Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

Original Research Article

A Study of Maternal and Perinatal Outcomes in Pregnancy Complicated by HELLP Syndrome

Dr. Gupteswar Mishra[1], Dr. Sankarsan Das[2], Dr. Sujit Kumar Mohanty[3], Dr. Nagendra Kumar Rajsamant[4]

[1]Assistant Professor, Department of Obstetrics and Gynecology, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India.

[2]Assistant Professor, Department of General Medicine, Shree Jagannath Medical College & Hospital, Puri, Odisha, India.

[3]Assistant Professor, Department of General Surgery, S.C.B. Medical College & Hospital, Cuttack, Odisha, India.

[4]Assistant Professor, Department of General Surgery, S.C.B. Medical College & Hospital, Cuttack, Odisha, India.

Corresponding Author

Dr. Nagendra Kumar Rajsamant, Assistant Professor, Department of General Surgery, S.C.B. Medical College, Cuttack, Odisha, India.

Received: 20 August, 2023 Accepted: 18 November, 2023

ABSTRACT

Background

Pregnancy can result in a serious complication known as HELLP which comprises of haemolysis, elevated levels of liver enzymes, and low platelet count. The aetiology of HELLP syndrome is still unknown. HELLP syndrome affects 6–12% of women with preeclampsia or eclampsia, making up to around 0.5% of all pregnancies . Compared to preeclampsia, HELLP syndrome is considered a high-risk condition for both the mother and neonate and its occurrence is associated with increased maternal and perinatal morbidity and mortality.

Objective

The objective of this study was to investigate the incidence of HELLP syndrome in cases of pre-eclampsia and eclampsia and document its associated maternal and perinatal. complications.

Materials and methods

This is a retrospective study that utilizes data collected from 55 patients diagnosed with HELLP syndrome at the Department of Obstetrics and Gynecology, Hi-tech medical college & hospital, Bhubaneswar between January 2020 and December 2022. The study included women who were diagnosed with severe preeclampsia or eclampsia and were beyond 28 weeks of pregnancy with abnormal laboratory results. Outcomes were presented as either mean (SD) or median (IQR) for continuous variables and as proportion for categorical variables. A p-value of <0.05 was considered statistically significant.

Results

Out of 2175 deliveries, 272 (12.5%) were complicated by pre-eclampsia (194 cases) and eclampsia (78 cases). Of these cases, 55 (20.2%) were diagnosed with HELLP syndrome.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

Majority of the subjects were aged 25 to 35 years (54.5%) followed by 18-25 years (34.5%). Around 40% of the subjects with HELLP reported “any” maternal complication. Among these, the most common were disseminated intravascular coagulation (DIC) (31.8%) followed by abruptio placentae (27.3%) and post-partum haemorrhage (22.7%). A total of 44 (80.0%) neonates were born preterm (<37 weeks of gestation). A total of 40% of the neonates were born with birth weight of 1500 to 2500 g. The perinatal death was observed in 10 (18.2%) with 4 stillbirths and 6 first-week deaths.

Conclusions

HELLP Syndrome is a complication of pre-eclampsia and eclampsia with potentially adverse maternal and neonatal/perinatal outcomes. Early diagnosis and prompt intervention are crucial to prevent further progression of the underlying pathophysiology and potential complications.

Keywords: Jaundice, jaundice in pregnancy, low platelet count, elevated liver enzyme, hemolysis, eclampsia, pre-eclampsia, DIC.

INTRODUCTION

Pregnancy can result in a serious complication known as HELLP which comprises of haemolysis, elevated levels of liver enzymes, and low platelet count [1]. The aetiology of HELLP syndrome is still unknown. HELLP syndrome affects 6–12% of women with preeclampsia or eclampsia, making up to around 0.5% of all pregnancies [2,3]. Compared to preeclampsia, HELLP syndrome is considered a high-risk condition for both the mother and neonate and its occurrence is associated with increased maternal and perinatal morbidity and mortality [4,5]. Maternal mortality is often a result of complications such as pulmonary edema, renal failure, disseminated intravascular coagulation, and subcapsular liver hematoma [5]. Perinatal mortality is primarily related to the gestational age at the time of delivery [4,5]. While the abnormal laboratory parameters make it easy to diagnose the HELLP syndrome in patients with severe pre-eclamptic toxaemia or eclampsia, some patients may exhibit minimal or no signs of pre-eclampsia despite having the syndrome [6,7]. Early diagnosis, identification of complications, and timely intervention are crucial strategies for managing HELLP syndrome.

