

CT Head Findings In Patients Of Eclampsia In A Tertiary Care Centre - A Prospective Observational Study

Sunita Jamwal¹, Ajay Wakhloo^{2*}, Natasha Gupta³

¹Fellow Reproductive Endocrinology and Infertility, PGIMER Chandigarh, Ex Senior Resident, Department of Obstetrics and Gynaecology, PGIMER Chandigarh, MD Obstetrics & Gynaecology, GMC Jammu, J&K, India

²Professor, Department of Obstetrics and Gynaecology, GMC Jammu, J&K, India

³Ex Senior Resident, Department of Obstetrics and Gynaecology, AIIMS, New Delhi, MD Obstetrics & Gynaecology, GMC Jammu, J&K, India

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Abstract

Objective: To evaluate the different neurological changes in brain by CT scan in eclampsia patients. **Method:** This was a prospective observational study conducted in a tertiary hospital. Patients of eclampsia admitted at SMGS hospital, GMC Jammu underwent CT scan head within 48 hours of eclampsia after administering standard MgSO₄ protocol. **Results:** Out of 100 patients in the present study, 40 patients did not show any abnormality in the CT findings. In 60 patients the abnormality in the CT findings differed significantly. Most commonly abnormality was recorded as vasogenic edema (46.6%) followed by cerebral infarct (25%) and cerebral edema (6.66%). 2 cases of subdural hematoma were found. Subarachnoid hemorrhage were recorded in one patient each. With regard to the relationship between eclampsia and CT abnormalities it was found that maximum abnormalities were recorded in antepartum while postpartum and imminent recorded equal number of abnormalities and no case of intrapartum eclampsia was seen. Further it was noticed that parieto-occipital region of the brain was mostly affected which was followed by occipital and frontal while temporal and basal ganglia regions were least affected. **Conclusion:** So we concluded that CT head of eclampsia patients should be done which may help in modifying the treatment protocol.

Keywords: computed tomography, eclampsia

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Introduction

Eclampsia is one of the commonest causes of maternal death. It is defined as development of seizures that cannot be attributed to other cause during pregnancy or puerperium in a woman with preeclampsia [1]. The incidence in developed countries is 1 in 2000 deliveries whereas the incidence in developing countries varies from 1 in 100 to 1 in 1700 cases [2]. Depending upon whether convulsions appear before, during, or after labour, eclampsia is designated as antepartum (38-53%), intrapartum (18-36%) and post-partum (25%) [3]. The seizure is similar to that occurring in grand mal epilepsy with premonitory slight twitching of the face and limbs leading to the generalized tonic and clonic stages followed by postictal state or coma. The disease is preceded by features of severe preeclampsia in 80% cases. Eclamptic seizures are self limiting and seldom last longer than 3-4 minutes. Eclampsia can lead to acute renal failure, pulmonary edema, cardiopulmonary arrest, and aspiration [4].

Maternal mortality due to eclampsia is 1-5%. Up to 5% of women with eclampsia have altered consciousness, including persistent coma, following a seizure. This is due to extensive cerebral edema, and transtentorial herniation [5]. In approximately 10% of women, some degree of blindness follows a seizure. Blindness with severe preeclampsia without convulsion is usually due to retinal detachment [6]. Conversely, blindness with eclampsia is almost

always due to occipital lobe edema [7]. In both instances, however, the prognosis for return to normal function is good and is usually complete within 1-2 weeks post partum. The syndrome of PRES (Posterior Reversible Encephalopathy Syndrome and Hypertension), indicative of central vasogenic edema, has been increasingly recognized as a component of eclampsia [8]. Computed tomography (CT) of the head, with or without contrast can exclude intracranial hemorrhage, cerebral venous thrombosis and central nervous system lesions, all of which present with seizures in pregnancy. Abnormal findings on neuroimaging have been noted in about 80-90% of women with eclampsia. Most common lesions are seen in parieto-occipital lobes in the distribution of posterior cerebral arteries. This lesion occurs as a result of vasogenic oedema induced by endothelial damage and other changes contributing to pathophysiology of eclampsia [9]. Generalized cerebral edema or edema of occipital lobes may cause symptoms such as blindness, lethargy and confusion [5]. Other findings include intracranial haemorrhage (60%), cortical and subcortical petechial hemorrhage, microscopic vascular lesions such as fibrinoid necrosis of arterial wall and perivascular microinfarcts and hemorrhage, subcortical edema, hemorrhagic areas in white matter, basal ganglia, pons which can rupture into ventricles. Loss of sulci, decreased ventricular size, intraventricular hemorrhage, low attenuation areas are other findings [10]. The present study was conducted to evaluate the different neurological changes by CT scan head in patients of eclampsia. These findings can lead to better understanding of the pathophysiology of eclampsia and thus decrease in morbidity and mortality associated with it.

