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Original Research Article

Maternal and Perinatal Outcome of Eclampsia in a Tertiary Care Centre of Darbhanga

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Abstract:

Background: Eclampsia continues to be a major cause of maternal and neonatal morbidity and mortality, especially in underdeveloped countries, and a devastating obstetric emergency. The burden of eclampsia is disproportionately high in the Indian state of Bihar, where healthcare infrastructure frequently fails to fulfill the needs of a dense rural population.

Objectives: This study's main goal was to assess the clinical profile and sociodemographic traits of women who presented with eclampsia. In order to find weaknesses in the current healthcare delivery system, secondary goals included evaluating perinatal outcomes and examining the particular causes of maternal illness and mortality.

Methods: Over the course of a year, this prospective observational study was carried out at the Department of Obstetrics and Gynecology at Darbhanga Medical College and Hospital (DMCH), Darbhanga. 145 women having an eclampsia diagnosis were included in the study. Management used the Pritchard regimen in accordance with established institutional procedures. Analysis was done on clinical presentation, delivery method, and fetomaternal complications.

Results: Young primigravidae had the highest incidence (68.2%), with an astounding 86.2% of referrals being unbooked. The most common presentation (64.8%) was antepartum eclampsia. In 55.8% of instances, a cesarean section was necessary. Pulmonary edema (4.1%) and HELLP syndrome (9.6%) were the two main maternal consequences. The rate of maternal death was 4.1%. With a high incidence of low birth weight (58.6%) and a perinatal mortality rate of 35.5%, perinatal outcomes were compromised.

Conclusion: Mothers and newborns in the Darbhanga region continue to suffer greatly from eclampsia. The findings show that in order to shorten the time between seizure onset and tertiary care intervention, it is imperative to improve transit infrastructure and bolster antenatal surveillance at the local level.

Keywords: HELLP

Introduction

Background and Global Burden: The new start of generalized tonic-clonic seizures or coma in a woman with preeclampsia that cannot be explained by other neurological diseases is known as eclampsia [1]. It is at the extreme end of the range of pregnancy-related hypertension disorders, which, along with bleeding and infection, make up the fatal trio that accounts for most maternal deaths worldwide. The World Health Organization (WHO) reports that around 14% of maternal mortality globally are caused by hypertensive diseases, with the great majority of these deaths taking place in low- and middle-income nations [2]. Eclampsia is still a major public health concern in countries like India, where reported incidence rates range greatly between 0.18% and 4.6% depending on the location, despite the fact that the incidence has drastically decreased in the industrialized world as a result of good prenatal screening [3].

Pathophysiology and Clinical Significance

Eclampsia has a complicated, multifaceted pathogenesis that includes aberrant placentation that results in extensive endothelial dysfunction. Vasospasm, increased vascular permeability, and coagulation cascade activation are the outcomes of this. The central nervous system is especially susceptible; in the event of severe hypertension, cerebral autoregulation fails, resulting in seizures and vasogenic edema [4]. The convulsive state of the mother is equivalent to a hypoxic episode for the fetus. The fetus is at high risk for intrauterine growth restriction (IUGR), oligohydramnios, and acute asphyxia due to repeated seizures and the chronic placental insufficiency associated with preeclampsia [5].

Regional Context and Rationale

When it comes to obstetric treatment, the state of Bihar poses particular difficulties. Poor maternal health indices are a result of high population density, low female literacy rates, and unequal access to medical facilities. The main tertiary referral facility for the whole Mithilanchal region of North Bihar is Darbhanga Medical College and Hospital (DMCH). The majority of the patients in this clinic are from lower socioeconomic backgrounds, live in rural areas, and frequently arrive late in the course of their illness. Although there is a wealth of literature on eclampsia in metropolitan Indian areas, contemporary data from this area is scarce. Developing focused therapies requires an understanding of the regional patterns of disease presentation and outcomes. In order to audit the maternal and perinatal outcomes of eclampsia at this particular tertiary center over a one-year period, this study was conducted.