In approximately 70% of cases, HELLP syndrome develops before delivery, with the highest frequency occurring between the 27th and 37th gestational weeks [8]. In the postpartum period, HELLP syndrome typically develops within the first 48 hours after delivery [9]. Due to our hospital being a large tertiary care hospital, we have the infrastructure and necessary medical care facilities to provide quality treatment to patients with preeclampsia, eclampsia. We conducted this study to determine the incidence of HELLP syndrome and its effects on maternal and foetal outcomes. This study utilizes data collected from 110 patients diagnosed with HELLP syndrome at the Department of Obstetrics and Gynecology, Hi-tech medical college & hospital, Bhubaneswar between January 2020 and December 2022.

MATERIALS AND METHODS

During a three-year period from January 2020 to December 2022, a retrospective analysis was conducted on all deliveries that took place at the Department of Obstetrics and Gynecology, Hi-tech medical college & hospital, Bhubaneswar. The hospital's computerized records were used to identify patients with pregnancy-induced hypertension.

Inclusion criteria

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

- Women who have been diagnosed with severe preeclampsia or eclampsia and are beyond 28 weeks of pregnancy with abnormal laboratory results.

Exclusion criteria

- Women who are less than 28 weeks pregnant.
- Women who have hypertension due to causes other than pre-eclampsia and eclampsia.
- Women who have other medical conditions such as viral hepatitis, gastroenteritis, cholecystitis, and pancreatitis.

At the time of admission, patients underwent blood tests. The criteria used to diagnose HELLP syndrome in these patients were based on specific laboratory results, including lactate dehydrogenase levels equal to or greater than 600 IU/l, plasma aspartate and/or alanine aminotransferase levels equal to or greater than 70 IU/l, and a platelet count of less than or equal to $10^5/mm^3$ [1,10]. Haemolysis was confirmed by examination of the peripheral blood smear and an increase in total bilirubin. In addition to the above-mentioned laboratory tests, the patients also underwent evaluations of their coagulation profile, liver function tests, and renal function tests. The Department's protocol for the routine management of pre-eclampsia was implemented, which involved administering intravenous MgSO4, hydralazine, and labetalol to stabilize the patient's condition and blood pressure (BP) before induction of labor or lower segment caesarean section (LSCS) [11]. Patients with a gestational age of <34 weeks received dexamethasone 6 mg intramuscularly every 12 hourly (maximum of 4 doses).

After the patient was stabilized, a per vaginal examination was conducted to assess the Bishop's score. The mode of termination was determined based on the gestational period, cervix favourability, and the urgency for termination. Caesarean section was performed if there were obstetric indications or if the patient's condition worsened. All women and new-borns were monitored for one week during the postpartum period or until discharge from the hospital. The occurrence of major maternal complications and associated morbidity was monitored and analysed.

Outcomes and statistical analysis

The study aimed to analyse the medical records of patients with HELLP syndrome to determine factors such as age, parity, gestational age, and associated medical and obstetric complications, as well as to evaluate maternal and foetal outcomes. All analysis was done using STATA v.15.0 (TX, USA). Relevant characteristics and outcomes were presented as either mean (SD) or median (IQR) for continuous variables and as proportion for categorical variables. A p-value of <0.05 was considered statistically significant.

