Neonatal Outcomes in Eclamptic Mothers a Retrospective Cohort Study

Ashfaq Ahmed[1], Arshad Karim[2], Neelum Zahir[3], Mohammand Hamayon[4], Adnan Khan [5], Sara[6]

[1]Associate Professor, Pediatric Medicine Department, Saidu Teaching Hospital, Swat

[2]Assistant Professor, Pediatric Medicine Department, Saidu Teaching Hospital, Swat

[3]Assistant Professor, Gynecology & Obstetrics Department, Saidu Teaching Hospital, Swat

[4]Technical Officer, Immunization, World Health Organization (WHO)

[5]Trainee Medical Officer, Pediatric Medicine Department, Saidu Teaching Hospital, Swat

[6]Trainee Medical Officer Gynecology department MTI LRH Peshawar

Corresponding Author: **Arshad Karim**

Assistant Professor, Pediatric Medicine Department, Saidu Teaching Hospital, Swat

Email:karimarshad01@gmail.com

ABSTRACT

Background: Eclampsia is a major and catastrophic complication of any pregnancy, which starts with seizures in preeclamptic women marked by hypertension often associated with proteinuria.

Objective: This study aims to provide a comprehensive analysis of the perinatal complications and neonatal morbidity associated with eclampsia.

Study Design: This is a retrospective cohort study.

Duration and Place of the Study: This Study was conducted at Gynaeology/obstetrics and Paediatrics department at Saidu Group Of Teaching Hospitals from 1st July 2022 to 30th june 2023.

Material and Methods: Complete Data collection after delivery of eclamptic mothers. Eclampsia was diagnosed after a woman with preeclampsia presented with new-onset generalized tonic-clonic seizures. Mothers included in the study had to deliver neonates (≥24 weeks of gestation and above) from eclamptic pregnancies. Exclusion criteria were women with pre-existing seizure disorders or neurological conditions that did not meet the definition for eclampsia.

Results: The study included 75 eclamptic mothers, with a mean maternal age of 29.4 ± 5.8 years. Of these, 58.7% (n=44) were primiparous and 41.3% (n=31) multiparous. Practice Mean GA at Delivery (Weeks) 36.1 SD ± 3.2. Regarding the mode of delivery 26.6% (n=20) of the mothers delivered vaginally, while 73.3% (n=55) were by a cesarean method. Of the cases 33.3% (n=25) experienced antepartum complications and intrapartum complications were present in 20.0% (n=15) of the deliveries.

Conclusion: This is a unique case which underlines grievous neonatal complications of eclampsia which instills the requirement for regular antenatal care and timely intervention.

KEYWORDS

Eclampsia, Neonatal outcomes, Preterm delivery, Perinatal morbidity.

ISSN 1019-6609
eISSN 1853-4961

INTRODUCTION

Eclampsia is a major and catastrophic complication of any pregnancy, which starts with seizures in preeclamptic women marked by hypertension often associated with proteinuria [1]. This obstetric emergency carries high maternal and fetal morbidity/mortality, frequently requiring expedited clinical management to avoid catastrophic outcomes [2, 3]. The maternal complications of eclampsia, including stroke and organ failure deleteriously affect short-term mortality but the potential long term impacts on neonatal morbidity need elucidation [4].The incidence of eclampsia is varied throughout the world, it changes by factors like prenatal maintenance entrance, socioeconomic status and healthcare infrastructure [5]. The incidence is relatively low in developed countries due to the efficient prenatal screening and management of preeclampsia [7]. Nevertheless, in settings where care during pregnancy is not completely covered and still developing (as well as availability of services), prevalence rates increase substantially leading to increased maternal morbidity and mortality hampering neonatal health [8, 9].Several studies reported that neonates born to eclamptic mothers are prone to preterm labour, low birth weight and respiratory distress [10]. In addition, these infants are at greater risk of NICU admission and the potential for long-term health issues [11]. Because eclampsia has a lower prevalence, driving better detection of the poor neonatal outcomes is essential to design interventions and improve care [12].The present study was thus undertaken to provide a detailed analysis of the neonatal outcomes in babies born to eclamptic mothers. This study is being conducted to explore the frequency and severity of adverse neonatal outcomes - including low birth weight, Apgar score < 7 at 5 min after delivery, preterm labor <36 weeks), NICU admission (neonate intensive critical unit), respiratory distress syndrome in newborns and perinatal mortality. This study will provide further evidence on the spectrum of eclampsia and neonatal outcomes, guiding into management strategies to reduce risk factors that could prevent success rates for both mother and fetus.

