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**Original Research Article**

# Study of maternal and perinatal outcome in cases of a HELLP syndrome

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## ABSTRACT

**Background:** HELLP is an acronym which describes the presence of haemolysis, elevated liver enzymes, low platelet count during pregnancy. It is a life-threatening manifestation of pre-eclampsia. The incidence of HELLP syndrome is 0.5-0.9% of all pregnancies and 10-20% in cases of pre-eclampsia. The rationale of this study lied in the anticipation that knowledge of incidence of the HELLP Syndrome will incite the interest of medical fraternity handling various pregnancy related complication. The results may also imply that early detection of high-risk individuals by primary medical personnel and timely referral to a tertiary care centre will be helpful in improving maternal and perinatal outcomes. Aim of this study were to study the incidence of HELLP syndrome in patients with pre-eclampsia and to study maternal and perinatal outcome in pre-eclampsia patients complicated with HELLP syndrome.
**Methods:** A prospective observational study of 400 admitted cases with more than 20 weeks of gestation having pre-eclampsia. Statistical analysis of the data done on IBM SPSS Statistics Version.
**Results:** The incidence of HELLP syndrome in pre-eclampsia was found to be 9.25%. The major maternal complications were placental abruption (35.14%), acute renal failure (16.22%), eclampsia (5.4%), papilledema (5.41%), PRES (5.41%), DIC (5.41%), maternal mortality (8.11%) in cases of HELLP syndrome while low birth weight (48.64%) respiratory distress syndrome (35.14%), meconium aspiration syndrome (18.9%), IUD (10.81%), NICU admission (37.84%), NND (10.81%) were neonatal complications.
**Conclusions:** HELLP syndrome in pre-eclampsia is associated with significant maternal and perinatal morbidity and mortality and early detection and prompt management is the key for a better maternal and perinatal outcome.

**Keywords:** HELLP syndrome, Pre-eclampsia, Pregnancy

## INTRODUCTION

HELP or HELLP is an acronym which describes the presence of haemolysis (H), elevated levels (EL) of Liver enzymes or evidence of hepatic dysfunction, and thrombocytopenia or low platelet (LP) count during the pregnancy. Since the time of its description in original article in 1982, many medical researchers have undertaken studies to better describe, understand and treat this potential hazard. HELLP syndrome is a severe life-threatening manifestation of pre-eclampsia.[1] Pre-eclampsia is diagnosed when there is significant proteinuria in the presence of gestational hypertension.[2] Weinstein considered HELLP syndrome as a variant of preeclampsia.[1]

It develops in 10-20% cases of severe preeclampsia.[3] It is a multi-system disease attributed to abnormal vascular tone, vasospasm, defect in the coagulation system and damage to the vascular endothelium. There is production

of endogenous anti-oxidants, and when they are in overwhelming numbers, a condition of oxidative stress develops. Pre-eclampsia develops due to poor trophoblastic invasion in myometrium, and maternal spiral arteries retain their muscular walls. Impaired intervillous blood flow results in inadequate perfusion and ischemia in the second half of pregnancy.

The diagnosis of HELLP syndrome is based upon laboratory evidence of microangiopathic haemolytic anaemia, hepatic dysfunction and thrombocytopenia in a patient suspected to have pre-eclampsia.[5] At present, there are two major definitions for diagnosing the HELLP syndrome: Tennessee classification system and the Mississippi-triple class system. HELLP syndrome may develop antepartum or postpartum. The consequences of HELLP syndrome can be seen significantly in both Maternal and foetal complications. Hence the present study aims to find out the incidence of HELLP Syndrome amongst pre-eclampsia patients and evaluate its various maternal and perinatal complications.

## METHODS

This was a prospective observational study conducted in B. J. Medical College and SGH Pune. All pre-eclampsia patients between 18-35years of more than 20 weeks of gestational age were enrolled in the study. Patients with chronic hypertension, pre-existing liver disease, pre-existing renal disease, known epileptic patients were excluded. A sample size of 400 cases with pre-eclampsia was calculated by using Dixit JV formula and it took over 6 months from May 2019 to October 2019 to complete the sample size. Primary data were collected in paper based proforma and the data were then entered in Microsoft Excel spreadsheets 2013. Statistical analysis was done on IBM SPSS Statistics Version 20. Continuous variables were described as Means±standard deviation or median with interquartile range. Means were compared using independent sample T test (Student T test). Column proportions were compared using chi square test categorical variables. Risk was estimated using Odds ratios along with 95% confidence intervals. P value <0.05 was considered significant and p value <0.01 were considered highly significant.