RESULTS

Out of 2175 deliveries, 272 (12.5%) were complicated by pre-eclampsia (194 cases) and eclampsia (78 cases). Of these cases, 55 (20.2%) were diagnosed with HELLP syndrome. The characteristics of these 55 subjects have been presented in Table I. Majority of the subjects were aged 25 to 35 years (54.5%) followed by 18-25 years (34.5%). The remaining 11% were older than 35 years. A total of 60% were primigravidae. The mean (SD) systolic and diastolic blood pressure (in mm Hg) of the included subjects were 171.3 (10.5) and 114 (11.7) respectively. Clinically evident oedema and proteinuria were present in around 57% and 46% subjects respectively. The gestational age at which the diagnosis of HELLP was made differed among the subjects. Majority were diagnosed at more than 36 weeks (49.0%). Around 31% were diagnosed between 33 to 36 weeks of gestation and the remaining 20% diagnosed between 28 to 32 weeks gestation. The assessment of biochemical and laboratory

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

parameters indicated that around 65% of subjects have serum bilirubin of more than 2mg/dl. Those with serum uric acid of >7mg/dl and serum creatinine >1.2mg/dl was 64% and 53% respectively (Table I).

Table I: Characteristics of the 55 patients diagnosed with HELLP syndrome.

Characteristics	N (%)
Age categories (years)	
18-25	19 (34.5)
25-35	30 (54.5)
>35	6 (11%)
Primigravidae	33 (60.0%)
Mean± SD systolic blood pressure (mm Hg)	171.3 ± 10.5
Mean± SD diastolic blood pressure (mm Hg)	114 ± 11.7
Clinical evident oedema present	31 (56.4)
Proteinuria present	25 (45.5)
Gestational age at diagnosis (weeks)	
28-32 weeks	11 (20.0)
33-36 weeks	17 (31.0)
>36 weeks	27 (49.0)
Biochemical and laboratory characteristics	
Sr. bilirubin >2mg/dl	36 (65.5)
Sr. uric acid >7mg/dl	35 (63.6)
Sr. creatinine >1.2mg/dl	29 (52.7)

Values are n (%) unless specified otherwise

Maternal complications

Around 40% of the subjects with HELLP reported "any" maternal complication (Table II). Among these, the most common were disseminated intravascular coagulation (DIC) (31.8%; n=7) followed by abruptio placentae (27.3%; n=6) and post-partum haemorrhage (22.7%; n=5). Shock was reported in around 18% (n=4) whereas acute renal failure and pleural effusion was reported in 3 subjects each (13.6%) (Table II). There were no maternal deaths, and haemodialysis successfully reversed acute renal failure.

Perinatal outcomes

Table III presents the perinatal outcomes for the neonates delivered during the 55 pregnancies. On average, the babies were born at 31.5+3.7 weeks gestational age (range 27-39 weeks) with a mean birth weight of 1909+822 g (range 890-3700 g). Majority of the deliveries were under 32 weeks of gestation (41.8%) followed by 32-36 weeks of gestation (38.2%). Intra-uterine growth retardation was noted in around 27% (n=15) of the births. A total of 44 (80.0%) neonates were born preterm (<37 weeks of gestation). A total of 40% of the neonates were born with birth weight of 1500 to 2500 g and nearly one-third were under 1500 g at the time of birth (Table III).

Table II: Distribution of maternal complications in those with HELLP syndrome

Complications	N (%)
"Any" complications	22 (40.0)
Abruptio placentae	6 (27.3)
Disseminated intravascular coagulation	7 (31.8)
Postpartum haemorrhage	5 (22.7)
Shock	4 (18.2)

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

Acute renal failure	3 (13.6)
Pleural effusion	3 (13.6)

There were patients who experienced multiple complications

The 1-minute Apgar score was 5 or below in 12 neonates (21.8%). In 8 neonates (14.5%), the 5-minute Apgar score was 7 or below (Table III). The mean umbilical cord blood pH was 6.94+0.10. A total of 25 (45.5%) neonates required admission to the neonatal intensive care unit (NICU). Respiratory distress was the most common reason for NICU admission followed by birth asphyxia, respiratory infection, intraventricular haemorrhage, and apnoea. The perinatal death was observed in 10 (18.2%) with 4 stillbirths (7.3%) and 6 (11.0%) first-week death.

