International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Lewis PF et al. Int J Reprod Contracept Obstet Gynecol. 2025 Mar;14(3):780-785
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20250504

Original Research Article

A comparative study of co-morbidities and outcomes between HELLP syndrome and severe pre-eclampsia without HELLP syndrome in a tertiary care centre

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Received: 04 October 2024
Revised: 04 February 2025
Accepted: 05 February 2025

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ABSTRACT

Background: Pre-eclampsia is a pregnancy specific, multi-system, life-threatening complication. Incidence of severe pre-eclampsia varies between 10-20% of all pregnancies and that of HELLP syndrome is 0.2-0.6% of all pregnancies. This study aims to provide a comprehensive view of maternal and perinatal outcomes in HELLP syndrome and that of severe pre-eclampsia without HELLP.
Methods: This prospective, observational, comparative study was conducted at a tertiary care centre- Grant medical college and sir JJ group of hospitals, in a period of 10 months (March 2024 to December 2024). 30 patients of pre-eclampsia with severe features were compared with 30 patients of HELLP syndrome. The maternal and perinatal outcomes were studied and results analysed.
Results: Incidence of maternal complications and the need for blood and blood products transfusion was greater in HELLP syndrome. However, only marginal differences were noted in the perinatal outcomes.
Conclusions: HELLP syndrome is associated with increased maternal morbidity and mortality as compared to severe pre-eclampsia. Only marginal differences were noted in neonatal outcomes due to HELLP syndrome and severe preeclampsia without HELLP syndrome. Aggressive and timely treatment of these maternal conditions helps in reducing the maternal morbidity and mortality.

Keywords: HELLP syndrome, Maternal and perinatal outcome, Pre-eclampsia

INTRODUCTION

Pre-eclampsia is a pregnancy specific, life-threatening complication. It is a complex multi-system disease, diagnosed by sudden-onset hypertension (developed after 20 weeks of gestation) and either proteinuria or maternal endorgan dysfunction or uteroplacental dysfunction. It is one of the most severe complications of pregnancy and a leading cause of maternal and perinatal mortality and morbidity.[1] Incidence of HELLP syndrome varies between 0.2% to 0.6% in all pregnancies and between 10%-20% with severe preeclampsia. Severe Pre-eclampsia is defined as Systolic BP>/=160 mmHg or Diastolic BP>/=110 mmHg with features of Proteinuria or end-organ damage.[2]

The term 'HELLP' syndrome was coined by Louis Weinstein. It is an acronym for hemolysis, elevated liver enzymes and low platelet counts.[3]

Hemolysis can be confirmed by peripheral blood smear showing schistocytes, elevated indirect bilirubin, low serum haptoglobin levels and/or serum LDH greater than 600IU/l. Patients present with malaise, nausea, vomiting, epigastric pain and headache.[4] The definitive management of severe preeclampsia and related complications is delivery of the fetus and placenta. Management starts with stabilization, early diagnosis, timely intervention, focusing on adequate BP control and eclampsia prophylaxis.[5] Early diagnosis and early initiation of treatment significantly

help in improving maternal morbidity and mortality of patients with HELLP syndrome. Patients with severe preeclampsia with/without HELLP syndrome must be managed in a tertiary care center where a multidisciplinary approach can be practiced and ICU/CCU facilities are available.[6]

METHODS

This prospective, observational, comparative study was conducted at a tertiary care centre, Grant medical college and sir JJ group of hospitals, over a period of 10 months (March 2024 to December 2024). After obtaining ethical approval, patients diagnosed with severe pre-eclampsia and HELLP syndrome were included in the study.

HELLP group comprised of 30 patients with one or more, hemolysis characterised by presence of schistocytes on peripheral smear or elevated LDH levels (>600 IU/l). Elevated liver enzymes. (AST/ALT>40 IU/l). Low platelet count (<1,00,000/ microliter)

Non-HELLP group comprised of 30 patients with severe pre-eclampsia without HELLP syndrome, with systolic BP>/=160 mmHg or diastolic BP>/=110 mmHg with features of proteinuria or end organ damage. Proteinuria is considered significant if 24-hour urine protein is>/=300 mg/dL or urine protein creatinine ratio (UPCR) is>/=0.3 or urine protein dispstick is>/=2.

In absence of proteinuria, any 1 of the following signs of end-organ damage are considered significant-liver dysfunction, renal insufficiency, thrombocytopenia, pulmonary edema, cerebral symptoms (headache, dizziness) or visual symptoms (blurring of vision, diplopia, scotoma).[2]

Patients with pre-existing hypertension, liver or renal disorders were excluded from this study. Following maternal parameters were assessed, maternal age, parity, booking status, antenatal maternal comorbidities, mode of delivery, ICU stay, blood and blood products transfusion and postpartum complications.