*Correspondence

Dr. Ajay Wakhloo

Professor, Department of Obstetrics and Gynaecology, GMC Jammu, J&K, India

E-mail: drjaywakhloo@gmail.com

Material and methods

Study Design – This was a prospective observational cross sectional study conducted in a tertiary care centre over a period of 1 year from November 2015 to December 2016 at SMGS hospital, Government Medical College, Jammu. Ethical approval was taken from institutional ethical committee

Study population- Pregnant women who were diagnosed with eclampsia during the course of stay at hospital and delivered at SMGS Hospital, Govt Medical College, Jammu were recruited. Informed consent was taken.

Inclusion criteria

- Patients with eclampsia (antepartum, intrapartum, imminent, and postpartum)

Exclusion criteria

- Pregnant women with chronic hypertension
- Pregnant women with diagnosed case of epilepsy
- Pregnant women with known brain lesions & infections

100 patients who met inclusion criteria and consented for the study were recruited in the study from November 2015 to October 2016 in the Department of Obstetrics and Gynaecology, SMGS Hospital, GMC Jammu. A proforma was prepared for each patient which

included menstrual history, obstetric history & past medical/surgical history. Women who were admitted to the labor/antenatal ward underwent basic investigations including blood group, CBC, RFTs, LFTs, Blood Sugar and special investigations including Urine for Albumin & 24 hour Urinary Protein. Patients of eclampsia admitted at SMGS hospital underwent CT scan head (Plain and Contrast) within 48 hours of eclampsia. Both non-contrast as well as with contrast scans were done using 5mm axial sections in a spiral mode using non ionic intravenous contrast. CT images were analysed for any abnormalities

Standard Magnesium Sulphate protocol was given to all eclamptic mothers.

Statistical analysis

Statistical calculations were performed using the SPSS 16.0. Data were first analysed descriptively. Mean and standard deviation were determined for continuous variables. Categorical data were presented with absolute and relative frequencies. In order to detect differences between subjects students t-test was used for continuous variables, while, for categorical variables, the X² test was used. A p-value of less than 0.05 was considered statistically significant.

