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ECLAMPSIA IN EASTERN UTTAR PRADESH: MATERNAL AND PERINATAL OUTCOMES IN A PROSPECTIVE STUDY

Cardiology

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ABSTRACT

Background: Eclampsia continues to be a major cause of maternal and perinatal morbidity and mortality in developing regions of India, despite the proven efficacy of magnesium sulphate therapy. This study was done to evaluate the incidence, clinical profile, treatment modalities, and maternal and perinatal outcomes of eclampsia in Eastern Uttar Pradesh (Gorakhpur and surrounding districts). **Methods:** A prospective observational study was conducted on 131 eclamptic women admitted to the Department of Obstetrics & Gynaecology, B.R.D. Medical College, Gorakhpur, from March to December 2002. Data on sociodemographic parameters, clinical features, seizure characteristics, blood pressure, treatment regimens, and outcomes were analyzed. **Results:** Most patients were young (<24 years: 54.1%) and primigravidae (69.4%), with 100% being unbooked. Antepartum eclampsia predominated (80.9%), followed by postpartum (18.3%) and intrapartum (0.8%) types. Nearly half (50.4%) had 5–10 seizures before admission, and 45% had diastolic BP ≥110 mmHg. Magnesium sulphate was the primary anticonvulsant (88.6%), with seizure recurrence in only 4.6% of cases. However, maternal mortality remained high (22.4%), mainly due to delayed referrals and limited intensive care facilities. The perinatal mortality rate was 49.5% (54.9/1000 births), with 85.4% of deaths being fresh stillbirths, reflecting severe antepartum compromise. **Conclusion:** Eclampsia remains a significant obstetric emergency in Eastern Uttar Pradesh, affecting young, unbooked, and socioeconomically disadvantaged women. Although magnesium sulphate effectively controlled seizures, late presentation and inadequate critical care facilities contributed to persistently high maternal and perinatal mortality. Strengthening antenatal care, early referral, and better-equipped tertiary centers are imperative to improve outcomes.

KEYWORDS

Eclampsia, Maternal Mortality, Perinatal Outcome, Magnesium Sulphate, Eastern Uttar Pradesh, Seizures

INTRODUCTION

Eclampsia, defined as the occurrence of new-onset grand mal seizures in a woman with preeclampsia, remains a leading cause of preventable maternal and perinatal morbidity and mortality worldwide [1]. While its incidence has significantly declined in high-income nations due to robust antenatal screening and aggressive management of preeclampsia, it continues to pose a major public health crisis in many low- and middle-income countries (LMICs) [1, 2]. The global burden of eclampsia is disproportionately concentrated in resource-poor settings, where it is often associated with delayed diagnosis, late referral, and inadequate critical care facilities [2].

In the developed world, maternal mortality rates from eclampsia are often reported in single-digit percentages, for instance, less than 1% in the United Kingdom [3]. However, reports from various regions in India frequently demonstrate alarmingly higher maternal mortality rates, highlighting significant geographical disparities in obstetrical outcomes [4]. Furthermore, eclampsia is a significant contributor to perinatal morbidity and mortality due to complications such as placental abruption, intrauterine growth restriction, and preterm birth, with perinatal mortality rates in some Indian studies exceeding 50% [5].

The pathogenesis of eclampsia is complex and multifactorial, involving endothelial dysfunction, cerebral hyperperfusion/hypoperfusion, and vasospasm, which can lead to cerebral edema and convulsions [2]. The standard treatment with Magnesium Sulphate (MgSO4) has been proven effective in preventing the recurrence of seizures and improving maternal outcomes, as established by landmark trials such as the Eclampsia Trial Collaborative Group (ETCG) [4, 6]. However, the efficacy of treatment is heavily reliant on timely administration, which is often hampered in settings with poor infrastructure.

Eastern Uttar Pradesh, encompassing districts like Gorakhpur, represents a region characterized by a large, predominantly rural population with socio-economic challenges, often resulting in poor antenatal care coverage and high rates of unbooked pregnancies. While anecdotal evidence and localized reports suggest eclampsia remains a significant clinical challenge in this area, comprehensive prospective data detailing the clinical spectrum and outcomes are scarce.

Therefore, the objective of this prospective observational study was to comprehensively analyze the incidence, clinical profile (including maternal age, parity, and seizure characteristics), treatment regimens, and the resultant maternal and perinatal outcomes of women presenting with eclampsia in Eastern Uttar Pradesh. The findings will provide crucial epidemiological data to inform regional public health policy and guide improvements in local obstetric care protocols.