Perinatal parameters were assessed gender, gestational age, birth weight, NICU admissions and neonatal deaths.

RESULTS

Maternal outcomes

There were 30 patients of severe pre-eclampsia without HELLP syndrome and 30 patients of HELLP syndrome.

Age wise distribution of cases

In the present study, maximum number of patients were in the age group of 2630 years in both HELLP and non-HELLP study groups i.e. 50% in HELLP group and 43.3% in the non-HELLP group.

Distribution of cases according to parity

In the present study, 70% cases in both the study groups were Nulliparous females.

Distribution of cases according to antenatal care registration

In the present study, 66.66% cases were referred cases in the HELLP group and 66.66% cases in the non-HELLP group were registered cases in our tertiary care centre.

Distribution of cases according to the associated antenatal complications

In the present study, 22 cases (73.33%) in the HELLP group and 19 cases (63.33%) in the non-HELLP group had antenatal comorbidities. Out of which most cases had multiple comorbidities including anemia, diabetes mellitus, obesity and chronic hypertension.

Distribution of cases based on the mode of delivery

In the present study, 17 (56.6%) cases in the HELLP group and 21 (70%) cases in the non-HELLP group delivered by caesarean section. 3 (10%) cases in the HELLP group and 1 (3.3%) case in the non-HELLP group delivered by operative vaginal delivery.

Distribution of cases based on ICU stay

Present study showed that patients with HELLP syndrome (73.3%) needed ICU care significantly (0.000784) more than those with severe pre-eclampsia without HELLP syndrome (30%). Amongst those requiring ICU care, 45.45% cases in HELLP group and 22.22% cases in non-HELLP group needed ventilator/inotropic support.

Distribution of cases as per the need of blood and blood products transfusion

In the present study, 30 (100%) cases needed transfusion, which is significantly more than in the non-HELLP group, where only 7 (56.6%) cases needed blood/blood products transfusion.

Distribution of cases as per the postpartum complications

Maternal complications were significantly more in the HELLP group (80%) than in the non-HELLP group (26.6%).

Postpartum haemorrhage was the most common complication in both the study groups. There were 3 (12.5%) cases of maternal mortality in the HELLP group. The causes of mortality was sepsis, disseminated intravascular coagulopathy and multi-organ dysfunction syndrome.

Distribution of cases as per the gestational age at the time of delivery

In the present study, 13 (43.3%) cases were delivered at 28-34 weeks of gestation in the HELLP group and 15 (50%) cases were delivered at 28-34 weeks of gestation in the non-HELLP group, making preterm births very common amongst HELLP and severe pre-eclampsia without HELLP. The mean gestational age in cases of HELLP syndrome was 32.6 weeks and that in the non-HELLP group was 33.1 weeks.

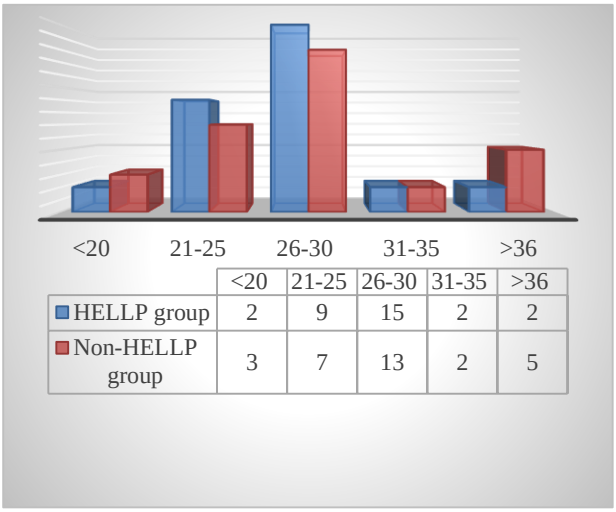

Figure 1: Distribution of cases according to maternal age.

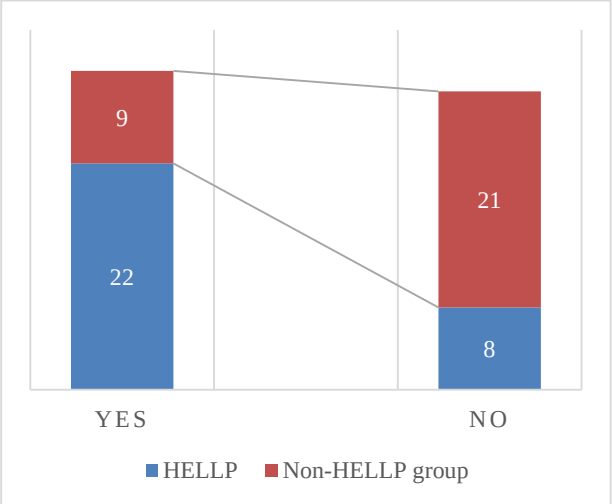

Figure 2: Distribution of cases according to the need for ICU stay.