Material and Methods

Study Design and Setting

The Department of Obstetrics and Gynecology at Darbhanga Medical College and Hospital (DMCH), Darbhanga, was the site of this prospective observational study. The trial lasted for a full year. As a government teaching hospital with a large frequency of referrals from several neighboring districts, DMCH is a perfect place to assess the severity of obstetric emergencies in the area.

Study Population and Sampling

145 consecutive pregnant women with a diagnosis of eclampsia who were admitted to the labor department or the eclampsia unit made up the study population. The hospital's yearly admission statistics for hypertensive diseases were used to calculate the sample size. Strict inclusion and exclusion criteria were used to guarantee the data's validity. Regardless of gestational age or parity, we included all pregnant women who presented with convulsions linked to hypertension (blood

pressure ≥140/90 mmHg) and proteinuria. On the other hand, in order to prevent confusing the diagnosis of eclampsia, individuals having a history of epilepsy, severe brain damage, cerebral malaria, meningitis, or metabolic seizures were carefully eliminated.

Data Collection and Clinical Management

The management protocol was started as soon as the patient was admitted, concurrently with data collecting. The patient (if conscious) or any accompanying family members were asked to provide a thorough history. This contained demographic information including residence, age, and socioeconomic status. Evaluating the patient's "booking status" was an essential component of the history-taking process. Only if a woman had attended three or more antenatal care (ANC) visits was she considered "booked"; otherwise, she was considered "unbooked."

The degree of consciousness, the frequency of convulsions, and the severity of the blood pressure were the main objectives of the clinical evaluation. The gestational age, fetal heart rate, and labor stage were ascertained during obstetric examination. Every patient was treated in accordance with the usual institutional procedure, which uses magnesium sulphate, or the Pritchard Regimen, to prevent and control seizures.

In order to prevent toxicity symptoms like respiratory depression or lack of knee jerk reflex, a loading dosage of 4g IV and 10g IM was administered, followed by maintenance doses every 4 hours. To keep diastolic blood pressure between 90 and 100 mmHg, antihypertensive medication, mostly intravenous Labetalol or oral Nifedipine, was given [6].

Obstetric Interventions and Follow-up

Since delivery is the only effective treatment for eclampsia, measures were taken to end the pregnancy after the mother's condition had stabilized, as indicated by the control of blood pressure and seizures. The delivery method was customized for each patient. If there was no fetal distress and the woman was already in active labor or had a favorable Bishop's score, vaginal delivery was attempted. But for obstetric indications including poor cervix, fetal discomfort, or cephalopelvic disproportion, cesarean sections were frequently performed. Patients were monitored until they were discharged in order to document perinatal outcomes (such as APGAR scores, birth weight, and NICU admissions) and maternal problems (such as HELLP syndrome, renal failure, or pulmonary edema). The institutional review board granted ethical clearance before the study started.

Results

145 patients having an eclampsia diagnosis over a 12-month period were included in the analysis. In terms of results, clinical presentation, and demography, the data showed clear trends.

Demographic and Antenatal Profile

According to the demographic data, eclampsia primarily affects young, first-time mothers in this area. With 44.8% (n=65) of the total cases, women under the age of 20 made up the largest subgroup, while those between the ages of 21 and 25 made up 40.7% (n=59). Primigravidae, or first-time mothers, accounted for 68.2% (n=99) of the study group and were disproportionately impacted.

The state of prenatal care was possibly the most alarming discovery. Just 13.8% (n=20) of the cases were booked; the vast majority, 86.2% (n=125), had gotten little to no prenatal care.

Clinical Presentation

The timing of seizure onset is a critical factor in management. As shown in Table 1, the majority of patients presented with antepartum eclampsia, meaning seizures occurred before the onset of labor.

Table 1: **Distribution of Cases According to Type of Eclampsia**

Type of Eclampsia	Number of Cases (n=145)	Percentage (%)
Antepartum	94	64.8%
Intrapartum	26	17.9%
Postpartum	25	17.2%
Total	**145**	**100%**

In order to comprehend the impact of prematurity, we also examined the gestational age at presentation. Perinatal survival is greatly impacted by the fact that over half of the patients appeared preterm, as shown in Table 2.

