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## A study of pulmonary and cardiovascular complications in eclampsia

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### Abstract

**Background:** Hypertensive disorders of pregnancy affect about 10% of all pregnant women around the world. Eclampsia is an important predictor of organ dysfunctions and mortality. This study looks into the pulmonary and cardiovascular complications occurring in eclampsia.

**Methods:** The prospective observational study included 90 cases admitted to the labor room with a diagnosis of eclampsia (antepartum, intrapartum and postpartum eclampsia). In all patients, single dose MgSO<sub>4</sub> regimen was used. Obstetric management and termination of pregnancy was done accordingly. All maternal complications and puerperal complications and associated morbidity and mortality were recorded and analyzed.

**Results:** Incidence of eclampsia was 0.05%. 66.7% were primigravidae. The mean gestational age of presentation was 34 weeks. Among the eclampsia cases (n=90), 85.6% patients presented in the antenatal period. Intrapartum and postpartum presentations were 2.2% and 6.7%. Pulmonary complications accounted 13.3% and 6.6% had cardiovascular complications (out of which 3.3% had postpartum cardiomyopathy and 1.1% had cardiac arrhythmia). Maternal mortality reported was 0.05% in our study.

**Conclusion:** Pulmonary and cardiovascular complications of eclampsia were common among the rural and low socio-economic group of women in this study. There is a need to educate the women regarding the need for regular antenatal check-ups.

**Keywords:** Pulmonary and cardiovascular complications, eclampsia

### Introduction

Hypertensive disorders of pregnancy are an important cause of severe morbidity, long term disability and death among both mothers and their babies. Hypertensive disorders of pregnancy account for nearly 18% of all maternal deaths worldwide [3]. The majority of deaths due to pre-eclampsia and eclampsia are avoidable through the provision of timely and effective care to the women presenting with these complications [4]. 5%–8% of women with pre-eclampsia present as eclampsia in developing countries [2, 5]. In 11-44% of eclampsia, seizures occur postpartum, 38-53% occur in antepartum period and 18- 36% in intrapartum period [6].

Expectant women with hypertension are predisposed towards the development of potentially lethal complications, such as abruptio placenta, disseminated intravascular coagulation, pulmonary edema, aspiration pneumonia, hepatic failure, cortical blindness and acute renal failure and cardiopulmonary arrest. Eclampsia and HELLP syndrome are important predictors of further organ dysfunctions and mortality<sup>7</sup>. Adult respiratory distress syndrome and intracerebral hemorrhage are rare complications among eclamptic series reported from the developed world. This study looked into the pulmonary and cardiovascular complications in eclampsia in our population.

### Methods

A prospective study was conducted from 1<sup>st</sup> January to 31<sup>st</sup> December 2020 for a period of one year at the Department of Obstetrics and Gynecology, Government General Hospital (GGH), Guntur. Patients with eclampsia admitted to labor room were enrolled in this study. Women with gestational age  $\leq$  20 weeks, multiple pregnancy, History of epilepsy, chronic hypertension, congenital heart disease, respiratory disease, tubercular meningitis, cerebrovascular accident, non-hypertensive encephalopathy, space occupying lesions, cerebral vasculitis, thrombotic thrombocytopenic purpura or metabolic disorders (like

hypoglycemia, uremia or dyselectrolyemia) were excluded from the study. Physician/pulmonologist would be consulted for pulmonary or cardiovascular evaluation. These cases were followed up till delivery or 48 hours postnatal life or discharge, whichever was later. The collected data variables were entered into an excel sheet. After appropriate data

filtration, the data sheet was transferred and analyzed using SPSS software version 20.0.

**Results**

The present study was carried out in 90 patients admitted to the labor ward.