Neonatal outcomes

Gender

In the present study, 20 (66.66%) cases in the HELLP group and 21 (70%) cases in the non-HELLP group were male babies.

Birth weight

In the present study, both study groups- HELLP (40%) and non-HELLP (33.33%) - had maximum babies in the range of 1.5-2.5 kg.

Live birth vs still birth

In the present study, both the study groups delivered 90% live born babies.

Distribution based on the need for NICU admissions

In the present study 19 (70.37%) babies in the HELLP group and 21 (77.77%) babies in the non-HELLP group needed NICU admissions.

Reasons for NICU admissions

Apart from the babies belonging to low-birth-weight category, following are the reasons for NICU admissions.

Neonatal deaths

In both the study groups, neonatal deaths were comparable, 44.44% in the HELLP group and 43.18% in the non-HELLP group.

Table 1: Distribution of cases according to the antenatal co-morbidities.

Antenatal co-morbidities	HELLP group	Non-HELLP group
Anemia	6 (27.27%)	4 (21.05%)
Gestational diabetes mellitus	4 (18.18%)	4 (21.05%)
Obesity	3 (13.63%)	2 (10.52%)
Multiple co-morbidities (Anemia/ hypothyroidism/ DM/ obesity)	9 (40.90%)	9 (47.36%)
Total cases	22 (73.33%)	19 (63.33%)

Table 4: distribution of cases as per postpartum complications.

Postpartum complications	HELLP group	Non-HELLP group
Postpartum haemorrhage	8 (33.33%)	4 (50%)
Acute kidney injury	3 (12.5%)	1 (12.5%)
Wound gape	2 (8.33%)	2 (25%)
Vulval hematoma	0 (0%)	1 (12.5%)
Pleural effusion	4 (16.66%)	0
Posterior reversible encephalopathy syndrome	4 (16.66%)	0
Mortality	3 (12.5%)	0

Table 5: Distribution of cases according to the gestational age.

Gestational age	HELLP	Non-HELLP group
<28 weeks	4 (13.33)	2 (6.66%)
28-34 weeks	13 (43.3%)	15 (50%)
35-37 weeks	3 (10%)	1 (3.33%)
37-40 weeks	10 (33.33%)	11 (36.6 %)
>40 weeks	0 (0%)	1 (3.33%)

Table 6: Distribution of cases according to the birth weight of the babies.

Birth weight (kg)	HELLP	Non-HELLP
<1	7 (23.33%)	5 (16.66%)
1-1.5	3 (10%)	5 (16.66%)
1.5-2.5	12 (40%)	10 (33.33%)
2.5-3.5	6 (20%)	5 (16.66%)
>3.5	2 (6.66%)	5 (16.66%)

Table 7: Reasons for NICU admissions.

Reason for NICU admission	HELLP	Non-HELLP group
Respiratory distress	13 (43.33%)	14 (46.66%)
Congenital anomalies	0 (0%)	1 (3.33%)
Birth asphyxia	4 (13.33%)	2 (6.66%)
Large for gestational age	2 (6.66%)	4 (13.33%)

DISCUSSION

Maternal outcome

In the present study, mean maternal age was 27 years in the HELLP group and 29 years in the non-HELLP group. Vinaars MT et al, noted the mean maternal age to be 30 years and 32 years in the HELLP and non-HELLP groups.[7] A study conducted by Turgut el al, showed that most cases of HELLP and non-HELLP were seen in the age group of 25-30 years; mean maternal age being 28.7 year in HELLP group and 27.7 years in non-HELLP group.[8]

It was observed that maximum cases in both the study groups was associated with nulliparous females. However, in a study conducted by Turgut A. et al, HELLP syndrome was seen more in nulliparous females and severe pre-eclampsia without HELLP was seen more in multiparous females.[8] In a study conducted by Madge et al, HELLP and non-HELLP group showed maximum cases in multiparous females.[10]

The mean gestational age at delivery was found to be 32.6 weeks in HELLP syndrome and 33.1 weeks in severe pre-eclampsia without HELLP. Tandon et al observed mean of 35.3 weeks in HELLP group and 36.4 weeks in the non-HELLP group.[9] In a study conducted by Kim HY et al, mean gestational at delivery is 33.1 weeks in HELLP syndrome and 32 weeks in non-HELLP group.[13] In the present study, frequency of caesarean sections was 56.6% in the HELLP group and 70% in non-HELLP group. This is comparable to a study conducted by Turgut et al, (HELLP 81.1% and 71.3% non-HELLP group).[8] However, study conducted by Madge et al, observed higher incidence of vaginal deliveries in both the groups (81.81% HELLP group and 52.72% non-HELLP group).[10]