Table 2: **Distribution According to Gestational Age**

Gestational Age	Number of Cases	Percentage (%)
$<$ 32 Weeks	22	15.2%
32 $-$ 36 Weeks	63	43.4%
$\geq$ 37 Weeks (Term)	60	41.4%
Total	**145**	**100%**

Mode of Delivery

Following maternal stability, the mode of delivery was decided.

Although vaginal delivery is usually desired, surgical intervention was frequently required due to the urgency of the clinical circumstances. 44.1% of women had spontaneous or induced vaginal births. In 2.7% of cases, the second stage of labor was shortened by instrumental delivery (forceps or ventouse). As a result, 55.8% (n=81) of patients underwent Lower Segment Cesarean Section (LSCS), which was the most popular method of birth. Fetal discomfort, unsuccessful induction, and an unfavorable cervix in a primigravida far from term were the main reasons for LSCS.

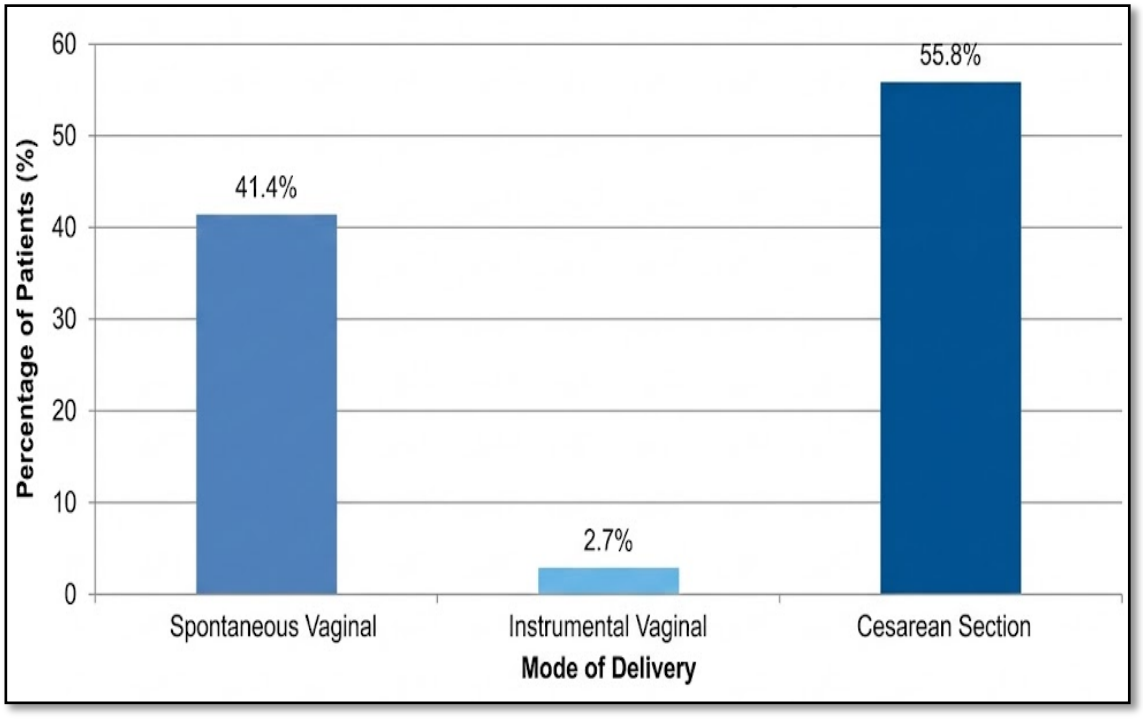

Figure 1: **Frequency distribution of delivery modes**

Maternal Morbidity and Mortality: Due to the disease's multisystemic nature, maternal complications were common and severe. HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count) was the most frequent consequence, occurring in 9.6% of patients. Other potentially fatal consequences were acute renal damage (3.4%) and pulmonary edema (4.1%), which is frequently caused by fluid overload or capillary leak. 7.5% of cases had abruptio placentae, a condition associated with the hypertensive crisis. Sadly, there were six maternal fatalities, making the case fatality rate 4.1%. Pulmonary edema, severe cerebrovascular hemorrhage, and multi-organ dysfunction syndrome (MODS) were determined to be the reasons of death.