**Table 1:** Showing the incidence of pulmonary and cardiovascular complications in eclampsia cases at GGH.

<b>Total no. of deliveries</b>	<b>8529</b>
Total no. of cases of eclampsia	90
Incidence of eclampsia	1.05%
Total no of cases with pulmonary and cardiovascular complications	13
Incidence of pulmonary complications	0.15%
Incidence of cardiovascular complications	0.03%

In the present study, as shown in table 1, the incidence of eclampsia is 1.05%. Incidence of pulmonary and cardiovascular complications was 0.15% and 0.03%. Majority of the cases in the study (51.1%) were in the age group of 21-25 years. Their mean age was 22 years.

**Table 2:** Showing the distribution of the subjects based on gestational age.

Gestation	Frequency	Percent
< 28 wks.	3	3.3
28 - 32 wks.	29	32.2
33 - 36 wks.	25	26.7
≥ 37 wks.	28	31.1
Postpartum	5	6.7
Total	90	100
Mean ± SD	34.44±4.25	

In present study, mean gestational age at the time of presentation was 34 weeks. Majority (85.6%) were antepartum eclampsia. 2.2% were intrapartum eclampsia. The mean systolic and diastolic blood pressure in the eclamptic women was 151.12±15.2 mmHg and 101.7 ±13.4 mmHg respectively. Majority (26.7%) of the patients had tachycardia at the time of admission. Among the 15.5% of the patients who had respiratory findings, 1.1% of the patients had both crepitations and rhonchi and 14.4% had pulmonary edema at

the time of presentation. Majority (80%) of the patients had normal fetal heart sounds. 6.7% had decreased fetal heart rate and 6.7% had intrauterine fetal distress. Majority (56.6%) had vaginal deliveries, out of which 2.2% had assisted vaginal delivery. Out of 90 subjects, 13.3% had pulmonary complications, 6.6% had cardiovascular complications out of which 3(3.3%) had dilated cardiomyopathy, 1(1.1%) had cardiac arrhythmia and 2(2.2%) had mild pericardial effusion. Fundus was normal in 81.1%. Grade 1 changes were seen in 11 subjects (12.2%), grade 2 in 2.2% and grade 3 in 1.1%. Grade 4 changes were seen in 3 (3.3%) subjects, of which all the 3 had central serous retinopathy.

**Table 3:** Depicting the correlation between age and pulmonary and cardiovascular complications normotensive.

Age group versus cardiopulmonary complications					
Age group	Present		Absent		P value
	Frequency	Percent	Frequency	Percent	
≤ 20 yrs. (n=31)	7	22.6	24	77.4	0.185
21-25 yrs. (n=46)	4	8.7	42	91.3	
26-30 yrs. (n=13)	3	23.1	10	76.9	
Total (n=90)	14	15.6	76	84.4	

Pulmonary and cardiovascular complications were more in extremes of the age <20years and >30years, and statistically not significant.

**Table 4:** Showing correlation between number of episodes of convulsions and pulmonary and cardiovascular complications

Episodes of convulsions versus cardiopulmonary complications					
Episodes	Present		Absent		P value
	Frequency	Percent	Frequency	Percent	
1 - 2 episodes (n=58)	9	15.5	49	84.5	0.721
3 - 4 episodes (n=24)	3	12.5	21	87.5	
> 4 episodes (n=8)	2	25.0	6	75.0	
Total (n=90)	14	15.6	76	84.4	

In table 4, it can be noted that pulmonary and cardiovascular complications are more in patients with > 4 episodes of convulsions.

**Table 5:** Showing correlation between type of eclampsia and pulmonary and cardiovascular complications

Type of eclampsia	Complications Present		Absent		P value
	Frequency	Percent	Frequency	Percent	
Antepartum (n=77)	10	13.0	67	87.0	0.294
Postpartum (n=6)	2	33.3	4	66.7	
Intrapartum (n=2)	1	50.0	1	50.0	
Others (n=5)	1	20.0	4	80.0	
Total (n=90)	14	15.6	76	84.4	

Pulmonary and cardiovascular complications were more in intrapartum eclampsia, which is not significant.