73.3% patients were admitted to ICU in HELLP group and only 30% patients admitted in non-HELLP group. Turgut et al, reported only 3.6% ICU admissions in HELLP group and no ICU admissions in the non-HELLP group.[8] Kongwattanakul et al, conducted a study where he found that 6.6% cases of HELLP syndrome and 0.9% of severe pre-eclampsia without HELLP syndrome needed ICU admission.[14]

100% patients required blood/blood products transfusion in HELLP group and only 56.6% patients required transfusion in the non-HELLP group. Madge et al, reported 70.9% cases in HELLP group needed transfusions and only 9.09% cases in the non-HELLP group needed transfusions.[10]

In present study, 80% cases in HELLP syndrome were observed to be having significantly more postpartum complications than severe pre-eclampsia without HELLP syndrome (26.6%). Mortality was in 3 (12.5 %) cases of HELLP syndrome. Tandon et al reported similar results with higher incidence of mortality in HELLP syndrome (18.18%) and only 0.9% in non-HELLP group.[9]

Perinatal outcome

Perinatal outcome was almost similar in both the study groups. Marginally low birth weight was seen in HELLP than in preeclampsia group –1.76 kg vs 2 kg in a study conducted by Madge et al.[10]

This is comparable to the present study where the mean birth weights found in HELLP syndrome was 1.85 kg and in severe pre-eclampsia without HELLP syndrome, it was 2.06 kg.

As per the study conducted by Madge et al, the NICU admission rate was marginally higher in HELLP compared to preeclampsia (32.72% vs 30.9%).[10] However, in present study the NICU admission rate is higher in non-HELLP group (77.77%) than in HELLP group (70.37%).

In present study, the most common reason for NICU admission was low birth weight (mostly due to preterm birth and fetal growth restriction). Other contributory factor for NICU admission in both HELLP and non-HELLP study group is respiratory distress. Similarly, in a study conducted by Madge et al, the most common reason

for NICU admission was prematurity and related complications followed by ARDS.[10]

In a study conducted by Madge et al, 15.38% neonatal deaths were reported in HELLP group and 13.2% neonatal deaths were reported in non-HELLP group.[10] In a study conducted by Gul A et al, 16.8% cases in HELLP and 8% cases in non-HELLP group were reported as neonatal deaths.[15] Perinatal mortality in HELLP syndrome patients was 20.5% in a study by Ascoglu et al and 40.5% in study by Chawla et al.[11,12] In present study, neonatal deaths were marginally higher in HELLP syndrome (44.44%) as compared to severe pre-eclampsia without HELLP syndrome (43.18%).

This study has potential limitations that should be acknowledged. The sample size of 60 subjects, while sufficient for preliminary analysis, may limit the statistical power and generalizability of the findings to a broader population. Additionally, the study duration of 10 months may not be sufficient for analysing broader population.

CONCLUSION

Severe pre-eclampsia with or without HELLP syndrome has a great impact on the lives of both the mother and the baby. This study concluded that HELLP syndrome is associated with significantly increased maternal morbidity and mortality as compared to severe pre-eclampsia without HELLP syndrome. However, the neonatal outcomes in HELLP group and the non-HELLP group are not significantly different.

Although, unlike the maternal outcomes, the severity of neonatal outcomes is higher in the non-HELLP group than the HELLP group. A multidisciplinary approach is to-be-aimed for management of such high-risk cases at a tertiary healthcare centre. The following measures should be adopted such as timely recognition of the high-risk cases, early referral to higher centre (with prior intimation) and prompt aggressive management, to reduce the incidence and complications of HELLP syndrome.

A team of highly skilled obstetricians, physicians, anaesthetist and paediatrician should be available at tertiary care centre, for better management of such high-risk cases, along with facilities like blood bank and ICU. Pregnancy-related complications cannot be predicted, but can be prevented and the incidence can be reduced by levelling up with the increasing demands of advanced healthcare needs. Hence, Maternal outcomes can improved by better critical care. Preterm birth cannot be prevented , however, Neonatal outcomes can be improved by the timely intervention by neonatologist and better NICU facilities.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Lewis PF, Surpatne VV, Bendale R, Thathira S. A comparative study of co-morbidities and outcomes between HELLP syndrome and severe pre-eclampsia without HELLP syndrome in a tertiary care centre. Int J Reprod Contracept Obstet Gynecol 2025;14:780-5.