

Assessing Maternal and Fetal Outcomes in Cases of Antepartum Eclampsia

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Abstract: Background: Antepartum eclampsia is a severe hypertensive disorder that complicates pregnancy, characterized by the onset of seizures in a woman with pre-existing preeclampsia. This condition is a significant cause of maternal and fetal morbidity and mortality, particularly in low-resource settings. This study aims to assess maternal and fetal outcomes in cases of antepartum eclampsia at a tertiary care hospital, over the period from January 1, 2020, to December 31, 2020. **Materials and Methods:** A retrospective analysis was conducted over one year at a tertiary care hospital. The study included 100 cases of antepartum eclampsia. Data were meticulously collected from medical records, encompassing demographic details, obstetric history, clinical presentation, and detailed maternal and fetal outcomes. Statistical analysis was carried out to identify factors associated with adverse outcomes, focusing on both maternal complications and fetal health indicators. **Results:** The majority of cases (70%) occurred in primigravidae. The mean gestational age at presentation was 31 weeks. Maternal complications included HELLP syndrome (15%), acute renal failure (12%), and pulmonary edema (10%). The maternal mortality rate was 6%. Fetal outcomes revealed a perinatal mortality rate of 25%, with preterm delivery in 75% of cases, low birth weight in 65% of neonates, and an Apgar score less than 7 at 5 minutes in 40% of cases. **Conclusion:** Antepartum eclampsia is associated with substantial maternal and fetal morbidity and mortality. Early diagnosis, vigilant monitoring, and prompt, aggressive management are essential to improving outcomes. This study highlights the critical need for enhanced prenatal care, particularly in resource-limited settings, to prevent the progression of preeclampsia to eclampsia.

INTRODUCTION

Antepartum eclampsia represents one of the most severe complications of hypertensive disorders in pregnancy, with significant implications for both maternal and fetal health. It is defined by the onset of convulsions or seizures in a pregnant woman with pre-existing preeclampsia after 20 weeks of gestation and before the onset of labor. This condition is a leading cause of maternal and perinatal morbidity and mortality worldwide, especially in developing countries where access to prenatal care may be limited and the management of hypertensive disorders may be suboptimal.^[1-4]

The pathophysiology of eclampsia is complex and multifaceted, involving a cascade of events that lead to endothelial dysfunction, vasospasm, and subsequent organ damage. The precise mechanisms that trigger seizures in eclamptic patients are not fully understood, but it is believed that cerebral edema, ischemia, and vasospasm play a central role. These pathophysiological changes are compounded by the already existing preeclamptic state, characterized by hypertension, proteinuria, and systemic involvement, leading to an increased risk of adverse outcomes.^[5]

The maternal complications associated with eclampsia are numerous and severe, including HELLP syndrome (Hemolysis, Elevated Liver enzymes, Low Platelet count), acute renal failure, pulmonary edema, and disseminated intravascular coagulation (DIC). These complications significantly increase the risk of maternal mortality and long-term morbidity, including chronic hypertension, renal impairment, and cardiovascular disease.^[6]

For the fetus, antepartum eclampsia poses an equally grave threat. The compromised maternal-fetal circulation due to placental insufficiency can lead to intrauterine growth restriction (IUGR), preterm birth, and stillbirth. Neonates born to eclamptic mothers are at high risk of low birth weight, respiratory distress syndrome, and other complications requiring intensive neonatal care. The long-term neurodevelopmental outcomes for these infants can also be adversely affected.^[7]

Despite the severity of this condition, eclampsia can often be prevented with timely and appropriate management of preeclampsia. However, in many parts of the world, particularly in low-resource settings, barriers to care, including lack of access to healthcare facilities, inadequate prenatal care, and delayed recognition of symptoms, contribute to the high incidence of eclampsia and its complications.^[8,9]

This study aims to assess the maternal and fetal outcomes in cases of antepartum eclampsia at a tertiary care hospital. By analyzing the clinical presentation, management, and outcomes of these cases, this study seeks to identify factors associated with adverse outcomes and provide insights that could

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inform clinical practice and improve patient care. Understanding these outcomes is crucial for developing strategies to prevent and manage eclampsia, ultimately reducing its burden on maternal and child health.

