



A Prospective Observational Study of Neuro Imaging in Eclampsia Patients in a Tertiary Care Institution

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Introduction

Hypertensive disorders complicating pregnancy is one of the major cause of maternal and perinatal mortality and morbidity worldwide. Among the Hypertensive disorders, Preeclampsia and Eclampsia are a life threatening multisystem disorder, which affects Cardiovascular, Hematological, Renal, Hepatic, and Central nervous system.

Preeclampsia is estimated to affect about 5 % of deliveries while eclampsia affects about 1.4% of deliveries. Cerebrovascular involvement is the direct cause of death in 40% of patients with hypertensive disorders. When it is diagnosed and intervened at the earlier, symptoms and radiological changes can be reversed.

Besides clinical presentation, Neuro imaging is the only route to find out the CNS involvement. It provides a more accurate assessment of degree of CNS involvement. Neurovascular changes and complication occurring as a result of vascular pathology in cerebrovascular system is the reason behind Eclampsia. When it is identified by imaging studies and intervened, we can prevent the complication becoming irreversible.

To identify the prevalence of neurovascular complications and neurovascular changes in

Eclampsia, a prospective analytical study was conducted in Government Vellore Medical College, Vellore. CT Brain was done for all patients of Eclampsia in the year 2017 and the findings were analysed.

Aim of the Study

- To do CT BRAIN for all Antepartum, Intrapartum and Postpartum Eclampsia patients and to identify the cause, to arrive at a proper diagnosis and decide further management.
- To intervene as soon as the cause is made out to avoid maternal morbidity and mortality.

Materials and Methods

Type of Study: Prospective Analytical study.

After getting consent, CT Brain was done for all antepartum, intrapartum and postpartum eclampsia patients and the findings were analysed.

Period of Study: January 2017 to December 2017

Setting: The study was conducted at the Department of Obstetrics and Gynaecology, Govt. Vellore Medical College, Vellore. The study was approved by the Board of Ethical Committee.

Sample Size: 100

Inclusion Criteria

- Antepartum eclampsia
- Intrapartum eclampsia
- Postpartum eclampsia

Exclusion Criteria

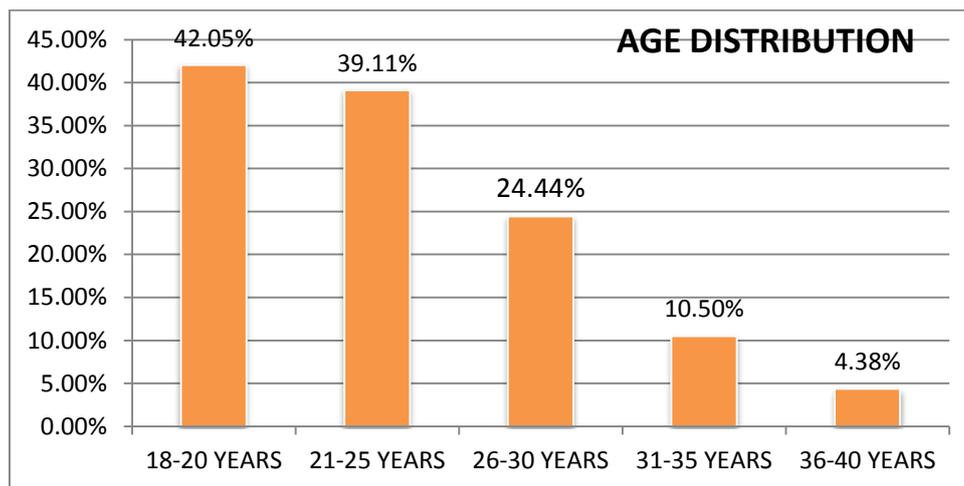
- Epilepsy
- Cerebral tumours

- Preexisting renal disorders

Consent: Informed consent in the form of written consent was obtained from the patients or relatives (in situations where patients is indisposed) after explaining the procedure.