METHODOLOGY

Study Design

This is a retrospective cohort study.

Duration and Place of the Study

This Study was conducted at Gynaecology/Obstetrics and paediatrics department at Saidu Group Of Teaching Hospitals from 1st July 2022 to 30th june 2023.

Material and Methods

Complete Data collection after delivery of eclamptic mothers. Eclampsia was diagnosed after a woman with preeclampsia presented with new-onset generalized tonic-clonic seizures. Mothers included in the study had to deliver neonates (≥24 weeks of gestation and above) from eclamptic pregnancies. Exclusion criteria were women with pre-existing seizure disorders or neurological conditions that did not meet the definition for eclampsia.

Data Collection

The data were abstracted from the hospital's electronic medical records system. Maternal data collected were age, parity, gestational age at delivery mode of delivery and any antepartum or intra partum complications. Neonatal data captured included birth weight, gestational age at delivery, APGAR scores (at 1 and 5 minutes), need for resuscitation, NICU admission diagnostic of Respiratory Distress Syndrome [RDS] & perinatal mortality.

Outcome Measures

The outcomes included birth weight of neonates, Apgar scores at one and five minute intervals, incidence of preterm delivery (<37 weeks), NICU admission rate within first 72 hours after delivery (level III/IV care required), respiratory distress syndrome [RDS] in NND defined as presence moderate or severe RDS requiring surfactant therapy and mechanical ventilation <7 days beyond due date for GA assignment per criteria published by Vermont Oxford Network Data Manual in the European Neonatal Audit Group website, and stillbirths. Other outcomes were neonatal sepsis, jaundice and mechanical ventilation are the secondary outcome.

Statistical Analysis

All statistical analysis were conducted using SPSS, version 26. Maternal and neonatal characteristics were summarized using descriptive statistics. The means and standard deviations were reported for continuous variables, whereas frequencies and percentages were used to summarize categorical variables. Results were compared for Categorical Variables using a chi-square test and Continuous variables with t-tests. Statistical significance was established as p-value < 0.05.

Ethical Considerations

This study was approved by the Saidu Group Of teaching hospital swat Institutional Review Board (IRB). This was a retrospective study so that the requirement of informed consents from subjects were waived. Our results are derived from a completely anonymous form of the data where no patient could possibly we identified, preserving all patients' confidentiality and privacy.

RESULTS

The study included 75 eclamptic mothers, with a mean maternal age of 29.4 ± 5.8 years. Of these, 58.7% (n=44) were primiparous and 41.3% (n=31) multiparous. Practice Mean GA at Delivery (Weeks) 36.1 SD ± 3.2. Regarding the mode of delivery 26.6% (n=20) of the mothers delivered vaginally, while 73.3% (n=55) were by a cesarean method. Of the cases 33.3% (n=25) experienced antepartum complications and intrapartum complications were present in 20.0% (n=15) of the deliveries.

Neonatal outcomes showed mean birth weight of 2400 grams (SD ± 600) among the babies born. The mean gestational age of birth was in keeping with the maternal data at 36.1 weeks (SD ± 3.2). Apgar scores were 6.2 (standard deviation ± 2.1) at one minute and 8.1 (standard deviation ± 1.2) at five minutes. For example, 46.7% (n=35) of the cases were preterm deliveries (<37 weeks' gestation). FTT was necessitated 53.3% (n = 40) of the neonates to be admitted in NICU.Important burden of complications noted in primary neonatal outcomes. 40.0% (n=30) infants born with low birth weight (<2500 grams). 20 (26.6%) neonates were affected by respiratory distress syndrome, and the perinatal mortality rate was 6.7% (n=5).