## RESULTS

In the present study, there were total 400 pre-eclampsia patients of which 37 were diagnosed with HELLP syndrome giving an incidence of 9.25% among pre-eclampsia patients and a general incidence of 0.7% (total admissions-4978). *Non HELLP group in the tables corresponds to rest of the pre-eclampsia patients in the study population.

The average age of the HELLP group was 27.89±4.97 years which was significantly higher than non HELLP group 24.82±3.3 years. (p <0.0001).

**Table 1: Comparison of mean age between study groups.**

| Age of the mothers | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| | 27.89 | 4.97 | 24.82 | 3.30 | <0.0001 |

**Table 2: Distribution of gravidity between study groups.**

| Gravida | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **Primigravida** | 12.00 | 32.43 | 101.00 | 27.82 | 0.554 |
| **Multigravida** | 25.00 | 67.57 | 262.00 | 72.18 | |

**Table 3: Distribution of gestation age.**

| Gestation age in weeks | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **24-30** | 4.00 | 10.81 | 21.00 | 5.79 | 0.2302 |
| **30-37** | 21.00 | 56.76 | 116.00 | 31.96 | 0.0025 |
| **>37 weeks** | 12.00 | 32.43 | 226.00 | 62.26 | 0.0004 |

**Table 4: Comparison of incidence of maternal complications.**

| Maternal complications | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **Preeclampsia** | 37.00 | 100.00 | 363.00 | 100.00 | 1 |
| **Eclampsia** | 2.00 | 5.41 | 13.00 | 3.58 | 0.5772 |
| **Acute renal failure** | 6.00 | 16.22 | 6.00 | 1.65 | <0.0001 |
| **Placental abruption** | 13.00 | 35.14 | 16.00 | 4.41 | <0.0001 |

Continued.

| Maternal complications | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **Papilledema** | 2.00 | 5.41 | 2.00 | 0.55 | 0.0047 |
| **PRES** | 2.00 | 5.41 | 7.00 | 1.93 | 0.1746 |
| **Disseminated intravascular coagulation (DIC)** | 2.00 | 5.41 | 2.00 | 0.55 | 0.0047 |

Total 32.43% females were primigravida and 67.57% females were multigravida in the HELLP group. 27.82% females were primigravida and 72.18% females were multigravida in the non HELLP group (P=0.554).

There were 10.8% females in the HELLP group and 5.79% females in non HELLP group were delivered at gestation of 24-30 weeks (P=0.23).

Most of the females in HELLP group i.e. 56.8% compared to 31.9% females in non HELLP group were delivered preterm at gestation of 30-37weeks. (P=0.0025)

Most of the females in non HELLP group i.e. 62.26 % compared to only 32.43% females in HELLP group were delivered full term (gestation >37weeks.) (P=0.0004).

Acute renal failure was observed in 16.22% cases of HELLP group and in 1.65% cases of non HELLP group. (p<0.0001).

Placental abruption was observed in 35.14% cases of HELLP group and in 4.41 % cases of non HELLP group. (p<0.0001).

Papilledema was observed in 5.41% cases of HELLP group and in 0.55% cases of non HELLP group. (p=0.0047).

Posterior reversible encephalopathy syndrome (PRES) was observed in 5.41% cases of HELLP group and in 1.93% cases of non HELLP group. (p=0.1746).

Disseminated intravascular coagulation (DIC) was observed in 5.41% cases of HELLP group and in 0.55% cases of non HELLP group. (p=0.0047).

LSCS was performed in 21.6% among HELLP group females compared to 18.5% females in non HELLP group (p=0.3925).

Normal vaginal delivery was performed in 40.54 % among HELLP group females compared to 30.30 % females in non HELLP group (p=0.201).

Normal vaginal delivery with episiotomy was performed in non HELLP group in higher proportion i.e. 45.18% among non HELLP group than 24.32% in HELLP group (p=0.0148).

Preterm LSCS was performed in 13.5% HELLP group females compared to 5.5% in non HELLP group (p=0.055).

A total of 8.11% maternal mortality was reported in HELLP group compared to 0.83% mortality among non HELLP group (p=0.0005).

Total 3 HELLP syndrome patients out of 37 were diagnosed to be HELLP syndrome during post-partum period. i.e. 8% of all HELLP syndrome patients were diagnosed in post-partum period and remaining 92% were diagnosed antenatally.

