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Original Research Article

A study of the incidence of posterior reversible encephalopathy syndrome in patients with eclampsia and their fetomaternal outcome at a tertiary care centre in India

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ABSTRACT

Background: Hypertensive disorders are one of the most crucial and still unsolved problems in obstetrics. Eclampsia is one of the most serious acute complications of pregnancy, and the risk of morbidity and mortality for both the mother and baby is very high. Posterior Reversible Encephalopathy Syndrome (PRES) is a neurological condition associated with eclampsia that can have severe consequences if not promptly diagnosed and managed. It presents with altered consciousness, acute cortical blindness and convulsions. "Delivery is the ultimate cure of eclampsia" is a traditional belief but it does occur in the postpartum period too.

Methods: A retrospective analysis of medical records was conducted for eclamptic patients admitted to the tertiary care center over a specified period. Patients diagnosed with PRES were identified and their clinical characteristics, diagnostic imaging findings, treatment modalities, and maternal and neonatal outcomes were reviewed.

Results: This study sheds light on the incidence of posterior reversible encephalopathy syndrome in eclamptic patients at a tertiary care center in India. PRES was more common in primigravidas in the younger age group (20-30 years) and patients who presented with multiple seizures, resulting in higher number of cesarean sections.

Conclusions: Early recognition and management of PRES are crucial for improving maternal outcomes. Further research is warranted to refine strategies for timely diagnosis and intervention, ultimately contributing to the reduction of maternal and neonatal morbidity and mortality associated with eclampsia and its complications.

Keywords: Eclampsia, Hypertensive disorders of pregnancy, Posterior reverse encephalopathy syndrome

INTRODUCTION

Hypertensive disorders are one of the most crucial and still unsolved problems in obstetrics. Pre-eclampsia is a complex multisystem disease, diagnosed by onset of hypertension (>20 weeks of gestation) and either of the two: a) Proteinuria and/or b) Maternal end organ damage (platelet count <1 lakh, serum creatinine > 1.1 mg/dl, liver enzymes more than twice the normal values, pulmonary edema or cerebral/visual symptoms) or uteroplacental

dysfunction (for example, fetal growth restriction (FGR) or angiogenic imbalance).¹

Eclampsia is one of the most serious acute complications of pregnancy, and the risk of morbidity and mortality for both the mother and baby is very high.² It presents as a case of pre-eclampsia with grand mal or tonic-clonic seizures or coma which is not attributable to any organic neurological disease.

Frequently, patients can be misdiagnosed due to atypical presentation of signs and symptoms or delayed onset eclampsia. Posterior Reversible Encephalopathy Syndrome (PRES) is a clinicoradiological syndrome and is potentially reversible. It presents with altered consciousness, acute cortical blindness and convulsions. Abnormal findings on neuroimaging (CT/MRI) include vasogenic edema with or without ischemic changes in the posterior brain circulation.³

Pathological mechanisms such as hypertensive encephalopathy and failure of cerebral blood flow autoregulation, lead to cerebral edema and hemorrhage which can be attributed as the cause of the cerebral manifestations of eclampsia.

The cornerstone step to reduce maternal and perinatal morbidity and mortality is prompt identification of high risk patients and well-timed appropriate interventions.

Thus, it is crucial to have a high index of suspicion and maintain close follow-up even in the postpartum period to help in early detection and subsequently prevention of Eclampsia.

Illiteracy, lack of health awareness, poverty, poor linkage of community with comprehensive health facilities and superstitious beliefs prevents women from seeking medical advice during pregnancy. All of these combined together contribute to eclampsia.

Aim of this research were to study the incidence of the posterior reversible encephalopathy syndrome in eclamptic patients and to study the fetomaternal outcomes of eclamptic patients with posterior reversible encephalopathy syndrome.

METHODS

Study design

It was a single centric, observational and retrospective study. The study was conducted at Grant Government Medical College and Sir J.J. Group of Hospital in the Department of Obstetrics and Gynaecology in a Tertiary Care Hospital.

Sample size

All eclamptic patients who were admitted in our institute with the diagnosis of PRES within the study period were included in the review. The data were gathered as a chart review, which was conducted retrospectively.

Study duration

The study was conducted for a period of one year from January 2022 to January 2023.

The study was conducted after obtaining permission from the Institutional Ethics Committee (IEC). All the data collected was kept strictly confidential. The participants were informed completely about the study and after that written informed consent (in English/Hindi/Marathi) was taken from the subjects and/or their attendants before their recruitment in the study.

Eclamptic patients with a diagnosis of PRES on neuroimaging (CT/MRI) at Department of Obstetrics & Gynecology in tertiary healthcare center, fulfilling the following inclusion and exclusion criteria were included in the study.

Inclusion criteria

The study includes patients with eclampsia aged between 18-45 years who are diagnosed with PRES on neuroimaging (CT/MRI).