Results and Analysis

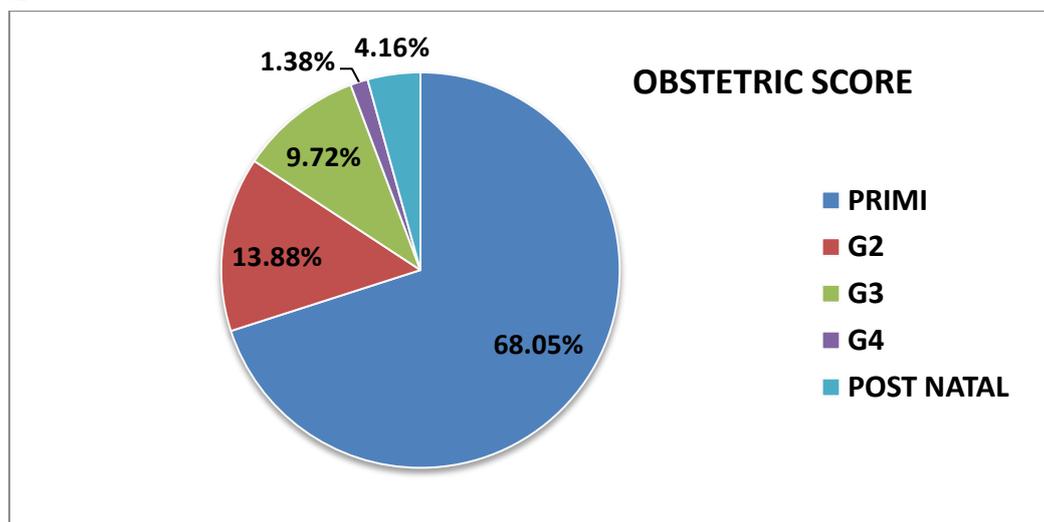
Age Distribution



In the study, 42.05% of the patients were in the age group of 18 to 20 years and 39.11% of the patients were in the 21 to 25 years age group.

Teenage pregnancy and patients older than 35 years are considered to be at high risk for Eclampsia.

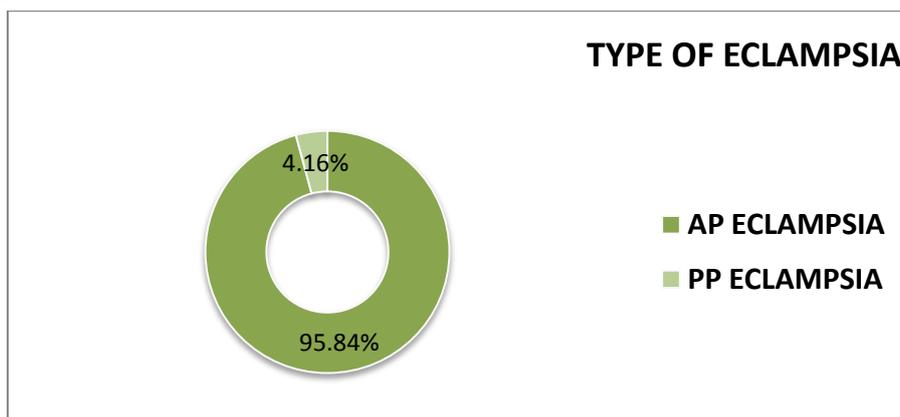
Obstetric Score



About 68.05% of patients with Eclampsia were Primigravida and 4.16% of patients had Postpartum eclampsia.

Eclampsia, like preeclampsia tends to occur more commonly in first pregnancies.

Type of Eclampsia

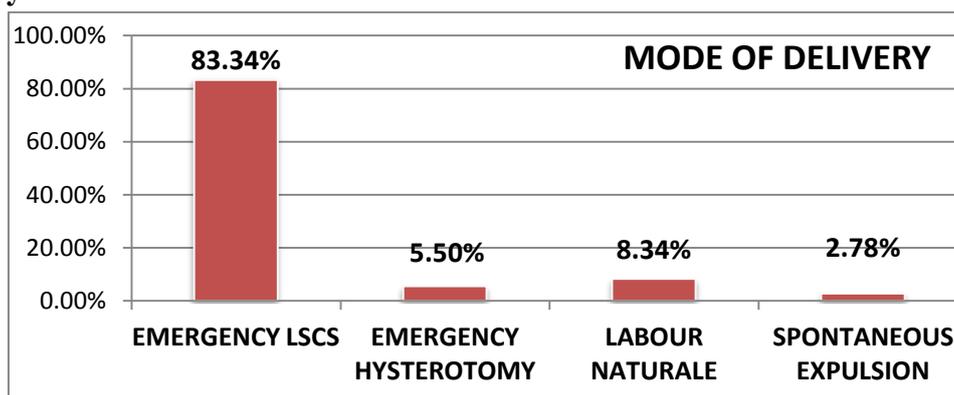


In our study 95.84% of patients had Antepartum Eclampsia and 4.16% of patients had Postpartum Eclampsia. Eclampsia is most common in the last trimester and becomes increasingly frequent as term approaches.