**Table 5: Distribution of type of delivery.**

| Type of delivery | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **LSCS** | 8 | 21.6 | 67 | 18.5 | 0.3925 |
| **Normal vaginal delivery** | 15 | 40.5 | 110 | 30.3 | 0.201 |
| **Normal vaginal with episiotomy** | 9 | 24.3 | 164 | 45.2 | 0.0148 |
| **Vacuum in normal vaginal with episiotomy** | 0 | 0.0 | 2 | 0.6 | 0.6515 |
| **Preterm LSCS** | 5 | 13.5 | 20 | 5.5 | 0.055 |

**Table 6: Comparison of maternal mortality between HELLP AND Non HELLP groups.**

| Mortality | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| | 3.00 | 8.11 | 3.00 | 0.83 | 0.0005 |

**Table 7: Comparison of neonatal outcomes.**

| Neonatal outcomes | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| **APGAR score < 7** | 10.00 | 27.03 | 57.00 | 15.70 | 0.0791 |
| **Birth asphyxia** | 0.00 | 0.00 | 20.00 | 5.51 | 0.1434 |
| **Respiratory distress syndrome (RDS)** | 13.00 | 35.14 | 51.00 | 14.05 | 0.0009 |
| **NICU admissions** | 14.00 | 37.84 | 77.00 | 21.21 | 0.0217 |
| **Meconium aspiration syndrome (MAS)** | 7.00 | 18.92 | 95.00 | 26.17 | 0.3357 |
| **Intra uterine death (IUD)** | 4.00 | 10.81 | 10.00 | 2.75 | 0.0111 |

**Table 8: Comparison of incidence of neonatal death.**

| Neonatal death | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| | 4.00 | 10.81 | 18.00 | 4.96 | 0.1376 |

**Table 9: Comparison of rate of abnormal USG.**

| Abnormal USG | HELLP (N=37) | | Non HELLP (N=363) | | P value |
|---|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion | |
| | 12.00 | 32.43 | 81.00 | 22.31 | 0.1656 |

**Table 10: Comparison of incidence of low birth weight.**

| LBW | HELLP (N=37) | | Non-HELLP (N=363) | |
|---|---|---|---|---|
| | Frequency | Proportion | Frequency | Proportion |
| | 18 | 48.64 | 123 | 33.88 |

APGAR score <7 was observed among 27.03% neonates of HELLP group women compared to 15.7% of neonates of non HELLP group women (p=0.079).

Respiratory distress syndrome (RDS) was observed among 35.14% neonates of HELLP group women compared to 14.05% of neonates of non HELLP group women (p=0.0009).

NICU admissions were required for 37.84% neonates of HELLP group women compared to 21.21% neonates of non HELLP group women (p=0.021).

Meconium aspiration syndrome (MAS) was observed in 18.9% neonates of HELLP group women compared to 26.17% neonates of non HELLP group women (p=0.33).

Intra uterine death was reported among 10.81% foetuses of HELLP group women compared to 2.81% foetuses of non HELLP group women (p=0.011).

Overall incidence of neonatal death was 10.81% in HELLP group women compared to 4.96% in non HELLP group women (p=0.137).

Abnormal USG reports were observed during ANC visits of 32.43% of HELLP group females compared to 22.31% females in non HELLP group (p=0.165).

Overall incidence of low birth weight was 48.64% in HELLP group compared to 33.88% in non HELLP group women.

## DISCUSSION

In the present study, there were total 400 pre-eclampsia patients of which 37 were diagnosed with HELLP syndrome giving an incidence of 9.25% among pre-eclampsia patients and a general incidence of 0.7% (total admissions-4978). A comparison of various parameters of this study with other studies is shown in the Table 11.

Total 32.43% females were primigravida and 67.57% females were multigravida in the HELLP group and our findings were comparable to Imir et al 64.1% multiparous and 35.9% primiparous.[10]

In our study 56.8% HELLP patients were delivered preterm at gestation of 30-37weeks (mean 35 weeks) comparable to Fonseca et al.[13] Average age of 34 weeks and > 31 weeks Magann, Ju et al.[12]

**Table 11: Showing comparison with other studies.**

| Heading | Present Study (in %) | Other studies (in %) |
|---|---|---|
| Incidence in pre-eclampsia patient | 9.25% | 10-20% Sibai et al[5], 2-30% Imir et al[10] |
| **Maternal complications** | | |
| Eclampsia/PRES | 5.41% | 4-9% Weinstein et al[8] |
| Acute renal failure | 16.22% | 28% Isler et al[14], 25% Imir et al[10] |
| Abruptio placentae | 35.14% | 10.9% Imir et al[10], 10% Haddad et al[7] |
| Maternal mortality | 8.11% | 1-24% Sibai et al[5], 2% Ahmed et al[4] |
| **Fetal outcome** | | |
| Intrauterine death | 10.81% | 8-37% perinatal mortality Imir et al[10], 66.7% Kaur at al[11] |
| Respiratory distress syndrome | 35.14% | 20% adverse perinatal outcome Banoo et al[9] |
| Meconium aspiration syndrome | 18.9% | |
| NICU admission | 37.84% | |
| Neonatal death | 10.81% | |

LSCS was performed in 21.6%, preterm LSCS in 13.6%, normal vaginal delivery was performed in 40.54% and normal vaginal delivery with episiotomy was performed in 24.32% in HELLP group whereas Kaur et al gives 28.6% vaginal deliveries and 71.4% deliveries by LSCS.[11]

Total 8% of all HELLP syndrome patients were diagnosed during post-partum period in our study, Sibai et al gives an incidence of 70% cases developing before delivery.[6]

Overall incidence of low birth weight was 48.64% in HELLP group in our study.