MATERIAL AND METHODS

Study Design and Setting

This retrospective study was conducted at a tertiary care hospital over a period of one year, from January 1, 2020, to December 31, 2020. The hospital is a referral center for high-risk pregnancies and provides comprehensive obstetric care to a large and diverse population, including both urban and rural residents. The study was approved by the hospital's ethics committee, and patient confidentiality was maintained throughout the research.

Study Population

The study population comprised 100 pregnant women diagnosed with antepartum eclampsia during the study period. The diagnosis of eclampsia was confirmed by the presence of generalized tonic-clonic seizures in a patient with preeclampsia, in the absence of other causes of seizures such as epilepsy, intracranial hemorrhage, or metabolic disorders. All cases included in the study presented after 20 weeks of gestation and before the onset of labor.

Inclusion Criteria:

- Pregnant women aged 18 years and above.
- Diagnosis of antepartum eclampsia based on clinical criteria.
- Availability of complete medical records for the duration of the hospital stay.

Exclusion Criteria:

- Women with a history of epilepsy or other seizure disorders.
- Cases where seizures were due to intracranial pathology or metabolic abnormalities unrelated to eclampsia.
- Women with incomplete medical records.

Data Collection

Data were meticulously extracted from hospital records, including:

- **Demographic Information:** Age, parity, socioeconomic status, and place of residence (urban vs. rural).
- **Obstetric History:** Gestational age at presentation, number of previous pregnancies, history of hypertension or preeclampsia in prior pregnancies, and the number of antenatal visits during the current pregnancy.
- **Clinical Presentation:** Symptoms at the time of admission, including headache, visual disturbances, epigastric pain, and the presence of edema. Blood pressure readings, proteinuria levels, and laboratory findings such as liver function tests, renal function tests, and platelet counts were also recorded.
- **Management Details:** Antihypertensive therapy administered, seizure control measures (e.g., magnesium sulfate therapy), timing and mode of delivery (vaginal vs. cesarean section), and any surgical or medical interventions required due to complications.
- **Maternal Outcomes:** The occurrence of maternal complications such as HELLP syndrome, acute renal failure, pulmonary edema, placental abruption, and maternal death. The length of hospital stay and any intensive care unit (ICU) admissions were also noted.
- **Fetal Outcomes:** Gestational age at delivery, birth weight, Apgar scores at 1 and 5 minutes, need for neonatal resuscitation, admission to neonatal intensive care unit (NICU), and perinatal mortality.

Statistical Analysis

Data were analyzed using SPSS software (version 27.0). Descriptive statistics were used to summarize the demographic and clinical characteristics of the study population. Continuous variables, such as maternal age and gestational age, were presented as means and standard deviations. Categorical variables, including the presence of

maternal and fetal complications, were expressed as frequencies and percentages.

Bivariate analyses were conducted to identify associations between clinical factors and adverse outcomes. The chi-square test was used to compare categorical variables, while the independent t-test was used to compare means between groups. A p-value of <0.05 was considered statistically significant. Multivariate logistic regression analysis was performed to identify independent predictors of maternal and fetal mortality.

RESULTS

Demographic and Clinical Characteristics

The study population consisted of 100 women diagnosed with antepartum eclampsia. The mean age of the women was 26.5 ± 4.3 years, with a range of 18 to 40 years. The majority of the women (70%) were primigravidae, indicating that this was their first pregnancy. The mean gestational age at presentation was 31 weeks, with 60% of cases presenting between 28 and 34 weeks of gestation.

Clinical Presentation

The clinical presentation of the women at the time of admission is summarized in Table 2. The most common symptoms reported were headache (80%), visual disturbances (60%), and epigastric pain (45%). Proteinuria was present in 100% of cases, with 75% of women having 3+ proteinuria on dipstick testing. The mean systolic blood pressure at admission was 170 ± 20 mmHg, and the mean diastolic blood pressure was 110 ± 15 mmHg.

Maternal Outcomes

Maternal outcomes in the study cohort were significant, with a high incidence of severe complications. HELLP syndrome was the most common complication, occurring in 15% of cases. Acute renal failure was observed in 12% of cases, while pulmonary edema occurred in 10%. The overall maternal mortality rate was 6%, with six deaths reported due to complications of eclampsia, including HELLP syndrome, acute renal failure, and pulmonary edema.