In more recent years, the incidence of postpartum eclampsia has risen. This is presumably related to

improved access to prenatal care, earlier detection of preeclampsia, and prophylactic use of magnesium sulphate. Importantly, other diagnoses should be considered in women with convulsions more than 48 hours postpartum or in women with focal neurological deficits, prolonged coma, or atypical eclampsia.

Mode of Delivery

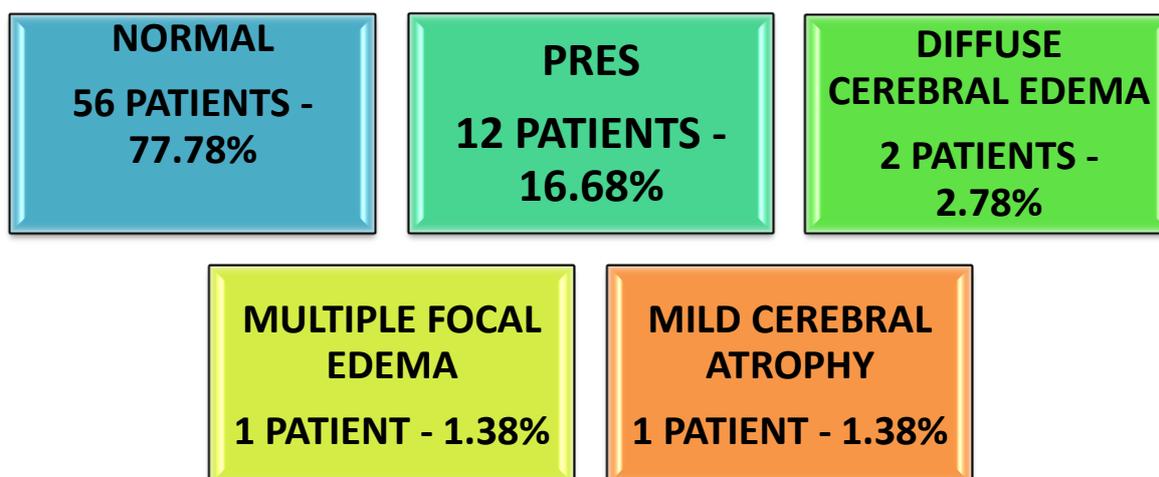


83.34% of patients were delivered by Emergency LSCS and 8.34% of patients delivered by Labour Naturele.

Following a seizure, labor often ensues spontaneously or can be induced successfully even in women remote from term. An immediate cure does not promptly follow delivery by any route, but serious morbidity is less common during the puerperium in women delivered vaginally.

Although most maternal outcomes were similar between vaginal delivery and LSCS, almost a fourth of women with eclampsia who underwent emergent cesarean delivery required general anesthesia. This is a great concern because eclamptic women have laryngotracheal edema and are at a higher risk for failed intubation, gastric acid aspiration, and death.

CT Brain Findings



About 77.78% of patients with Eclampsia had a normal CT Brain study and 16.68% of the patients had PRES.

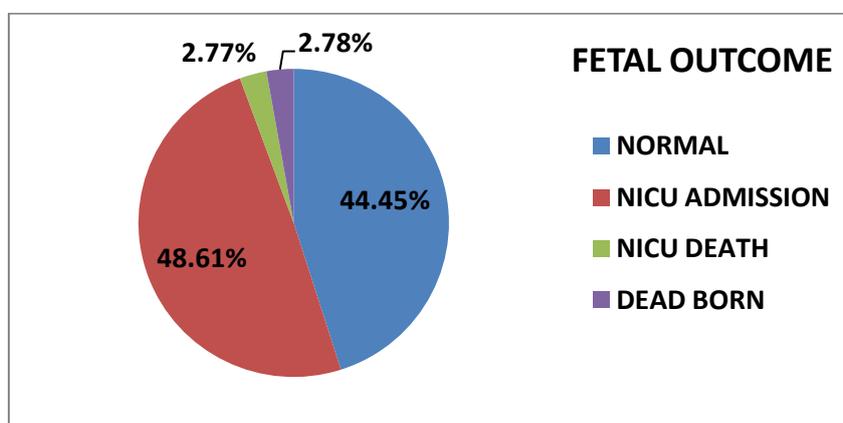
With CT imaging, localized hypodense lesions at the gray and white-matter junction, primarily in the parieto occipital lobes, are typically found in eclampsia. Such lesions may also be seen in the frontal and inferior temporal lobes, the basal ganglia, and thalamus.

