

A Study of Concurrence of Eclampsia with Posterior Encephalopathy Syndrome

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Abstract:

Background: To investigate the concurrence of posterior encephalopathy syndrome or posterior reversible encephalopathy syndrome (PRES) with eclampsia and to describe the obstetric and radiological correlates.

Material and methods: This was a prospective study of all patients with eclampsia who attended obstetrics labour room of Nalanda Medical College and Hospital and underwent neuroimaging via magnetic resonance imaging (MRI) during December 2019 to February 2020.

Results: 8 out of 11 eclamptic patients (72.7%) revealed PRES on neuroimaging using MRI. PRES was identified within the parietal, occipital, frontal, temporal and basal ganglia/brainstem/cerebellum areas of the brain. Eclampsia occurred antepartum in 5 patients and postpartum in 6 patients. Headache was the most common presenting symptom (81.1%) followed by altered mental status (54.5%), visual disturbances (36.3%), and nausea/vomiting (18.1%). Severe systolic hypertension was present in 5 patients (45.45%).

Conclusion: The common finding of PRES in patients with eclampsia suggests that PRES is a core component of the pathogenesis of eclampsia. Therapy targeted at reversal of PRES pathogenesis may facilitate recovery from eclampsia.

Key Word: PRES (posterior reversible encephalopathy syndrome), neuroimaging MRI, eclampsia.

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I. Introduction

Posterior encephalopathy syndrome or Posterior reversible encephalopathy syndrome (PRES) or posterior reversible leukoencephalopathy is a subtype of hypertensive encephalopathy characterised by headache, confusion, seizures and visual loss.

It may occur due to a number of causes, predominantly severe hypertension, eclampsia, autoimmune disease and infection with sepsis.

First described in 1996 by Hinchey et al.

If promptly recognised and treated, the clinical syndrome usually resolves within a week and the changes seen in magnetic resonance imaging (MRI) resolves over days to week

Differential diagnosis

Vascular-1. cerebral venous thrombosis 2. intracranial haemorrhage 3. posterior circulation stroke 4. primary central nervous system vasculitis.

Non-vascular-1. infective encephalitis 2. autoimmune encephalitis 3. metabolic/toxic encephalopathy.

II. Aims and Objectives To investigate the concurrence of posterior reversible encephalopathy syndrome (PRES) with eclampsia and to describe the obstetric & radiological correlates.

II. Materials and Method

This prospective cohort study was carried in department of obstetrics and gynaecology at Nalanda medical college and hospital, Patna from December 2019 to February 2020. All patients with eclampsia who reported at labour room during this duration were taken into study. After written informed consent was obtained, a well designated questionnaire was used to collect the data of recruited patients which included socio-demographic characteristics such as maternal age, height weight, gravida, gestational age, mode of delivery, history of any other neurological disorder or cerebrovascular accidents or known seizures disorders, neuroimaging (MRI) reports and blood pressure.

Study Design : A single-centre, prospective cohort study

Study Duration: December 2019 To February 2020.

Study Location: This was a tertiary care teaching hospital based study done in Labour room of Department of Obstetrics and Gynaecology, Nalanda Medical College and Hospital, Patna .

Study was approved by the institutional review board.

Inclusion criteria:

1. Pregnancy or within 6 weeks postpartum.
2. Neuroimaging including MRI performed during hospitalisation.
3. Diagnosis of eclampsia.

Exclusion criteria:

1. Not being pregnant or longer than 6 weeks postpartum.
2. Neuroimaging not performed during hospital.
3. No diagnosis of eclampsia.
4. Diagnosis of cerebral haemorrhage
5. Known seizure disorder .
6. Later diagnosis of seizure from a source other than eclampsia.

Study design:

11 women considered to have diagnosis of eclampsia (both antepartum and postpartum) during the study duration were enrolled in the study upon admission to our tertiary care hospital.

Imaging studies of these women were done within 24hrs of admission.

Reports were collected and diagnosis of PRES was made by using standard radiological criteria with the help of radiologists.

Radiological criteria for PRES:

Subcortical and gyral T2-weighted and fluid attenuated inversion recovery (FLAIR) signal hyperintensities that become more diffuse as the extent of oedema increases.