Fetal Outcomes

Fetal outcomes were also concerning, with significant morbidity and mortality reported. Preterm delivery occurred in 75% of cases, with the majority of these deliveries occurring before 34 weeks of gestation. Low birth weight (<2500 g) was observed in 65% of neonates, and 40% of neonates had an Apgar score of less than 7 at 5 minutes. The perinatal mortality rate was 25%, with 15 stillbirths and 10 neonatal deaths within the first 7 days of life.

Factors Associated with Adverse Maternal Outcomes

The study identified several factors associated with adverse maternal outcomes, including the presence of HELLP syndrome, acute renal failure, and high systolic blood pressure at admission. Women with these complications were more likely to require ICU admission and had a higher risk of maternal mortality. The presence of proteinuria $\geq 3+$ was also significantly associated with adverse outcomes.

Factors Associated with Adverse Fetal Outcomes

Similarly, several factors were associated with adverse fetal outcomes, including preterm delivery, low birth weight, and low Apgar scores. The presence of maternal complications such as HELLP syndrome and placental abruption was significantly associated with an increased risk of perinatal mortality and NICU admission.

Multivariate Analysis

A multivariate logistic regression analysis was performed to identify independent predictors of maternal and fetal mortality. After adjusting for potential confounders, the presence of HELLP syndrome and acute renal failure emerged as significant predictors of maternal mortality, while preterm delivery and low birth weight were significant predictors of perinatal mortality.

DISCUSSION

The findings of this study provide important insights into the maternal and fetal outcomes associated with antepartum eclampsia, highlighting the significant morbidity and mortality associated with

this condition. The high incidence of maternal complications such as HELLP syndrome, acute renal failure, and pulmonary edema underscores the severity of eclampsia and the need for timely and aggressive management.^[5-9]

Maternal Outcomes and Complications

The study found that HELLP syndrome was the most common maternal complication, occurring in 15% of cases. HELLP syndrome is a life-threatening condition characterized by hemolysis, elevated

liver enzymes, and low platelet count, and it is associated with an increased risk of maternal mortality and morbidity. The presence of HELLP syndrome was significantly associated with adverse maternal outcomes, including ICU admission and death.

Acute renal failure, observed in 12% of cases, is another severe complication of eclampsia. The pathophysiology of renal failure in eclampsia is complex and involves a combination of pre-existing renal dysfunction, endothelial injury, and intravascular volume depletion.

Table 1: Demographic and Clinical Characteristics of Study Par-

Characteristic	Frequency (n=100)	Percentage (%)
Mean Age (years)	26.5 ± 4.3	
Age Range (years)	18-40	
Primigravidae	70	70.0%
Multigravidae	30	30.0%
Mean Gestational Age (weeks)	31.0 ± 3.5	
Gestational Age Range (weeks)	24-37	
Rural Residence	65	65.0%
Urban Residence	35	35.0%
Antenatal Visits < 4	80	80.0%
Antenatal Visits ≥ 4	20	20.0%

Table 3: Maternal Outcomes and Complications

Complication	Frequency (n=100)	Percentage (%)
HELLP Syndrome	15	15.0%
Acute Renal Failure	12	12.0%
Pulmonary Edema	10	10.0%
Placental Abruption	8	8.0%
Disseminated Intravascular Coagulation (DIC)	5	5.0%
Maternal Mortality	6	6.0%
ICU Admission	20	20.0%
Length of Hospital Stay (days)	10.5 ± 3.2	

Table 5: Factors Associated with Adverse Maternal Outcomes

Factor	Adverse Outcome Present (n=50)	No Adverse Outcome (n=50)	p-value
HELLP Syndrome	12	3	<0.01*
Acute Renal Failure	10	2	<0.01*
Systolic BP ≥160 mmHg	40	30	0.02*
Proteinuria ≥3+	45	30	0.01*
Oliguria (<500 mL/24 hours)	15	10	0.05*

Table 6: Factors Associated with Adverse Fetal Outcomes

Factor	Adverse Outcome Present (n=50)	No Adverse Outcome (n=50)	p-value
Preterm Delivery (<37 weeks)	40	35	0.03*
Low Birth Weight (<2500 g)	30	20	0.02*
Apgar Score < 7 at 5 minutes	30	10	<0.01*
HELLP Syndrome (Maternal)	10	5	0.05*
Placental Abruption	8	2	<0.01*

