ORIGINAL ARTICLE

Maternal and Fetal Outcome in HELLP Syndrome: An Observational Study

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Abstract

Objective: HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets) is a component of hypertensive disorders of pregnancy that is associated with significant maternal and perinatal morbidity and mortality. HELLP syndrome is regarded as a high risk for the mother and neonate compared to preeclampsia.

Aims: This study evaluates the maternal and perinatal outcome in HELLP syndrome so that the management is improved resulting in reduced mortality and morbidity.

Materials and methods: It is an observational study where a total number of 56 cases of HELLP syndrome above 24 weeks of gestational age were admitted in Vanivilas Hospital, Bengaluru, during the study period of 24 months from October 2010 to October 2012.

Results: In the present study, majority (71.43%) of the patients were unbooked. There was no difference in parity among cases. Maternal mortality was 7.14% and perinatal mortality was 46.43%.

Conclusion: We have to intensify our efforts to reduce preeclampsia with HELLP syndrome from the grassroot level with regular antenatal care, early detection of preeclampsia, and its prompt management and early detection of complications with timely intervention.

Keywords: Elevated liver enzymes, Hemolysis, Thrombocytopenia.

Journal of South Asian Federation of Obstetrics and Gynaecology (2020): 10.5005/jp-journals-10006-1779

Introduction

Every woman wishes to have a healthy pregnancy which culminates in a healthy baby and a healthy mother. Unfortunately, some women develop dreaded complications that may result in adverse obstetric outcomes. These include hypertensive disorders of pregnancy, preeclampsia, eclampsia, and HELLP syndrome.[1] Preeclampsia occurs in 5–10% of pregnancies.[2] The HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets) is a variant of severe preeclampsia that is associated with significant maternal and perinatal morbidity and mortality.[3] HELLP syndrome develops in 6–12% of women with preeclampsia or eclampsia accounting for 0.4–0.7% of all pregnancies.[4] Maternal mortality is due to consequences such as pulmonary edema, renal failure, disseminated intravascular coagulation, and subcapsular liver hematoma.[5] Perinatal mortality appears to be primarily related to the gestational age at the time of delivery.[6] HELLP syndrome is regarded as high risk for the mother and neonate compared to preeclampsia. Early diagnosis and identification of complication of HELLP syndrome and timely intervention form the main strategy of management.[7]

As our hospital provides treatment facilities to large number of preeclampsia, eclampsia, and a relatively higher number of patients of HELLP syndrome, we have the opportunity to conduct such studies which can help us to determine the trend of occurrence of HELLP syndrome, its complications, and its effect on maternal and fetal outcome. This will help us in understanding better about the pathophysiology of the disease which can be applied to improve the management and thereby improve the maternal and perinatal outcome.

Objectives of the Study

- To study the clinical profile of HELLP syndrome in pregnant women at Vanivilas Hospital, Bengaluru.
- To study the maternal and perinatal outcome in these patients with HELLP syndrome.

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How to cite this article: Anitha GS, Krishnappa TK, Shivamurthy G, *et al*. Maternal and Fetal Outcome in HELLP Syndrome: An Observational Study. J South Asian Feder Obst Gynae 2020;12(3):122–132.

Source of support: Nil

Conflict of interest: None

Review of the Literature

History of HELLP Syndrome

Preeclampsia presenting with atypical clinical presentation is well known since the end of 19th Century. Dieckmenn called this spectrum the toxemias of pregnancy.[8]

In early 1980, Louis Weinstein had a terrible personal impact after encountering his first maternal death who presented with varied preeclampsia. He collected the data of 29 patients of preeclampsia/eclampsia with thrombocytopenia, abnormal peripheral smear, and abnormal liver function tests. He presented an article to *American Journal of Obstetrics and Gynecology* in 1982, and he coined the term HELLP syndrome, as he wanted to help educate his fellow clinicians to assist them in recognizing these patients.[1]

A study on maternal morbidity and mortality in 442 pregnancies with HELLP syndrome by Sibai et al. in 1993 demonstrated that HELLP syndrome is associated with an increased risk of maternal death (1%) and increased rates of maternal morbidities such as pulmonary edema (8%), acute renal failure (3%), DIC (15%), abruptio

placentae (9%), liver hemorrhage (1%), adult respiratory distress syndrome, sepsis, and stroke (<1%).[4]

A prospective study on HELLP syndrome, incidence, and maternal–fetal outcome by Abroug et al. in 1992 during a 6-month period showed that preeclampsia and eclampsia may be more severe in the presence of HELLP syndrome with a worsening of maternal prognosis while fetal outcome seems not altered.[9]

Kim et al. studied the neonatal outcome after preterm delivery in HELLP Syndrome in 2006 and demonstrated that the perinatal morbidities and mortalities are substantially increased in pregnancies complicated by the HELLP syndrome and is mainly experienced at very early gestational age in association with severe fetal growth restriction or abruptio placentae.[6]

Incidence

HELLP syndrome occurs in 0.2–0.6% of all pregnancies.[10] It is difficult to know the true incidence despite the studies done because of the difference in the diagnostic criteria used. In the study done at the University of Tennessee, Memphis, between 1992 and 1997, among the 442 patients of preeclampsia, 25% were diagnosed with HELLP syndrome.[11]

Risk Factors[4]

	Factor	*HELLP syndrome*	*Preeclampsia*
1	Parity	Multiparous	Nulliparous
2	Age	>25 years	<20 years or >45 years
3	Race	White	–
4	Others	History of poor pregnancy outcome	Family h/o PE, minimal prenatal care, diabetes mellitus, chronic hypertension, multiple gestation

Etiology and Pathophysiology

Primary pathology in HELLP syndrome appears to be endothelial dysfunction, i.e., microvascular injury.[12,13]

Inciting agents: sudden large volume of fetal/decidual cell traffic?