Focal areas include symmetric multilobar/hemispheric oedema with predominant involvement of parietal and occipital lobes. In addition, frontal and the inferior temporal-occipital junction are also focal areas, less commonly the cerebellum.

Statistical analysis:

Maternal gravida, mode of delivery, systolic hypertension, imaging modality, site of lesions was analysed via a chi square analysis

Maternal age, body mass index (BMI), gestational age at delivery were analysed using a Student *t* test. Data are expressed as mean and SD.

P value < .05 was considered significant.

III. Results

Among the 11 study subjects were 5 women with antepartum eclampsia and 6 women with postpartum eclampsia. (Table 1)

Headache was the most common presenting symptom (81.1%) followed by altered mental status (54.5%), visual disturbances (36.3%), and nausea/vomiting (18.1%). Severe systolic hypertension was present in 5 patients (45.45%).

A diagnosis of PRES was made in 8 out of 11 (72.7%) patients who were considered to have eclampsia using MRI as imaging modality. (Table 2)

Patient Demographics	Antepartum (n=5)	Postpartum (n=6)	P value
Maternal Age(years)	21.21±4.56	22.37±6.47	0.504
Maternal BMI(kg/m ²)	31.36±10.07	27.46±6.31	0.133
Gravida			0.767
Nulliparous	2	2	
Multiparous	3	4	
Gestational Age (Weeks)	31.7±4.40	34.6±4.33	0.002

Mode of delivery			0.001
Vaginal	1	5	
Caesarean Section	4	1	
HTN(Systolic),mmHg			0.002
<140	2	3	
140-180	2	3	
>180	1	0	

Table 1 :Showing Patient Demographics

Table 1 shows patient demographics in which mean maternal age in 5 antepartum eclampsia patient is 21.21 years with standard deviation of 4.56 years and in 6 postpartum eclampsia patient it is 22.37 years with standard deviation of 6.47 years ,P value of maternal age is 0.504

Mean Maternal BMI in 5 antepartum eclampsia patient is 31.36kg/m² with standard deviation of 10.07 and in 6 postpartum eclamptic patient it is 27.46 kg/m² with standard deviation 6.31.the P value of maternal BMI is 0.133.

Among 5 patient of antepartum eclampsia 2 were nulliparous and 3 were multiparous . Among 6 postpartum eclamptic patients 2 were nulliparous and 4 were multiparous.

The mean gestational age in antepartum eclampsia patients is 31.7 weeks with standard deviation of 4.40 weeks and the mean gestational age in postpartum eclamptic patients is 34.6 weeks with standard deviation of 4.43 weeks .The P value of gestational age is 0.002

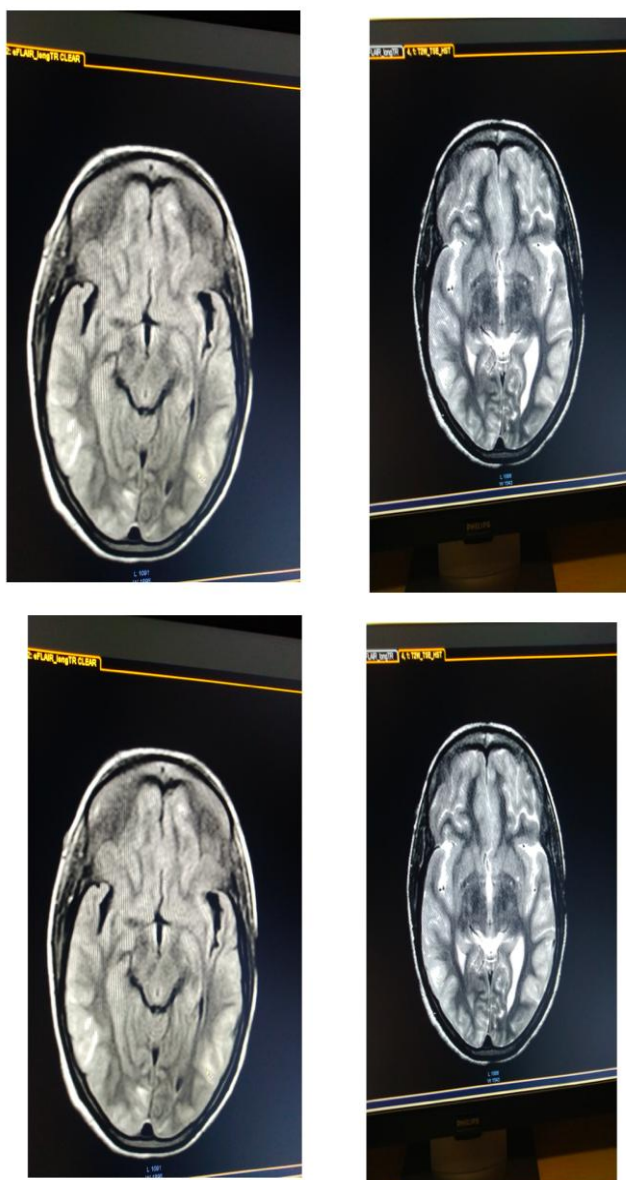
Among 5 antepartum eclampsia patient 1 was delivered vaginally and 4 underwent caesarean section. Among 6 postpartum eclamptic patient 5 were delivered vaginally and 1 was undergone caesarean section .the P value was 0.001 of mode of delivery .