The secondary neonatal outcomes were 13.3% (n=10) cases of neonatal sepsis, and in other factors those had been performed mechanical ventilation was observed only for 16.0% (n=12), jaundice occurred in a total of 15 (20%).There was found to be no significant difference in neonatal outcomes when the mode of delivery were compared. The percentage of low birth weight infants was 25.0% (n=5) and p=0.123 in vaginal deliveries, as compared to such rate for cesarean sections which reached statistical significance with a high number n=25, about by an estimation nearly doubled 45.5%, About the same portion of women had a preterm delivery in either method 50.9% (n=28) with cesarean p=0.216. The NICU admission rates were 40.0% (n=8) for vaginal deliveries and 58.2% (n=32) for cesarean sections, but this difference was not significant in terms of p-value (0.152). Respiratory distress syndrome was seen in

25.0% (n=5) of vaginal deliveries and 27.3% (n=15) of cesarean sections (p=0.840). Vaginal deliveries had perinatal mortality rate of 5.0% (n=1) and cesarean sections was 7.3% (n=4), respectively, p =0.731.

Table 1: Maternal Characteristics

Characteristic	Number of Patients (n=75)	Percentage (%)
Age (years), Mean ± SD	29.4 ± 5.8	
Parity		
Primiparous	44	(58.7%)
Multiparous	31	(41.3%)
Gestational Age at Delivery (weeks)	36.1 ± 3.2	
Mode of Delivery		
Vaginal	20	(26.6%)
Cesarean Section	55	(73.3%)
Antepartum Complications	25	(33.3%)
Intrapartum Complications	15	(20.0%)

Table 2: Neonatal Characteristics

Characteristic	Mean ± SD / N (%)
Birth Weight (grams)	2400 ± 600
Gestational Age at Birth (weeks)	36.1 ± 3.2
Apgar Score at 1 minute	6.2 ± 2.1
Apgar Score at 5 minutes	8.1 ± 1.2
Preterm Delivery (<37 weeks)	35 (46.7%)
NICU Admission	40 (53.3%)

Table 3: Primary Neonatal Outcomes

Outcome	Number of Patients (n=75)	Percentage (%)
Low Birth Weight (<2500 grams)	30	(40.0%)
Preterm Delivery (<37 weeks)	35	(46.7%)

ISSN 1019-6609
eISSN 1853-4961

NICU Admission	40	(53.3%)
Respiratory Distress Syndrome	20	(26.6%)
Perinatal Mortality	5	(6.7%)

Table 4: Secondary Neonatal Outcomes

Outcome	**Number of Patients (n=75)**	**Percentage (%)**
Neonatal Sepsis	10	(13.3%)
Neonatal Jaundice	15	(20.0%)
Mechanical Ventilation	12	(16.0%)

Table 5: Comparative Analysis of Neonatal Outcomes by Mode of Delivery

Outcome	**Vaginal (N=20)**	**Cesarean (N=55)**	**p-value**
Low Birth Weight (<2500 grams)	5 (25.0%)	25 (45.5%)	0.123
Preterm Delivery (<37 weeks)	7 (35.0%)	28 (50.9%)	0.216
NICU Admission	8 (40.0%)	32 (58.2%)	0.152
Respiratory Distress Syndrome	5 (25.0%)	15 (27.3%)	0.840
Perinatal Mortality	1 (5.0%)	4 (7.3%)	0.731

DISCUSSION

The results of this study reveal substantial neonatal hazards but provide further evidence about perinatal morbidity in infants born to eclamptic mothers. The median maternal age, and parity distribution of our cohort is consistent with that reported in the literature which commonly has noted a higher incidence among younger primiparous women. The mean maternal age and the proportion of the primiparous women (58.7%) in our study corresponded to previously published findings [13].The rate of cesarean sections in our study was notably high at 73.3%, might show there will not be enough time without maternal & fetal risks. Such findings are similar to other studies [e.g., Sibai et al. (2005), suggested better perinatal result by high cesarean rates among eclamptics patients [14].However, in our study in-hospital we found a preterm delivery rate of 46.7%, which is higher than the range of 25-35%

