenting feature (83.3%). Hypertension was identified as the most prevalent risk factor (70.8%). The majority of patients (75%) recovered completely, while Visual disturbances were observed in 12.5% of cases. ICU-related interventions such as mechanical ventilation were required in a significant proportion of patients, indicating the severity of presentation.

DISCUSSION

In the present study, seizures and altered sensorium were the most common clinical presentations, consistent with previous studies highlighting seizures as the predominant feature of PRES [7]. Hypertension emerged as the most frequent risk factor, supporting the theory of impaired cerebral autoregulation as a key mechanism [8]. The majority of patients showed favorable recovery, although a subset developed complications requiring ventilatory support, reflecting the variable severity of PRES in ICU settings. Mortality observed in this study is comparable to earlier reports, emphasizing that PRES, though reversible, can be life-threatening if not promptly recognized and managed [9].

CONCLUSIONS

Posterior reversible encephalopathy syndrome (PRES) is a significant neurological condition encountered in ICU settings, commonly presenting with seizures and altered sensorium. Hypertension remains the most important associated risk factor. Early recognition and prompt management lead to favorable outcomes in the majority of patients. However, a subset may develop severe complications requiring intensive support and may have increased mortality. Therefore, timely diagnosis with neuroimaging and appropriate management is crucial to improve clinical outcomes and reduce morbidity and mortality.

REFERENCES:

- Gokhale A, Kimona A, Kantor S, Prakash S, Manhas Y. Posterior reversible leukoencephalopathy syndrome (PRES) in intensive care unit – Case series. *Indian J Crit Care Med.* 2017;21(11):772–778.
- Kalaiselvan MS, Renuka MK, Arunkumar AS. Clinical features and outcomes of patients with posterior reversible encephalopathy syndrome. *Indian J Crit Care Med.* 2017;21(7):453–456.
- Legriel S, Lerner A, Wintermark M, Rykken JB, Gao B. Posterior reversible encephalopathy syndrome and associated diseases. *Front Neurol.* 2020;11:667.
- StatPearls Publishing. Posterior Reversible Encephalopathy Syndrome. Treasure Island (FL): StatPearls; 2024.
- Toledano M, Fugate JE. Posterior reversible encephalopathy in the intensive care unit. *Handb Clin Neurol.* 2017;141:467–483.
- Recent advances in PRES: pathophysiology, clinical insights, and management. *Int J Emerg Med.* 2026.
- Fugate JE, Rabinstein AA. Posterior reversible encephalopathy syndrome: clinical and radiological manifestations. *Lancet Neurol.* 2015;14(9):914–925.
- Bartynski WS. Posterior reversible encephalopathy syndrome, part 1: fundamental imaging and clinical features. *AJNR Am J Neuroradiol.* 2008;29(6):1036–1042.
- Legriel S, Pico F, Azoulay E. Understanding posterior reversible encephalopathy syndrome. *Annual Update in Intensive Care and Emergency Medicine.* 2011:631–653.