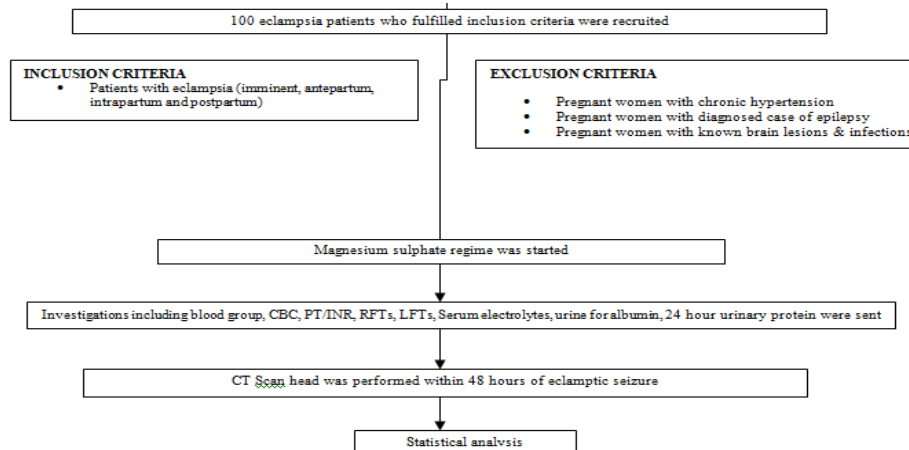


Fig 1:Methodology

Results

In our study, majority of the patients (59%) were antepartum followed by imminent (24%) and postpartum (17%). (Table 1) In our study, we found that 40 patients had no abnormality in CT scan head and in 60 patients abnormalities were detected. With regard to the relationship between eclampsia and CT abnormalities it was found that maximum abnormalities were recorded in antepartum while postpartum and imminent recorded equal number of abnormalities. 38 out of 60 patients (63.34%) who had abnormality belonged to antepartum group of eclampsia, 11 out of 60 (18.33 %) belonged to post- partum group of eclampsia and 11 out of 60 (18.33 %) belonged to imminent eclampsia group. 21 out of 40 (52.50%) patients who had no abnormality belonged to antepartum group of eclampsia, 6 out of 40 (15 %) belonged to post- partum group of eclampsia and 13 out of 40 (32.50 %) belonged to imminent eclampsia group. (Table 2) Among 60 patients who had abnormalities

detected, 46.6 % (28 out of 60) had vasogenic edema which was most common abnormality detected, 25 % (15/60) had cerebral infarcts which was 2nd most common abnormality detected, 6.66% (4/60) had generalised cerebral edema, 5% (3/60) had white matter edema, 3.33% (2/60) had subdural hematoma and intracerebral hemorrhage and each 1 patient out of 60 had right parietal lobe hemorrhage, small focal calcification, subarachnoid hemorrhage. (Table 3) Regarding area of distribution, parietal (28.33 % i.e 17/60) and parieto -occipital area (25 % i.e 15/60) were the most frequent site of brain lesions in CT scan followed by occipital lobe (10% i.e. 6/60). Simultaneous involvement of frontal, parietal and occipital lobe was seen in 10 % (6/60) of patients. Fronto-parietal area was affected in 5% (3/60) of patients. Other areas like cerebral, intracerebral, frontal, subarachnoid, subdural, bilateral cerebral were less commonly involved. Temporal and basal ganglia regions were least affected. (Table4)

Table 1: Distribution of cases according to type of eclampsia

Eclampsia	No.	Percentage
Antepartum	59	59.0
Postpartum	17	17.0
Imminent	24	24.0
Intrapartum	0	0

Table 2 : Distribution of cases relating type of eclampsia to CT findings.

Eclampsia	No. of patients (%)	
	Abnormality (n=60)	No abnormality (n=40)
Antepartum	38 (63.34)	21 (52.50)
Postpartum	11 (18.33)	6 (15.00)
Imminent	11 (18.33)	13 (32.50)