Table III: Distribution of perinatal outcomes in those with HELLP syndrome

Outcomes	N (%)
Gestational age at birth (weeks)	
<32	23 (41.8)
32-36	21 (38.2)
≥37	11 (20.0)
Intra-uterine growth retardation	15 (27.3)
Preterm (<37 weeks gestation)	44 (80.0)
Birth weight (grams)	
<1500	20 (36.4)
1500-2500	22 (40.0)
>2500	13 (23.6)
Apgar score	
≤5 at 1 min	12 (21.8)
≤7 at 5 min	8 (14.5)
NICU admissions	25 (45.5)
Perinatal death	10 (18.2)
Still birth	4 (7.3)
Death within 1 week of birth	6 (11.0)

DISCUSSION

In developed countries, the incidence of HELLP syndrome and total number of deaths from HELLP have significantly decreased due to advancements in antenatal care, early diagnosis, and effective management of preeclampsia [12,13]. However, in developing countries, preeclampsia-eclampsia with HELLP and its complications continue to contribute to maternal and perinatal morbidity and mortality. This could be due to several factors, including limited access to antenatal care, inadequate resources, and lack of awareness among healthcare providers and patients about the importance of timely diagnosis and management of these conditions [14]. Therefore, there is a need for greater investment in healthcare infrastructure, education, and training to reduce the burden of these conditions in developing countries.

In this study, we found that the incidence of HELLP syndrome in subjects with pre-eclampsia and eclampsia is around 20%. Further, the presence of HELLP syndrome was associated with adverse maternal and perinatal/neonatal outcomes. Delivery has been recognized as the primary treatment for HELLP Syndrome [1]. This approach is considered the most effective way to cure the syndrome. In our department, we also follow the policy of prompt delivery to achieve better outcomes for both mother and foetus, as this syndrome can cause rapid deterioration in the patient's condition. The incidence of HELLP Syndrome

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

reported in our study was higher than that reported in the studies conducted by Sowjanya et al. (15.5%) and Ara S et al. (6.5%) [15,16]. This difference might be due to our department's better laboratory facilities and more accurate implementation of diagnostic criteria. It is well documented that patients with HELLP syndrome have high rate of perinatal mortality [17]. In our study, we found the perinatal death rate of 182/1000 births and is much lower that the estimates previously published. This may be because of the better and prompt obstetric care provided in our department. Neonatal morbidity is mainly dependent on the gestational age at birth. In our study, the babies were born at mean of 31.5 weeks gestational age and majority of the deliveries were under 32 weeks of gestation. The increased incidence of perinatal mortality in our study may be partially attributed to the high rates of preterm births.

It is important to implement electronic foetal monitoring to identify any signs of foetal distress early and take timely interventions to prevent adverse outcomes. This could include measures such as expedited delivery or the administration of medication(s) to promote foetal lung maturity in cases of preterm birth. Additionally, improvements in neonatal care facilities can also help to reduce perinatal mortality rates by providing specialized care to premature or sick neonates. However, it is important to note that prevention is key, and good prenatal care is crucial to ensuring the best possible outcomes for both the mother and baby. This could include regular antenatal check-ups, monitoring of blood pressure and other vital signs, and early detection and management of any complications that may arise. By taking a proactive approach to maternal and foetal health, it may be possible to further reduce the perinatal mortality rates observed in the present study.

There are certain limitations of our study. First, we conducted a retrospective study using hospital records. It would have been better to conduct a prospective follow up study. Second, we did not evaluate long term outcomes such as recurrence rate and post-neonatal complications. The likelihood of recurrence of HELLP syndrome in future pregnancies is low, at only 3%-5% [18]. However, these patients do have a higher risk of experiencing other obstetric complications in subsequent pregnancies, such as pregnancy-induced hypertension, preterm delivery, and intrauterine growth restriction.

CONCLUSIONS

The findings of our study emphasize the need for early registration and regular antenatal check-ups for early diagnosis and classification of HELLP Syndrome. HELLP Syndrome is a severe obstetric complication that requires a multidisciplinary team approach and access to life-saving facilities such as mechanical ventilators, dialysis equipment, and blood products. Obstetricians should be skilled enough to identify the disease condition early, even in cases of atypical presentation.