Subjects and Methods

This was a prospective observational study conducted over nine months, from March 12, 2002, to December 12, 2002, in the Department of Obstetrics & Gynaecology at Nehru Chikitsalaya, B.R.D. Medical College, a tertiary care hospital located in Gorakhpur, caters to patients from Eastern Uttar Pradesh and suburban referral areas.

The study sample comprised 131 consecutive women admitted with a confirmed diagnosis of eclampsia during the stipulated study period. Cases were included based solely on the clinical diagnosis of eclampsia upon admission to the hospital unit.

Comprehensive information was collected from all participants. This included demographic and socioeconomic details such as age, parity, occupation, education, and socioeconomic status. Obstetric history was recorded, including gestational age and any previous history of pre-eclampsia or eclampsia. On admission and during hospital stay, clinical parameters such as blood pressure, respiratory rate, temperature, presence of pallor, icterus, and edema were monitored. The number and pattern of seizures before and after admission were documented. Neurological assessment included the patient's level of consciousness, deep tendon reflexes, and motor and sensory function.

Routine investigations included a complete haematological profile (Hb %, TLC, DLC, platelet count, bleeding time, clotting time), biochemical assessments (Random Blood Sugar, Serum Electrolytes, Serum Urea, Creatinine, Uric acid, SGOT, and SGPT), and complete urine examination, with a specific focus on albuminuria. Special investigations were performed as feasible: Electroencephalography (EEG) recordings were attempted using the International 10-20 system, and Echocardiography with color Doppler was performed in 52 of the 131 patients using a HEWLETT PACARD (Sonos 2000) system to assess left ventricular dimensions and wall thickness based on International Society of Echocardiography criteria.

The primary anticonvulsant regimen utilized was MgSO4 following

the protocol described by Pritchard & Pritchard (1975) [7]. Phenytoin was reserved as a secondary line of treatment for patients exhibiting signs of MgSO4 toxicity (such as absent knee jerk, respiratory depression, or oliguria) or for those whose convulsions were refractory to the primary MgSO4 regimen. Antihypertensive therapy involved the use of sublingual nifedipine for diastolic blood pressure >110 mmHg, with Labetalol also employed to prevent complications like cerebral hemorrhage. Obstetrical management included induction of labor for antepartum patients and Cesarean section when specific obstetrical indications were present.

Primary outcome measures assessed included maternal mortality, the time required for the patient to regain full consciousness following the last seizure, and the rate of seizure recurrence following the initiation of MgSO4 therapy. Perinatal outcomes, including stillbirths and neonatal deaths (combined to determine Perinatal Mortality Rate), were also calculated and analyzed in relation to the maternal clinical course.

RESULTS

The study cohort consisted predominantly of young women, with more than half (54.1%) aged below 24 years. Eclampsia was mainly observed among first-time mothers, as primigravidae constituted 69.4% of the total sample. Notably, all 131 patients (100%) were unbooked, reflecting a complete lack of prior antenatal care. A majority of participants (70.2%) were illiterate and belonged to a low socioeconomic background (54.9%), emphasizing the social vulnerability of the affected population. The demographic and obstetric characteristics of the study participants are summarized in Table 1.

Table 1: Patient Demographic and Obstetric Profile (N=131)

Characteristic	Count	Percentage
Age Distribution (Years)		
≤19	5	3.82
20-24	65	49.62
25-35	52	39.69
> 35	8	6.11
Total	131	100.00
Summary Age		
< 24 years	70	54.10
25-35 years	52	39.60
> 35 years	8	6.10
Parity		
Primigravidae/Primipara	91	69.40
Multigravidae/Multipara	40	30.60
Socioeconomic status/ Education		
Low Socioeconomic Status	72	54.96
Illiterate	92	70.20
Antenatal Care		
No Antenatal Checkup (Unbooked)	131	

Eclampsia onset was predominantly antepartum (80.9%), a pattern consistent with reports from other developing regions. A substantial proportion of patients presented with severe diseases, with 50.4% experiencing five to ten convulsions before hospital admission. Despite the high seizure burden, only a slight majority (51.1%) had a systolic blood pressure ≥160 mmHg, while 45% exhibited a diastolic pressure ≥110 mmHg at presentation. $MgSO_4$ was used as the primary anticonvulsant in 88.6% of cases, while phenytoin was administered in 11.4%, mainly for patients who developed toxicity or showed inadequate response to $MgSO_4$. Seizure recurrence following $MgSO_4$ therapy was low (4.6%), comparable to international trial outcomes, suggesting effective seizure control. Among patients who developed $MgSO_4$ toxicity, absent knee jerk was the most common sign (53.2%), followed by haematuria (10.6%) and respiratory depression (4.3%). The clinical and treatment characteristics of the study population are detailed in Table 2.