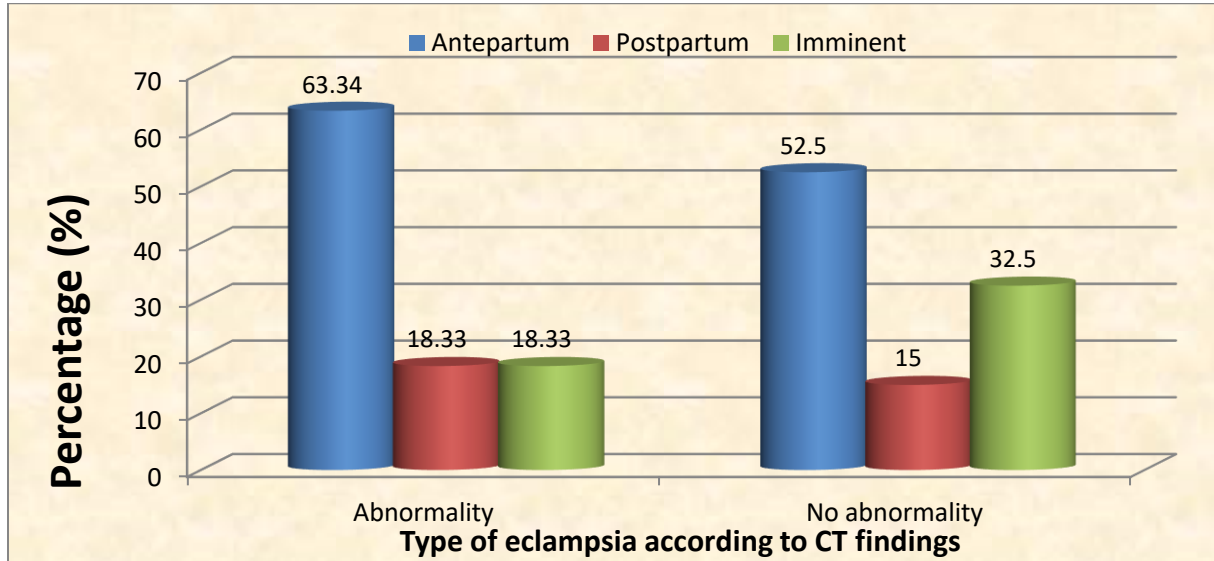


Fig 2: Bar chart showing distribution of cases relating type of eclampsia to CT findings.

Table 3: CT scan findings in relation to type of eclampsia

Findings	No. of patients (%)			Total (n=100)
	Antepartum (n=59)	Postpartum (n=17)	Imminent (n=24)	
Cerebral infarct	9 (15.25)	2 (11.76)	4 (16.67)	15
Generalized cerebral edema	3 (5.08)	0 (0.00)	1 (4.17)	4
Intra cerebral hemorrhage	1 (1.69)	1 (5.88)	0 (0.00)	2
Subdural hematoma	1 (1.69)	1 (5.88)	0 (0.00)	2
Vasogenic edema	19 (32.20)	5 (29.41)	4 (16.67)	28
White matter edema	2 (3.39)	0 (0.00)	1 (4.17)	3
Right parietal lobehemorrhage	0 (0.00)	1 (5.88)	0 (0.00)	1
Small focal calcification	0 (0.00)	1 (5.88)	0 (0.00)	1
Subarachnoid hemorrhage	0 (0.00)	0 (0.00)	1 (4.17)	1
Infarcts	3 (5.08)	0 (0.00)	0 (0.00)	3
No abnormality detected	21 (35.59)	6 (35.29)	13 (54.17)	60

Table 4: Different areas of brain involvement by CT scan

Findings	No.	Percentage
Frontal lobes	2	3.33
Occipital lobes	6	10.00
Parietal region	17	28.33
Parieto-occipital	15	25.00
Temporal lobes	1	1.67
Temporal and basal ganglia	1	1.67
Frontal, parietal and occipital	6	10.00
Fronto- parietal	3	5.00
Posterior high parietal parasagittal	1	1.67
Cerebral	2	3.33
Intra cerebral	2	3.33
Subarachnoid	2	3.33
Subdural	1	1.67
Bilateral cerebral	1	1.67