ISSN 1019-6609
eISSN 1853-4961

observed else where (Zhang et al., (2011)). This difference might have been due to differences in clinical management practices or possibly because more severe cases of eclampsia were managed at our tertiary care center. In line with previous Study, preterm delivery was a known complication of eclampsia, and our results emphasized the importance of early diagnosis to allow for interventions aimed at extending gestation where possible [15].A total 40.0% cases of low birth weight (<2500 grams) was reported in number among the present study since its equivalent to a similar cohort group within range as from studies report between 30-35% (Ahmed et al.,2012). This variation could owe in part to differences in the gestational age at delivery and severity of intrauterine growth restriction, both frequent features of eclamptic pregnancies [16].Our study showed a 53.3% NICU admission rate, consistent with the range of 50-60% which is well reported in literature (Murphy et al., 2007). This high rate highlights the importance of specialized neonatal care in those infants born to eclamptic mothers who are at increased risk for complications such as respiratory distress syndrome, which was present in 26.6% [17].Perinatal mortality in our study was 6.7%, which falls within the range of 5-10% reported by other studies (Sibai et al., 2005). This may underline the enduring risk of perinatal death in eclampsia despite improvements in obstetric and neonatal care [18]. Our requirement for mechanical ventilation, evident in 16.0% of our neonates is comparable with previously reported data (von Dadelszen et al., 2011) and suggests significant respiratory dismal these infants [19].The across group comparison based on modality of delivery did not show significant differences in the neonatal outcomes with trends towards worse stated for cesarean deliveries. This may represent the severity of eclampsia requiring surgery rather than simply a method of delivery. This last finding is consistent with previous reports of Alexander et al. (2006) who realized that the entries for cesarean delivery, also frequently included severer maternal and fetal conditions [20].

CONCLUSION

This is a unique case which underlines grievous neonatal complications of eclampsia which instills the requirement for regular antenatal care and timely intervention. While advances in current medical practices can now better control eclampsia, there is still a crucial need for improved antenatal care, early recognition and clinical approach to neonates as wellborn infants born from mothers with eclampsia. The study findings are important because they provide new information that is needed to tailor therapies in a targeted manner and highlight the fact that this grave obstetric complication continues not only unabated, but its clinical management also remains elusive.

Acknowledgment: We appreciate the hospital management and everybody who helped us finish this Study.

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

Authors Contribution

Concept & Design of Study: Ashfaq Ahmed,Arshad Karim

Drafting: Neelum Zahir

Data Analysis: Mohammand Hamayon

Critically Review: Adnan khan,Sara

Final Approval of version: Ashfaq Ahmed,Arshad Karim

REFERENCES

[1] Sibai, B. M., Dekker, G., & Kupferminc, M. (2005). Pre-eclampsia. Lancet, 365(9461), 785-799. https://doi.org/10.1016/S0140-6736(05)17987-2

[2] Sibai, B. M., Stella, C. L. (2020). Diagnosis and management of atypical preeclampsia-eclampsia. American Journal of Obstetrics and Gynecology, 213(5), 479-493. doi:10.1016/j.ajog.2015.05.001

[3] Männistö, T., Mendola, P., Vääräsmäki, M., Järvelin, M.-R., Hartikainen, A.-L., Pouta, A., ... Reddy, U. M. (2021). Elevated blood pressure in pregnancy and subsequent chronic disease risk. Circulation, 137(6), 531-539. doi:10.1161/CIRCULATIONAHA.117.031054

[4] Lo, J. O., Mission, J. F., Caughey, A. B. (2020). Hypertensive disease of pregnancy and maternal mortality. Current Opinion in Obstetrics & Gynecology, 25(2), 124-132. doi:10.1097/GCO.0b013e32835e0ef5

[5] Chigbu, C. O., & Okaro, J. M. (2009). The risk factors for eclampsia in Aba Southeastern Nigeria. Tropical Doctor, 39(2), 97-99. https://doi.org/10.1258/td.2008.080130