Exclusion criteria

The study excludes all patients who are <18 or >45 years of age and patients with a history of seizure disorders. All patients who did not consent to the study have also been excluded.

Study procedure

The patients included in the study were eclamptic patients who were subjected to neuroimaging CT/MRI without contrast after delivery or after stabilization and the diagnosis of PRES was made by a radiologist using the standard radiological criteria for PRES. Neurophysicians were involved after the CT/MRI study with the neuroimaging diagnosis of PRES. The criteria for diagnosis of PRES on CT were hypoattenuation of the occipital and parietal regions. These signs of PRES persist for several days to weeks. Patients were observed in the perinatal period and outcome was noted.

Data collection and statistical analysis

All the data collected from patient was compiled in a Microsoft office Excel sheet and analyzed. Results are displayed in Tabular and graphical format. Appropriate tests were planned to be applied wherever necessary.

RESULTS

The total number of deliveries in our institute during the study period was 2438, from which 51 patients had eclampsia and 25 patients were diagnosed with PRES. The incidence of eclampsia in the year of 2022-23 at our institute was 2.09% and incidence of posterior reversible encephalopathy syndrome in eclamptic patients was 49%. The average GCS score was 14±1 (Figure 1).

A total of 22 patients with PRES were registered with a hospital/public health centre. Three patients were

unregistered. 5 patients had regular (4 or more) visits and 17 had irregular (<4) visits (Figure 2).

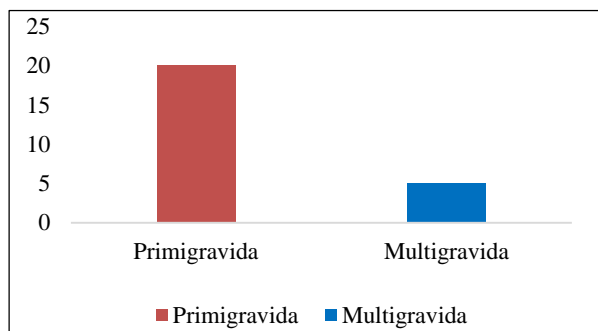


Figure 1: Parity wise distribution of eclamptic patients with PRES.

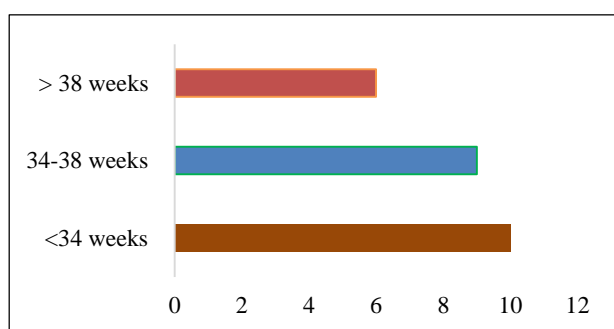


Figure 2: Gestational age wise distribution.

Total 10 (40%) patients had 3 or more convulsions, 8 (32%) patients had 2 convulsions and 7 (28%) patients had 1 convulsion. 12 (48%) patients were taken for caesarean section, 11 (44 %) patients were delivered vaginally, and 2 patients were delivered by assisted breech delivery (Figure 3).

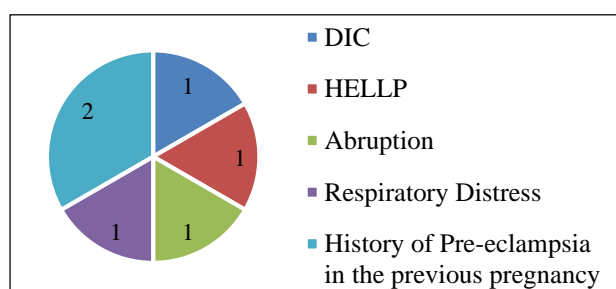


Figure 3: Associated maternal comorbidities observed.

Treatment given: The combination of MgSO₄ + mannitol + levetiracetam is given in maximum 23 (90%) of the patients in our study. Rest of the patients (2 patients) received MgSO₄ + levetiracetam.

Reversal of PRES in the study population: Effective management of PRES typically leads to improvement in clinical symptoms and resolution of the radiologic

abnormalities. Reversal of PRES in 7 days was observed in 21 patients (84%).

Maternal outcome: 12 out of 25 patients in the study population were admitted to critical care unit post delivery. 18 patients (72%) were in stable condition when discharged.

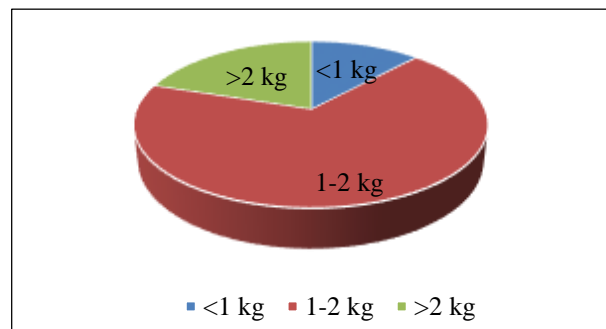


Figure 4: Weight of the newborn.