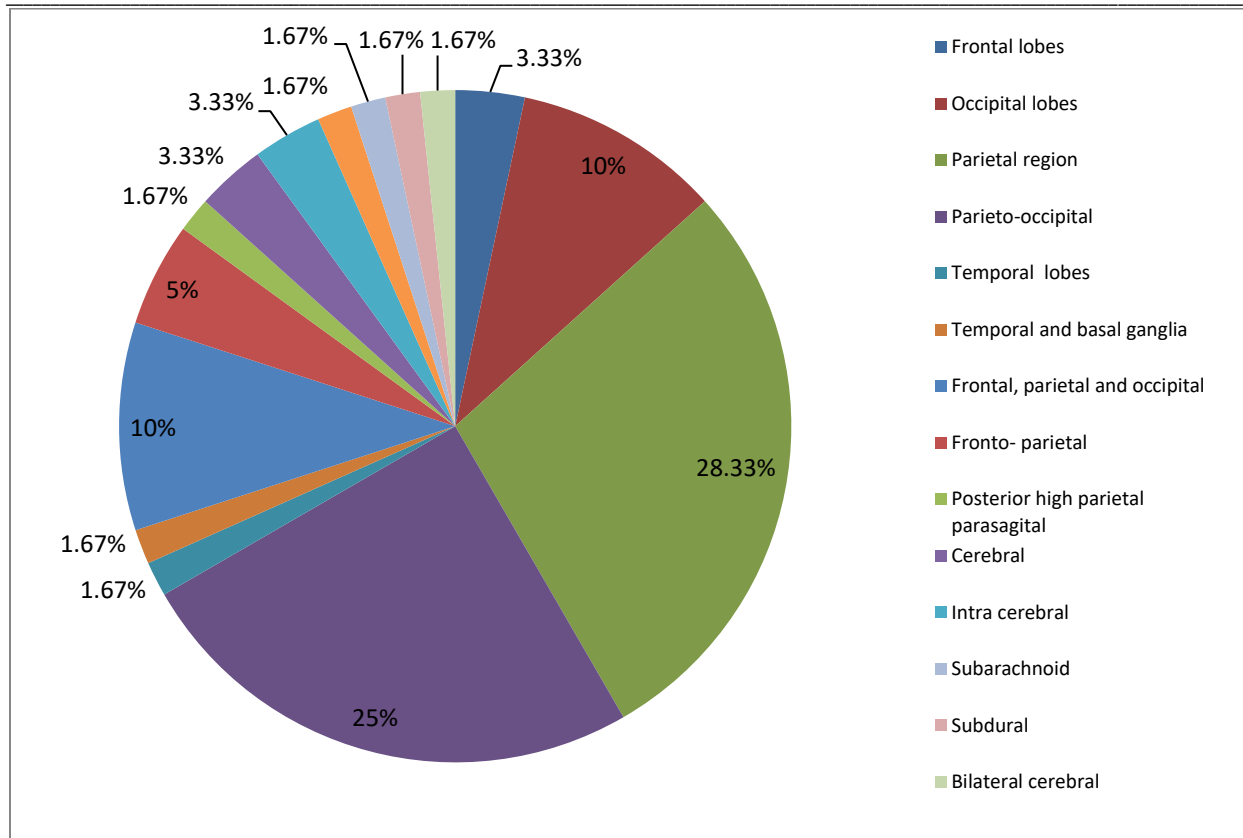


Fig.4 Pie chart showing different areas of brain involvement by CT scan.

Discussion

CT scan head can provide useful information to detect different brain lesions in eclampsia which may have different prognosis with residual effect and may need specific modification in management protocol to prevent long term neurologic sequelae and reduce maternal mortality and morbidity. The rationale of our study was to evaluate the CT scan head findings in patients of eclampsia. According to our study majority of the cases (59.0%) were having antepartum eclampsia followed by imminent (24%) and postpartum (17.0%) (Table 1). This finding of our study was comparable with the study performed by Sibai BM et al (2000) 38-53% antepartum, 15-20% intrapartum and 11-44% in the postpartum period[11]. In our study abnormal CT findings were found in 60% cases and 40% had no CT findings. Vasogenic edema (35%) was the most common finding followed by cerebral infarcts (18%) and white matter edema (3%) (Table 3). Vasogenic edema is the most common finding in eclampsia patients which explain the reversible nature of most eclampsia. The patients which show no significant finding in CT scan may have very mild vasogenic edema which is not detectable on CT scan. This finding was consistent with the study conducted by Khandaker S et al, (2014) in which 31.6% cases had cerebral edema and 37.8% eclamptic mothers had no CT findings[12]. Harandou M et al, (2006) also showed that cerebral edema was the most common finding accounting for about 74% cases[13]. In our study 2 cases of subdural hematoma and 1 case of subarachnoid hemorrhage were also found. Regarding area of distribution, parietal and parieto-occipital area were the most frequent site of brain lesions in CT scan followed by occipital lobe (Table 4). This finding was supported by Naidu et al (1997) in which they found parieto-occipital involvement in 97.4% of cases [14]. The strength of the study was that it was a

prospective study and with good sample size. But major limitation was lack of controls.

Conclusion

This study concluded that most common type of eclampsia was antepartum eclampsia. Most common CT scan head finding was vasogenic edema. And most common area involved was parietal area. CT scan is an important tool for prognosticating recovery in eclampsia patients and preventing irreversible injury to brain. Moreover neurologist opinion can be taken if CT scan findings suggest some important lesion. So we concluded that CT head of eclampsia patients should be done which may help in modifying the treatment protocol. Further large studies are required to validate the above findings.

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