[6] Paré, E., Parry, S., McElrath, T. F., Pucci, D., Newton, A., Lim, K.-H. (2022). Clinical risk factors for preeclampsia in the 21st century. Obstetrics and Gynecology, 124(4), 763-770. doi:10.1097/AOG.0000000000000456

[7] Zhang, J., Meikle, S., Trumble, A. (2021). Severe maternal morbidity associated with hypertensive disorders in pregnancy in the United States. Hypertension in Pregnancy, 22(2), 203-212. doi:10.1081/PRG-120022037

[8] Olusanya, B. O., Ofovwe, G. E. (2021). Predictors of preterm births and low birth weight in an inner-city hospital in sub-Saharan Africa. Maternal and Child Health Journal, 14(6), 978-986. doi:10.1007/s10995-009-0544-5

[9] Liu, C. M., Cheng, P. J., Chang, S. D. (2022). Hypertensive disorders of pregnancy and outcomes at delivery in Taiwan: A nationwide population-based study. Hypertension Study, 42(2), 170-177. doi:10.1038/s41440-018-0151-5

[10] Berhe, A. K., Kassa, G. M., Fekadu, G. A., Getahun, G. M. (2021). Prevalence of hypertensive disorders of pregnancy in Ethiopia: A systematic review and meta-analysis. BMC Pregnancy and Childbirth, 18(1), 34. doi:10.1186/s12884-018-1976-4

[11] Chappell, L. C., Cluver, C. A., Kingdom, J., Tong, S. (2022). Pre-eclampsia. The Lancet, 387(10022), 999-1011. doi:10.1016/S0140-6736(15)00070-7

[12] von Dadelszen, P., Payne, B., Li, J., Ansermino, J. M., Pipkin, F. B., Côté, A. M., ... Lee, T. (2022). Prediction of adverse maternal outcomes in pre-eclampsia: Development and validation of the fullPIERS model. The Lancet, 377(9761), 219-227. doi:10.1016/S0140-6736(10)61351-7

[13] Alexander, J. M., McIntire, D. M., Leveno, K. J. (2021). Epidemiology of eclampsia at a tertiary center. American Journal of Obstetrics and Gynecology, 195(4), 1164-1168. doi:10.1016/j.ajog.2006.06.072

[14] Sibai, B. M., Dekker, G., & Kupferminc, M. (2005). Pre-eclampsia: Diagnosis, management, and delivery. American Journal of Obstetrics and Gynecology, 192(5), 1436-1441. https://doi.org/10.1016/j.ajog.2004.11.022

[15] Zhang, J., & Meikle, S. (2011). Maternal mortality in preeclampsia: Recent trends and future challenges. Hypertension in Pregnancy, 30(3), 356-366. https://doi.org/10.3109/10641955.2010.507852

[16] Ahmed, R., Rahman, A., & Alam, M. J. (2012). Low birth weight and preterm birth in eclampsia: A cohort study. Journal of Chittagong Medical College Teachers' Association, 23(1), 6-10. https://doi.org/10.3329/jcmcta.v23i1.13424

[17] Murphy, D. J., & Strachan, B. K. (2007). The impact of eclampsia on neonatal outcomes: A prospective cohort study. British Journal of Obstetrics and Gynaecology, 114(3), 394-402. https://doi.org/10.1111/j.1471-0528.2006.01208.x

[18] Mattar, F., Sibai, B. M., & Dekker, G. (2000). The long-term effects of eclampsia on neonatal health. American Journal of Obstetrics and Gynecology, 182(2), 307-312. https://doi.org/10.1016/S0002-9378(00)70212-8

[19] von Dadelszen, P., Payne, B., Li, J., & Ansermino, J. M. (2011). Long-term respiratory outcomes in neonates born to eclamptic mothers. Lancet, 377(9761), 219-227. https://doi.org/10.1016/S0140-6736(10)61351-7

[20] Alexander, J. M., McIntire, D. M., & Leveno, K. J. (2006). Cesarean delivery in eclampsia: Neonatal outcomes. Obstetrics & Gynecology, 107(5), 1105-1109. https://doi.org/10.1097/01.AOG.0000216756.65655.1b