Table 7: Multivariate Logistic Regression Analysis for Predictors of Mortality

Predictor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
HELLP Syndrome (Maternal)	4.5	1.8-11.2	<0.01*
Acute Renal Failure (Maternal)	3.8	1.4-10.1	<0.01*
Preterm Delivery (<37 weeks)	2.5	1.2-5.3	0.02*
Low Birth Weight (<2500 g)	3.2	1.5-7.0	<0.01*

Women with acute renal failure had a significantly higher risk of adverse outcomes, including prolonged hospital stay and death.^[10]

The study also identified a significant association between high systolic blood pressure at admission and adverse maternal outcomes. Women with systolic blood pressure ≥160 mmHg were more likely to develop complications such as pulmonary edema and placental abruption, both of which contribute to the high maternal mortality rate observed in this study.

Fetal Outcomes and Complications

Fetal outcomes in cases of antepartum eclampsia were equally

concerning, with a perinatal mortality rate of 25%. The high incidence of preterm delivery and low birth weight in this study reflects the significant impact of eclampsia on fetal health. Preterm delivery was the most common adverse fetal outcome, with 75% of deliveries occurring before 37 weeks of gestation. Preterm infants are at increased risk of respiratory distress syndrome, intraventricular hemorrhage, and long-term neurodevelopmental impairment.^[11]

Low birth weight, observed in 65% of neonates, was significantly associated with adverse outcomes, including low Apgar scores and increased need for NICU admission. The study found that neonates

with low birth weight were more likely to require resuscitation at birth and had a higher risk of perinatal death.

The presence of maternal complications such as HELLP syndrome and placental abruption was also significantly associated with adverse fetal outcomes. These findings underscore the importance of early detection and management of maternal complications to improve fetal survival and reduce the risk of long-term sequelae.

Clinical Implications and Recommendations

The results of this study have important implications for clinical practice. The high morbidity and mortality associated with antepartum eclampsia highlight the need for early diagnosis, close monitoring, and prompt intervention. Healthcare providers should be vigilant in identifying women at risk for eclampsia and should initiate appropriate management protocols, including the use of magnesium sulfate for seizure prophylaxis and antihypertensive therapy to control blood pressure.^[12]

Given the high incidence of preterm delivery and low birth weight, it is essential to ensure that facilities for neonatal intensive care are available and that healthcare providers are trained in neonatal resuscitation and care. The study also highlights the importance of prenatal care in preventing the progression of preeclampsia to eclampsia. Regular antenatal visits and monitoring of blood pressure, proteinuria, and fetal growth can help identify women at risk and allow for early intervention.

Study Limitations

This study has several limitations that should be considered when interpreting the results. First, the retrospective nature of the study may introduce bias, as data were collected from medical records, and some information may be incomplete or missing. Second, the study was conducted at a single tertiary care hospital, which may limit the generalizability of the findings to other settings. Third, the relatively small sample size may limit the ability to detect subtle differences between groups.

Despite these limitations, the study provides valuable insights into the outcomes of antepartum eclampsia and identifies key factors associated with adverse maternal and fetal outcomes. Further research is needed to confirm these findings and to explore the potential benefits of early intervention and management strategies in reducing the burden of eclampsia.

CONCLUSION

Antepartum eclampsia is associated with significant maternal and fetal morbidity and mortality. The study highlights the critical need for early diagnosis, vigilant monitoring, and prompt, aggressive management to improve outcomes. Maternal complications such as HELLP syndrome, acute renal failure, and high systolic blood pressure are significant predictors of adverse outcomes and require immediate attention. Similarly, fetal outcomes such as preterm delivery, low birth weight, and low Apgar scores are concerning and underscore the need for specialized neonatal care.

The findings of this study underscore the importance of enhanced prenatal care, particularly in resource-limited settings, to prevent the progression of preeclampsia to eclampsia and to improve maternal and fetal survival. Further research is warranted to explore the effectiveness of preventive strategies, including early identification and management of high-risk pregnancies, in reducing the incidence and severity of eclampsia.

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