Results of this study are restricted to Indian population was the limitations of this study.

No data available to correlate from other studies on Incidence of association of meconium aspiration syndrome, NICU admission rate and neonatal deaths among HELLP syndrome patients.

## CONCLUSION

The present study was aimed to evaluate the feto-maternal outcome in cases of pre-eclampsia complicated with HELLP Syndrome. It was concluded that Placental abruption, Acute renal failure, IUFD, Preterm delivery were major maternal complications, maternal mortality was high in cases of pre-eclampsia that were complicated with HELLP Syndrome; whereas Low birth weight, Respiratory distress syndrome, Need for NICU, Prematurity were adverse perinatal outcomes. Neonatal death rate was significantly high in cases complicated with HELLP Syndrome. These complications can be managed successfully if diagnosed early. Timely intervention will help in preventing unnecessary complications and eventually improve maternal and perinatal outcome. The health care provider should keep a strong follow-up of pre-eclampsia patients and should simultaneously educate these patients regarding warning signs associated with the condition during their antenatal visit. Early detection and prompt referral to a tertiary care hospital will have a significant difference in patient outcome. It is also of utmost importance for a healthcare provider to know that few patients can develop this syndrome post-delivery and therefore one must monitor pre-eclampsia patient for a min of 72hours and look for development of post-partum HELLP.

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## REFERENCES

1. Weinstein L. Syndrome of hemolysis, elevated liver enzymes and low platelet count: a severe consequence of hypertension in pregnancy. Am J Obstet Gynecol. 1982;142(2):159-67.
2. Goodlin RC. Hemolysis, elevated liver enzymes and low platelets syndrome. Obstet Gynaecol. 1984;64(3):449-50.
3. Shennan A. Hypertensive disorders. In: Edmond DK, (ed.) Dewhurst's Text Book of Obstetrics and Gynaecology for Postgraduates. 7th ed. London: Blackwell Sciences; 2007:227-37.
4. Ahmed FA, Amin A, Naeem NK. HELLP syndrome, a clinical variant of pre-eclampsia. Annals. 2007;13(2):158-61.
5. Sibai BM, Ramadan MK, Usta I, Salama M, Mercer BM, Friedman SA. Maternal morbidity and mortality in 442 pregnancies with hemolysis, elevated liver enzymes, and low platelets (HELLP syndrome). Ame J Obstet Gynecol. 1993;169(4):1000-6.
6. Sibai BM: Imitators of severe pre-eclampsia/eclampsia. Clin Perinatol. 2004,31:835-52.
7. 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;183:444-8.
8. Curtin WM, Weinstein L. A review of HELLP syndrome. J Perinatol. 1999;19(2):138-43.
9. Banoo S, Makhdoomi TA, Mir S, Malik J. Incidence of HELLP syndrome in sever pregnancy induced hypertension and its impact on maternal and fetal outcome. JK Practitioner. 2007;14(2):92-4.
10. Imir GA, Özdemir Kol I, Kaygusuz K, Çetin A, Çetin M, Güvenal T, Gönüllü M. Perinatal outcomes in HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome. J Turk Ger Gynecol Assoc. 2008;9:89-93.
11. Kaur AP, Kaur N, Dhillon SP. HELLP syndrome and its implications on maternal and perinatal outcome. Int J Reprod Contracep Obstet Gynecol. 2018;7(3):1007-12.
12. Magann EF, Perry KG, Chauhan SP, Graves GR, Blake PG, Martin JN. Neonatal salvage by weeks of gestation in pregnancies complicated by HELLP syndrome. J Soc Gynecol Invest. 1994;1:206-9.
13. Fonseca JE, Méndez F, Cataño C, Arias F. Dexamethasone treatment does not improve the outcome of women with HELLP syndrome: a double-blind, placebo-controlled, randomized clinical trial. Am J Obstet Gynecol. 2005;193(5):1591-8.
14. Isler CM, Rinehart BK, Terrone DA, Martin RW, Magann EF, Martin JN Jr. Maternal mortality associated with HELLP (hemolysis, elevated liver enzymes, and low platelets) syndrome. Am J Obstet Gynecol. 1999;181(4):924-928.

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