REFERENCES

1. Haram K, Svendsen E, Abildgaard U. The HELLP syndrome: clinical issues and management. A Review. BMC Pregnancy Childbirth. 2009 Feb 26;9:8. doi: 10.1186/1471-2393-9-8.
2. Kirkpatrick CA. The HELLP syndrome. Acta Clin Belg. 2010 Mar-Apr;65(2):91-7.
3. Lisonkova S, Bone JN, Muraca GM, Razaz N, Wang LQ, Sabr Y, Boutin A, Mayer C, Joseph KS. Incidence and risk factors for severe preeclampsia, hemolysis, elevated liver enzymes, and low platelet count syndrome, and eclampsia at preterm and term gestation: a population-based study. Am J Obstet Gynecol. 2021 Nov;225(5):538.e1-538.e19.
4. Panda S, Das R, Sharma N, Das A, Deb P, Singh K. Maternal and Perinatal Outcomes in Hypertensive Disorders of Pregnancy and Factors Influencing It: A Prospective Hospital-Based Study in Northeast India. Cureus. 2021 Mar 18;13(3):e13982.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 11, 2023

5. Kongwattanakul K, Saksiriwuttho P, Chaiyarach S, Thepsuthammarat K. Incidence, characteristics, maternal complications, and perinatal outcomes associated with preeclampsia with severe features and HELLP syndrome. Int J Womens Health. 2018 Jul 17;10:371-377.
6. Albayrak M, Ozdemir I, Demiraran Y, Dikici S. Atypical preeclampsia and eclampsia: report of four cases and review of the literature. J Turk Ger Gynecol Assoc. 2010 Jun 1;11(2):115-7.
7. Khalid F, Mahendraker N, Tonismae T. HELLP Syndrome. [Updated 2022 Jun 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560615/
8. Hammoud GM, Ibdah JA. Preeclampsia-induced Liver Dysfunction, HELLP syndrome, and acute fatty liver of pregnancy. Clin Liver Dis (Hoboken). 2014 Sep 26;4(3):69-73.
9. Pop-Trajković S, Antić V, Kopitović V, Popović J, Trenkić M, Vacić N. Postpartum HELLP syndrome--the case of lost battle. Ups J Med Sci. 2013 Mar;118(1):51-3.
10. Souissi R, Haddad Z, Trabelsi W, Baffoun N, Boubaker M, Kaddour C, Skandrani L. HELLP syndrome: utility of specific classifications as prognostic tools. Crit Care. 2007;11(Suppl 2):P383. doi: 10.1186/cc5543
11. Duhig K, Vandermolen B, Shennan A. Recent advances in the diagnosis and management of pre-eclampsia. F1000Res. 2018 Feb 28;7:242. doi: 10.12688/f1000research.12249.1.
12. Khedagi AM, Bello NA. Hypertensive Disorders of Pregnancy. Cardiol Clin. 2021 Feb;39(1):77-90.
13. Umesawa M, Kobashi G. Epidemiology of hypertensive disorders in pregnancy: prevalence, risk factors, predictors and prognosis. Hypertens Res. 2017 Mar;40(3):213-220. doi: 10.1038/hr.2016.126.
14. Haddad B, Barton JR, Livingston JC, Chahine R, Sibai BM. Risk factors for adverse maternal outcomes among women with HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome. Am J Obstet Gynecol. 2000 Aug;183(2):444-8.
15. Bhavani SK. Clinical Study on HELLP Syndrome - Maternal and Perinatal Outcome. IOSR Journal of Dental and Medical Sciences. 2016;15(1):71-6.
16. Ara S, Singh BB. Incidence of HELLP Syndrome in pre-eclampsia and eclampsia and Maternal and Perinatal outcome including Morbidity and Mortality. Indian Journal of Research. 2015;4(7).
17. Lisonkova S, Razaz N, Sabr Y, Muraca GM, Boutin A, Mayer C, Joseph KS, Kramer MS. Maternal risk factors and adverse birth outcomes associated with HELLP syndrome: a population-based study. BJOG. 2020 Sep;127(10):1189-1198
18. Kascak P, Paskala M, Antal P, Gajdosik R. Recurrent HELLP Syndrome at 22 Weeks of Gestation. Case Rep Obstet Gynecol. 2017;2017:9845637. doi: 10.1155/2017/9845637.