Table 2: Clinical and Treatment Characteristics

Characteristic	Count	Percentage
Type of Eclampsia		
Antepartum	106	80.92
Postpartum	24	18.32
Intrapartum	1	0.76
Blood Pressure Profile (upon admission)		
Systolic BP < 160 mmHg	64	48.85
Systolic BP ≥ 160 mmHg	67	51.15
Diastolic BP ≥110 mmHg	59	45.00
Seizure Frequency (before admission)		
≤4 Convulsions	39	29.77
5-10 Convulsions	66	50.38
> 10 Convulsions	26	19.85
Anticonvulsant Therapy Used		
Magnesium Sulphate	116	88.55
Phenytoin (Secondary)	15	11.45
MgSO4Toxicity Observed		
Absent Knee Jerk	47*	53.20
Haematuria	N/A	10.60
Respiratory Depression	N/A	4.30
*Calculated as a percentage of patients who received MgSO4 and developed any toxicity.		

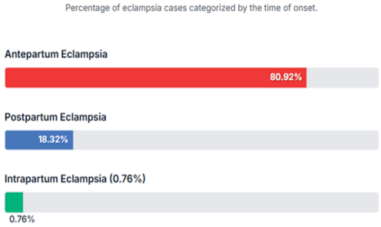
Maternal and perinatal outcomes were markedly poor in this cohort, primarily reflecting delayed referral and limited healthcare resources. The maternal mortality rate was alarmingly high at 22.40%, far exceeding the 5.1% reported in the UK ETCG trial. Despite this, magnesium sulphate ($MgSO_4$) therapy demonstrated effective seizure control, with a recurrence rate of only 4.58%. Among survivors, 87.5% regained consciousness within 72 hours of treatment.

Perinatal outcomes were similarly compromised. The total perinatal mortality rate (PMR) was 49.50%, corresponding to 54.86 per 1000 total births, which is significantly higher than rates reported in developed nations. Notably, 85.40% of perinatal deaths were fresh stillbirths, indicating severe antepartum compromise. Additionally, low Apgar scores were more common in neonates born to mothers who had multiple convulsions or experienced delayed initiation of treatment. (Table 3)

Table 3: Maternal and Perinatal Outcomes

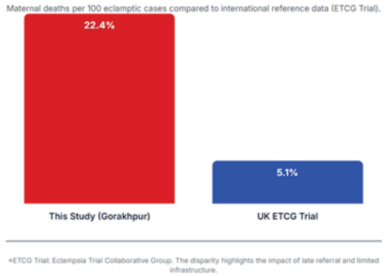
Outcome Measure	Result (n=131)	Percentage (%)	Comparative Data / Note
Maternal Outcome			
Total Maternal Deaths	24	22.40	Significantly higher than UK ETCG trial (5.1%)
Regained Consciousness (24-48 hours)	N/A	45.30	
Regained Consciousness (48-72 hours)	N/A	42.20	Majority (87.5%) regained consciousness within 72 hours
Recurrence of Seizures (Post MgSO4	6	4.58	Recurrence rate comparable to ETCG trial
Perinatal Outcome			
Total Perinatal Mortality Rate (PMR)	N/A	49.50	PMR in developed nations approx 22.2
PMR per 1000 Total Births	54.86	N/A	Significantly higher than developed countries (P<0.01)
Fresh Stillbirths (of total deaths)	N/A	85.40	Indicates severity of antepartum delay
Low Apgar Scores	N/A	N/A	More common in cases with multiple seizures & delayed treatment

Analysis of eclampsia type revealed that most cases were Antepartum, accounting for 80.92% of the cohort. This predominance aligns with trends observed in populations where antenatal care access is limited and hospital presentation occurs late in the disease course. Postpartum eclampsia represented 18.32% of cases, while Intrapartum eclampsia was rare, occurring in only 0.76% of patients. (Graph 1)



Graph 1: Distribution of Eclampsia Type

The comparison graph underscores one of the most striking findings of this study—the markedly higher maternal mortality rate observed in the Gorakhpur cohort compared to figures from developed nations. The Maternal Mortality Rate (MMR) in this study was 22.40% (24 deaths), more than four times higher than the 5.1% reported in the UK Eclampsia Trial Collaborative Group (ETCG) study. This pronounced disparity highlights the ongoing challenges faced by eclampsia patients in Eastern Uttar Pradesh, primarily related to delayed referral, absence of routine antenatal surveillance, and inadequate healthcare infrastructure (Graph 2).