Perinatal Outcome

Due to four twin gestations, 149 newborns were reported in the study. Most of the perinatal results were not good. There were 34 stillbirths (22.8%) and 115 live births (77.1%).

Nineteen of the live babies had early neonatal death (ENND) within the first week of life. This results in a startling 35.5% overall perinatal death rate. 57% of the babies had low birth weight (less than 2.5 kg).

Additionally, 42 neonates were diagnosed with birth asphyxia, which is characterized by an APGAR score of less than 7 at five minutes and requires emergency admission to the NICU.

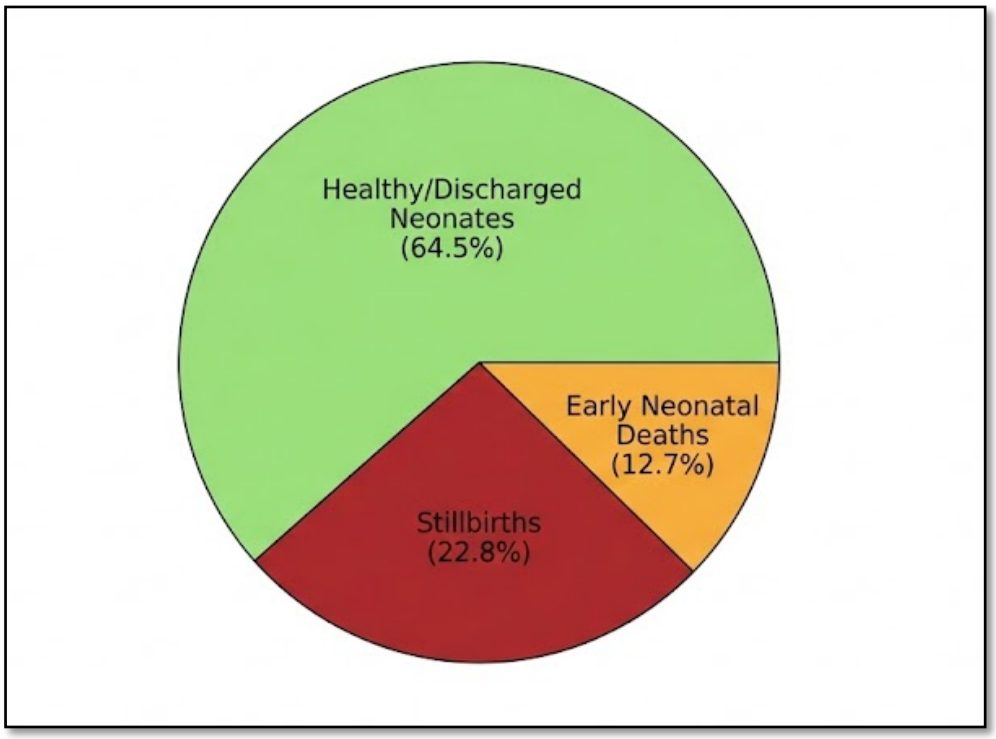

Figure 2: **Distribution of fetal outcomes**

Discussion

Sociodemographic Factors and Access to Care: The results of this study support the well-established notion that eclampsia affects young people and those who are not booked.

The "primipaternity" theory and immunological hypotheses of preeclampsia are supported by the fact that the disease is predominantly observed in first pregnancies, with epidemiological reviews consistently identifying primipaternity as a major risk factor [7]. More importantly, a systematic failure in prenatal coverage is

shown by the fact that 86.2% of patients were not scheduled. 90% of eclampsia patients were unbooked in a tertiary hospital study in Odisha, according to Swain et al., indicating that this is a widespread problem throughout Eastern India [8]. The premonitory symptoms of preeclampsia, such as elevated blood pressure and proteinuria, go unnoticed until the patient seizes due to the absence of prenatal examinations. The time required to transport the patient from rural regions to DMCH frequently exacerbates this delay; this phenomenon is commonly known as the "three delays" concept in maternal health [9].