**Table 6:** Showing correlation between gestational age and pulmonary and cardiovascular complications

Gestation group versus cardiopulmonary complications					
Gestation group	Present		Absent		P value
	Frequency	Percent	Frequency	Percent	
< 28 wks. (n=3)	00	0.0	03	100.0	0.517
28 - 32 wks. (n=29)	06	20.7	23	79.3	
33 - 36 wks. (n=3)	03	12.5	21	87.5	
≥ 37 wks. (n=28)	03	10.7	25	89.3	
Postpartum (n=6)	02	33.3	4	66.7	
Total (n=90)	14	15.6	76	84.4	

Pulmonary and cardiovascular complication were nil in <28 wks and increases as the gestational age increase and higher in postpartum, which is statistically not significant.

**Table 7:** Showing correlation between funduscopy and pulmonary and cardiovascular complications.

Fundoscopy versus cardiopulmonary complications					
Fundoscopy	Present		Absent		P value
	Frequency	Percent	Frequency	Percent	
Grade 1 HTN changes (n=11)	2	18.2	9	81.8	0.019
Grade 2 HTN changes (n=2)	2	100.0	0	0.0	
Grade 3 HTN changes (n=1)	0	0.0	1	100.0	
Grade 4 HTN changes (n=3)	0	0.0	3	100.0	
WNL (n=73)	10	13.7	63	86.3	
Total (n=90)	14	15.6	76	84.4	

Pulmonary and cardiovascular complications were noted more in grade 2 hypertensive changes and is statistically significant. Five cases of maternal mortality were reported.

**Discussion**

The incidence of pulmonary and cardiovascular complication in the present study is 1.05%. According to the Evidence and Information for Policy (EIP), World Health Organization (2000), incidence for eclampsia from a systematic review was 2.3% of pre-eclampsia cases for developing regions and 0.8% of pre-eclampsia cases for developed regions [8].

Incidence of eclampsia in antenatal, intrapartum and postpartum periods and their complications noted in our study was found similar to the findings noted in the study by Deepak *et al.* [9].

In our study, 91.1% of cases of eclampsia had 4 or lesser number of convulsions. The patients who had a greater number of convulsions were from places with no immediate access to medical services and less transport facilities to reach the hospital early. It implies that the earlier to reach, better the outcome and lower the morbidity and mortality. Transport facilities for example, 108 services have to be enhanced further.

The Mean SBP and DBP in the present study were comparable to the study by Rekha Sachan *et al.* [10].

Need for LSCS was higher (43.3%) in our study, compared to 24% in a similar study by Bhanu *et al.* [11], in view of delay in admission, being a referral centre.

Maternal mortality in my study was 0.05% compared to Bhanu’s study [11] which showed 5.7%. Shankar J *et al.* [12] study documented mortality of 25 – 40% range exclusively attributed to preeclampsia and eclampsia. It was a leading cause of death in 5 out of 10 years of the study duration.

Over the last 30 years, three studies published by Sudha S *et al.* [13], Shankar J *et al.* [12] and Shivakumar HC *et al.* [14]

prove that maternal mortality attributable to preeclampsia or eclampsia is alarmingly high (21-49%) despite significant reduction in maternal mortality rate (from 2063 to 374 / lakh live births). It reiterates that eclampsia needs top priority even today. The situation is worsened by teenage pregnancy, poverty and poor health-seeking behavior among the patients.

The limitation of the study was that it was a small study of short duration. Being a government set-up, advanced facilities like elective echo cardiography, pulmonary angiogram or ventilation perfusion scan, ABG, ventilators and continuous ECG monitoring were not readily available for needy patients. This could have reduced the admissions to decision making interval and would have improved the fetomaternal outcome.

**Conclusion**

Pulmonary and cardiovascular complications of eclampsia were common among the rural and low socio-economic women in this study. More awareness should be created for more women to access antenatal facilities. Information about danger signs of eclampsia should be made available. Significant efforts are required towards female education regarding pregnancy and nutrition, women empowerment, provision of social amenities in rural areas and the need for regular ante natal check-ups.

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