Graph 2: Comparison of Maternal Mortality Rate

DISCUSSION

This prospective observational study provides critical and contemporary insights into the clinical profile and outcomes of eclampsia at a major tertiary care center in Eastern Uttar Pradesh, reflecting the persistent challenges of managing this condition in low-resource settings. The demographic profile confirms that eclampsia disproportionately affects socially vulnerable women—young (54.1% aged <24 years), primigravidae (69.4%), largely illiterate (70.2%), and, most alarmingly, entirely unbooked for antenatal care [8]. These findings are consistent with recent regional studies from comparable developing settings [9] and underscore systemic deficiencies in preventive maternal health services. The predominance of antepartum eclampsia (80.92%) further reflects delayed presentation, allowing disease progression to the convulsive stage before hospital admission.

A distinctive strength of this study lies in the systematic integration of specialized neurological (EEG) and cardiac (echocardiographic) evaluations, enabling a more comprehensive understanding of the multisystem involvement characteristic of severe eclampsia. Although a majority of patients presented with a high seizure burden (5–10 convulsions), the recurrence rate following magnesium sulphate therapy was low (4.58%), reaffirming its efficacy when properly administered [10]. Nevertheless, the advanced stage of disease at presentation continued to compromise overall maternal safety.

The maternal mortality rate (22.4%) observed in this cohort stands in stark contrast to the 5.1% reported in high-income countries [10]. This disparity is not primarily due to ineffective anticonvulsant therapy, but rather to systemic failures, including delayed referral, absence of antenatal risk stratification, and inadequate infrastructural support, particularly the limited availability of intensive and neurocritical care facilities required to manage complications such as cerebral edema and renal failure [11].

Perinatal outcomes were equally concerning. The Perinatal Mortality Rate (PMR) of 49.5% was markedly higher than rates reported internationally [12]. The finding that 85.4% of perinatal deaths were fresh stillbirths indicates that fetal compromise often occurred before or during hospital presentation, reflecting the severity of maternal disease and the consequences of delayed intervention. Moreover, the association between low Apgar scores, multiple maternal seizures, and delayed treatment initiation underscores the direct impact of maternal disease severity on neonatal outcomes.

This study has certain limitations. Being single-centered, its findings may not be generalizable across all healthcare settings, particularly peripheral centers. Additionally, its observational design precludes definitive conclusions about treatment efficacy. The reliance on clinical criteria for toxicity monitoring, though appropriate in resource-constrained environments, may underestimate subclinical complications. Despite these limitations, this study highlights the critical link between socioeconomic vulnerability, limited healthcare access, and poor maternal–perinatal outcomes in eclampsia. The findings reinforce the urgent need for strengthened antenatal surveillance, early referral mechanisms, and tiered obstetric critical care networks to reduce preventable mortality in similar settings.

CONCLUSION

From the observations and results of the present study, while MgSO4 effectively controlled convulsions in most patients, the persistently high maternal and perinatal mortality rates are primarily attributable to systemic challenges, including delayed referral and limited healthcare infrastructure. Addressing these outcomes requires an urgent, multi-level intervention aimed at strengthening community-level antenatal surveillance and enhancing critical care capacity in tertiary hospitals to reduce preventable maternal and neonatal deaths.

List of Abbreviations :

1. $MgSO_4$ – Magnesium Sulphate
2. BP – Blood Pressure
3. MMR – Maternal Mortality Rate
4. PMR – Perinatal Mortality Rate
5. EEG – Electroencephalography
6. TLC – Total Leukocyte Count
7. DLC – Differential Leukocyte Count
8. Hb – Hemoglobin
9. SGOT – Serum Glutamic-Oxaloacetic Transaminase
10. SGPT – Serum Glutamic-Pyruvic Transaminase
11. UK – United Kingdom
12. ETCG – Eclampsia Trial Collaborative Group
13. N/A – Not Applicable
14. LMICs – Low- and Middle-Income Countries

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