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES) also known as REVERSIBLE POSTERIOR LEUCOENCEPHALOPATHY SYNDROME (RPLS) is hypothesized to be the primary injury based on its clinical pathological as well as neuro imaging features.

In non pregnant patients PRES may occur after a sub acute elevation of blood pressure. Areas of cerebrovascular vasodilation and vasoconstriction may both coexist in the acute phase of hypertension. The clinical presentation is variable and may include headache, seizures, visual changes, altered mental status and occasionally focal neurological signs.

MRI findings include hyperintensities on T2 weighted images. Three patterns described on MRI imaging include, superior frontal sulcus pattern, Dominant parieto-occipital pattern and Holo hemispheric watershed pattern.

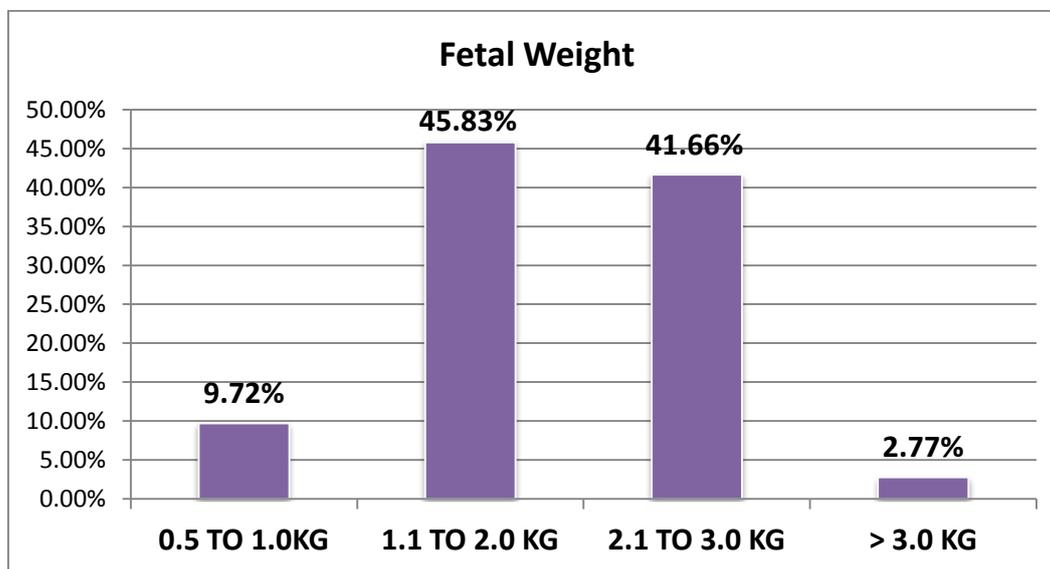
Fetal Outcome



About 44.45 % of the babies delivered were normal and 48.61% of the babies required admission in NICU for various reasons. These babies were successfully monitored and treated in

the NICU and discharged. 2.77% of the babies died during the course of treatment in the NICU and 2.78% of the babies were dead born.

Fetal Weight



45.83% of the babies delivered were of the birth weight 1.1 to 2.0 kg and 41.66% of the babies were of the birth weight 2.1 to 3.0 kg. Eclampsia is a major contributor to perinatal mortality and Low birth weight babies fared worse than their normal weight counterparts.

Discussion

Preeclampsia complicated by generalized tonic clonic convulsions appreciably increases the risk to both mother and fetus. Mattar and Sibai (2000) described outcomes in 399 consecutive women with eclampsia from 1977 through 1998. Major maternal complications included placental abruption—10 percent, neurological deficits—7 percent, aspiration pneumonia—7 percent, pulmonary edema—5percent, cardiopulmonary arrest—4 percent, and acute renal failure—4 percent. Moreover, 1 percent of these women died.