Systolic blood pressure measured in antepartum eclampsia patient ,2 patient had BP less than 140mm Hg, 2 patients had BP ranging between 140-180 mmHg and 1 patient had BP more than 180 mmHg , similarly in postpartum eclamptic patients ,3 patients had BP less than 140mmHg and 3 patient had BP between 140-180mmHg.The P value is 0.002

Variable	Antepartum(n=5)	Postpartum(n=6)	P value
Imaging modality used MRI with contrast	5	6	
Site of lesion			0.671
Occipital lobe	2	2	
Parietal lobe	1	2	
Temporal lobe	0	0	
Frontal lobe	0	1	
Basal ganglia	0	0	
Multiple areas	1	4	

Table 2

Table 2 is showing site of lesion in patients undergone neuroimaging (MRI with contrast), in antepartum eclampsia patients 2 showed lesion in occipital lobe ,1 in parietal lobe and 1 patient showed lesion in multiple areas. Similarly in post partum eclamptic patients 2 patient showed lesion in occipital lobe , 2 in parietal lobe ,1 in frontal lobe and 4 patients showed lesions in multiple areas.



FLAIR images showing hyperintensities in the parieto-occipital region.

Limitations of study

- Small sample size.
- Short duration of study.
- Single imaging modality used for evaluation.

IV. Discussion

The term PRES has been used based on similarity in the appearance on imaging, the common location of the parietal-occipital lobe or ‘posterior’ location of the lesions. The exact pathophysiological mechanism of PRES is still unclear. Three hypotheses have been proposed till now, which include (i) Cerebral vasoconstriction causing subsequent infarcts in the brain, (ii) Failure of cerebral autoregulation with vasogenic edema, and (iii) Endothelial damage with blood-brain barrier disruption further leading to fluid and protein transudation in the brain.

PRES should be considered in patients who present with seizures, altered consciousness, visual disturbance or headache, particularly in the context of acute hypertension.

Typical MRI findings include reversible, symmetrical, posterior subcortical vasogenic oedema. If recognized and treated promptly, the rapid-onset symptoms and radiologic features usually fully resolve within days to weeks.

Triggers and associated conditions: Acute hypertension, Acute kidney injury, Eclampsia, Sepsis and multi-organ failure, Autoimmune disease, Immunosuppressive drugs (for example, tacrolimus, cyclosporine, chemotherapy) Illicit drugs (for example, cocaine), Organ transplantation, Chronic hypertension, Chronic kidney disease.

According to studies, delayed diagnosis and treatment may lead to mortality or irreversible neurological deficit. The reversible nature of PRES has been challenged recently based on new reports of permanent neurological impairment and mortality reaching 15% if not treated promptly.

V. Conclusion

The common findings of PRES in patient with eclampsia suggests that PRES is a core component of pathogenesis of eclampsia. Further large sample studies need to be conducted for establishing PRES as a component in eclampsia.

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