Fetal outcome: Out of 18 (72%) alive babies, 11 babies were admitted in the Neonatal Intensive Care Unit (NICU). Most common cause for NICU admission was low birth weight (Figure 4 and 5).

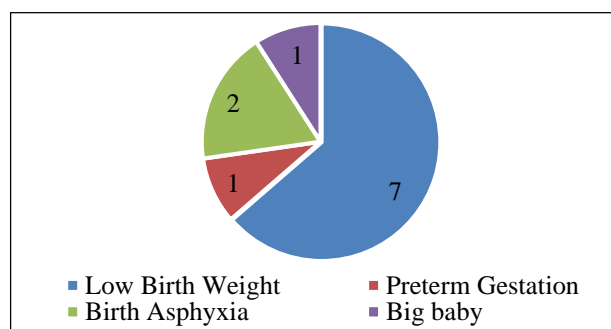


Figure 5: Causes of NICU admissions.

DISCUSSION

Posterior reversible encephalopathy syndrome (PRES) is a clinical-neuroradiological entity, was first described in 1996 by Hinchey et al. This syndrome is characterized by headache, visual disturbances, seizures, altered mental status and radiological findings of oedema in the white matter of the brain on MRI.⁴⁻⁶ PRES can clinically associated with number of medical conditions such as hypertensive encephalopathy, preeclampsia, eclampsia, acute renal diseases, haemolytic uremic syndrome, use of cytotoxic and immunosuppressant drugs.⁷ Recent studies and previous case reports states that PRES was observed frequently in patients with preeclampsia and eclampsia.⁸ Although pathophysiology of PRES is poorly understood, the same pathophysiological mechanisms of eclampsia are shared.⁹ Neuroimaging is important for the diagnosis of PRES and radiological abnormalities are best demonstrated by magnetic resonance imaging.

Reversibility of neuroimaging abnormalities following institution of treatment is a characteristic feature of posterior reversible encephalopathy syndrome. Complete or near-complete resolution of imaging abnormalities is noted in approximately 70% of the cases. The reversal of neuroimaging abnormalities is seen within 1 or 2 weeks. Infrequently, reversal may take a little longer and the resolution of lesions is complete within a month's time.¹⁰⁻¹² Therefore, prompt recognition and treatment with the support of a multidisciplinary team are crucial to avoid the permanent neuronal damage and reduce the maternal mortality. The age distribution as per similar studies has been depicted in Table 1.

Table 1: Age distribution.

Authors	Age in years (%)	Gestational age and obstetric score (%)
Meena et al ¹³	21-25 (64%)	29-36 (56%) and Primigravida (70%)
Sardesai et al ¹⁴	20-25 (79.09%)	28-36 (48%) and Primigravida (72.73%)
Present study	21-25 (40%)	28-34 (43.33%) and Primigravida (70%)

Number of convulsions: In the study conducted by Sardesai et al, 39.09% patients presented with PRES had more than or equal to 3 convulsions. The treatment provided to the patients along with the need for CCU admission and neonatal outcomes have shown similar results with comparative studies (Table 2-5).

Table 2: CCU admission.

Authors	CCU admission in %
Karanth et al ¹⁵	36.7
Present study	63.34

Table 3: Treatment given.

Authors	Treatment
Sardesai et al ¹⁴	MgSO ₄ + mannitol (63.33%)
Sheikh et al ¹⁶	Magnesium sulphate + benzodiazepines (44%)
Present study	MgSO ₄ + antibiotics + levetiracetam + mannitol (95%)

Table 4: Status of new born baby.

Authors	Status of new born baby
Karanth et al ¹²	Stillborn (20%)
Present study	Stillborn (32.7%)

Table 5: Birth weight.

Authors	Birth weight
Karanth et al ¹²	<2 kgs (56.66%)
Present study	<2 kgs (63.34%)

Just like other studies the present study also had some limitations. This research was limited by the size and site of the study population, so the results obtained could not be generalized for the entire community. The cause-and-effect relationship may not be visible accurately in such a small sample. A larger sample size and that too, from different sites and locations, can give a better and more reliable outcome.

Since the study was conducted in an urban tertiary care hospital, the data collected represents that a majority of participants in the present study were in an urban area and so the generalizability of the results is limited for rural area and which cannot reflect healthcare facilities available to all health centers, particularly in the rural areas

CONCLUSION

Eclampsia can present with life-threatening complications such as DIC, HELLP or Abruption wherein time is of the essence and multidisciplinary approach in management will help to improve the outcome. Incidence of PRES being significant, high index of suspicion and early neuroimaging studies could result in early diagnosis. This neurological disorder is potentially reversible with early diagnosis and appropriate management. In patients with PRES a timely intervention with anti-hypertensives, anti-cerebral oedema measures as well as management of other associated symptoms and conditions can make this condition truly reversible.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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