Clinical Presentation and Maternal Morbidity

Antepartum eclampsia was the most common symptom in our cohort (64.8%), according to Varudhini et al. [10]. Prenatal eclampsia care is particularly challenging because it must strike a balance between the mother's stability and the necessity to deliver a possibly premature fetus. When compared to affluent nations where deaths are rare, our study's maternal death rate of 4.1% is still unacceptably high, albeit being lower than earlier data. Our figures are comparable to those published by Dasari et al. (4.8%) in a comparable rural setting [11], but they are higher than the 0% reported by Roshini et al. at a South Indian tertiary hospital, indicating the regional discrepancy in healthcare resources [12].

The high incidence of pulmonary edema and HELLP syndrome (9.6%) indicates the severity of the illness at the time of arrival. The fact that pulmonary edema is often iatrogenic and associated with fluid management emphasizes the necessity of careful fluid balance in eclamptic patients [13].

Mode of Delivery and Perinatal Outcomes

Our study's 55.8% Cesarean section rate is in line with the growing global trend of surgical births for eclampsia. Although vaginal delivery is recommended by the American College of Obstetricians and Gynecologists (ACOG) for stable patients [14], in a tertiary institution such as DMCH, patients may arrive with uncontrollable seizures or fetal distress, requiring rapid LSCS. Our study's perinatal mortality rate of 35.5% illustrates the catastrophic effects of eclampsia on the fetus. Tukur et al.'s observation that preterm and birth asphyxia are the main causes of infant loss in eclampsia in underdeveloped nations [15] supports this. The significant stillbirth incidence (22.8%) indicates that a large number of fetuses experienced irreversible hypoxia injury at home or during transportation prior to arriving at the hospital. Our study's 57% connection between low birth weight and unfavorable outcomes aligns with Zuvarcan et al.'s recent findings from Indonesia, which highlighted a significant correlation between preeclampsia, low birth weight, and increased neonatal risks such as asphyxia [16].

Limitations

The numerous limitations of this study must be considered when assessing the findings. First of all, because it was a single-center study at a tertiary referral hospital, there is a lot of referral bias in the data. Because lesser cases may be treated at outlying centers and the most dangerous patients may die during transport and never reach admission, the patient group most likely represents the most severe end of the clinical range. Because of this, the high rates of morbidity and mortality might not accurately reflect the overall incidence or effects of eclampsia in the general population of Darbhanga.

Second, just the period between admission and release was included in the study's design. Without long-term follow-up, it is impossible to assess the chronic consequences that women with a history of eclampsia are known to have, such as persistent hypertension, neurological abnormalities, or future cardiovascular

risks. Moreover, reliable documentation about pre-referral management was sometimes lacking. Since many patients arrived in an obtunded state with scant medical records from primary health facilities, it is difficult to measure the consequences of specific treatment delays or incorrect dosages of anticonvulsants provided before to arrival. Finally, the sample size of 145 limits the statistical capacity to investigate rare complications or significantly stratify outcomes by specific demographic risk factors, even though it is enough for a descriptive analysis.

Conclusion

The study unequivocally shows that in the Darbhanga region, eclampsia continues to be a significant cause of maternal and neonatal illness and mortality. Deeply ingrained social and systemic problems are indicated by the typical patient profile of a young, unbooked primigravida from a rural background. The high rates of neonatal mortality (35.5%) and maternal mortality (4.1%) are not just clinical figures; they are avoidable tragedies.

The findings underscore that the battle against eclampsia must be fought not just in the ICU of a tertiary hospital, but at the community level. There is an urgent need to strengthen the peripheral healthcare system to ensure early registration of pregnancies and quality antenatal checks that include blood pressure monitoring and urine albumin analysis. The "referral chain" needs to be strengthened; identifying high-risk mothers early and initiating Magnesium Sulphate at the first point of contact (First Referral Units) before transport can significantly improve prognosis. Additionally, in order to guarantee that families in the Mithilanchal region are aware of the warning indications of preeclampsia and swiftly seek institutional care instead of using conventional home remedies, public health education is essential. The burden of this condition can only be decreased by a combination of aggressive tertiary management, prompt referral, and increased prenatal coverage.

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