Headaches and visual symptoms are common with severe preeclampsia, and associated convulsions define eclampsia. The earliest anatomical descriptions of brain involvement came from autopsy specimens, but CT- and MR-imaging and

Doppler studies have added many important insights into cerebrovascular involvement. Various techniques used for neuro imaging in eclampsia are Computed Tomography scanning of brain, Magnetic Resonance Imaging of the brain (MRI), Magnetic Resonance (MR) angiography, Magnetic Resonance (MR) Venography, Cerebral angiography, Transcranial Doppler study, Single Photon Emission Computed Tomography (SPECT).Of these most common and most useful techniques is the CT scan of brain and MRI of brain. Other modalities such as MR angiography findings may be normal or may show reversible cerebral vasospasm.

MR venography findings are usually normal and are helpful in excluding the possibility of dural sinus thrombosis, an important differential diagnosis.

Characteristic CT scan findings are

1. Normal
2. Cerebral edema
3. Diffuse white matter low density areas
4. Patchy area of low density
5. Occipital white matter edema
6. Loss of normal cortical sulci
7. Reduced ventricular size

Cerebral haemorrhage

1. Intraventricular haemorrhage
2. Parenchymal haemorrhage (high density)
3. Cerebral infarction
4. Low attenuation areas
5. Basal ganglia infarction

Posterior Reversible Encephalopathy Syndrome (PRES) is a potentially devastating neurologic syndrome characterised by rapidly progressive signs and symptoms which includes headache, seizures, consciousness disturbance and (or) visual disturbances. Imaging abnormalities of PRES are predominantly in bilateral posterior circulation regions mainly in the parieto – occipital areas. When unrecognised the patient's condition can progress to ischemia, massive infarction and death. Alternative term such as hypertensive encephalopathy, reversible posterior cerebral edema syndrome and posterior reversible leuko encephalopathy are used to describe this group of disorder. A variety of causes such as pre-eclampsia / eclampsia, uremia, systemic lupus erythematosus (SLE) and immuno suppressant therapy have been associated with this syndrome. Treatment is based on the cause. Control of blood pressure may alleviate the symptoms. Many cases will resolve within one to two weeks of controlling the blood pressure and eliminating the triggering factors. Yet uncommon death may occur due to intra cerebral hemorrhage or cerebral edema. PRES may occur in 5-10% of cases. In our study 22.23% of the patients had positive CT findings, of which PRES was the most common diagnosis.

In the study by Chakravarthy et al all 8 patients (100%) had cerebral odema, 3 patients (37%) had cerebral haemorrhage.

In a study by Dejana Jovanovic et al out of 29 patients 83% had pathological findings. The most common findings were cerebral odema. In the study by Milliez et al out of 18 patients with positive findings 3 had features of cerebrovascular damage, 6 had cerebral odema, 9 had exaggerated cortical sulci suggesting the diagnosis of

communicating hydrocephalus with cortical atrophy. In the study by Moodley et al (1993) most common finding was cerebral odema.

Conclusion

Until recently, eclamptic seizures were believed to have no significant long-term sequelae. However recent studies with long term follow up of patients with eclampsia and preeclampsia showed long term persistence of brain white matter lesions which were incurred during eclamptic convulsions. Thus proper diagnosis with neuro imaging techniques like CT and MRI Brain is essential in patients with eclampsia for adequate management and follow up of patients with complications or brain lesions.

References

1. Dejana Jovanovic et al: Neurological manifestations and diagnostic findings in Eclampsia, Stroke. Aha journal. org. 2008. A.Chakravarthy, S. D. Chakravarti:
2. The Neurology of Eclampsia: Neurology India, vol. 50. No. 2. June 2002. pp128-135.
3. Williams Obstetrics, Twenty fourth Edition. Ch.40.Hypertensive disorders of pregnancy.
4. AYH, Buananno FC, Scrafer Pw, et al. Posterior leukoencephalopathy without severe hypertension: utility of diffusion weighted MRI. Neurology 1998; 51:1369-76.
5. Aukes AM, de Groot JC, Aarnoudse JG, et al: Brain lesions several years after eclampsia. Am J Obstet Gynecol 200(5):504.e1, 2009
6. Aukes AM, de Groot JC, Wiegman MJ, et al: Long-term cerebral imaging after pre-eclampsia. BJOG 119(9):1117, 2012
7. Aukes AM, Wessel I, Dubois AM, et al: Self-reported cognitive functioning in formerly eclamptic women. Am J Obstet Gynecol 197(4):365.e1, 2007.