Vasospasm? Vascular repair deficiency? Unknown?

↓

Vascular endothelial dysfunction and damage

↓

Platelet aggregation and consumption

↓

Fibrin activation and consumption

↓

Selective organs ischemia and insufficiency

↓

Diverse symptomatology

Classification

Two most commonly used systems:

Mississippi Classification

This classification is based on the observation that maternal platelet count and to less extent, LDH concentration, are more reflective of the disease severity and the rapidity of the recovery.[14]

Class I	Platelet < 50,000/mL
	AST or ALT > 70 IU/L
	LDH > 600 IU/L
Class II	Platelet 50,000–100,000/mL
	AST or ALT > 70 IU/L
	LDH > 600 IU/L
Class III	Platelet 100,000–150,000/mL
	AST or ALT > 40 IU/L
	LDH > 600 IU/L

Tennessee Classification[11]

True or complete HELLP: Platelet < 100,000/mL

AST/ALT > 70 I/L

LDH > 600 IU/L

Partial or incomplete HELLP: Severe PE with any one of the following ELLP, HEL, EL, LP.

Clinical Features

Diagnostic Criteria[7]

Diagnosis of this syndrome involves the demonstration of one or more of the following parameters.

Hemolysis (At least Two of These)

- Abnormal peripheral smear—Schistocytes, Burr cells, Echinocytes
  Triangular cells, helmet cells
- Increased total bilirubin (mostly indirect) > 1.2 mg/dL
- Low serum haptoglobin level < 0.4 g
- Increased LDH > 600 IU/dL
- Drop in hemoglobin level unrelated to blood loss
- LDH and haptoglobin are sensitive early markers of HELLP syndrome.[11,15]

Elevated Liver Enzymes

- Increased transaminases (AST & ALT) > 70 IU/L
- Increased LDH > 600 IU/L
- Increased total bilirubin > 1.2 mg/dL

Thrombocytopenia

- Platelet count < 100,000–150,000/μL
- Thrombocytopenia is the first indicator of disease
- Mild < 150,000–100,000/μL
- Moderate < 100,000–50,000/μL
- Severe < 50,000/μL

Maternal Mortality and Morbidity

Presence of HELLP syndrome increases maternal mortality and morbidity.[4] The maternal mortality and morbidity are particularly high with complete or true HELLP syndrome when compared to incomplete HELLP syndrome.[9]

Class I or class II HELLP syndrome patients develop more complications when compared to class III HELLP syndrome.[16,17] However, most of the pregnant patients with HELLP syndrome recover completely with prompt diagnosis and appropriate intervention[18] (Figs 1 to 9).

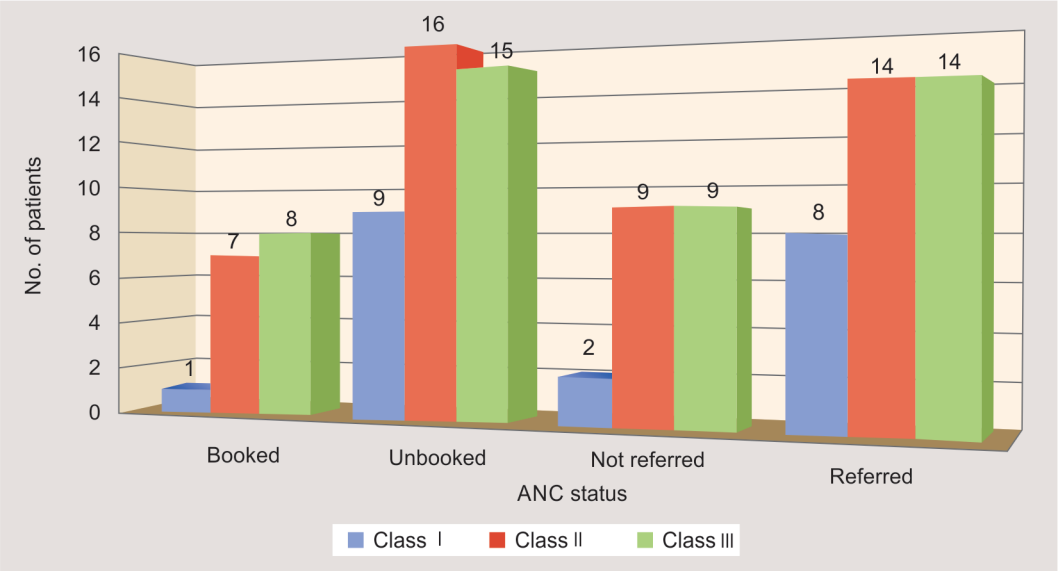

Fig. 1: Distribution of booked and unbooked cases along with referral status

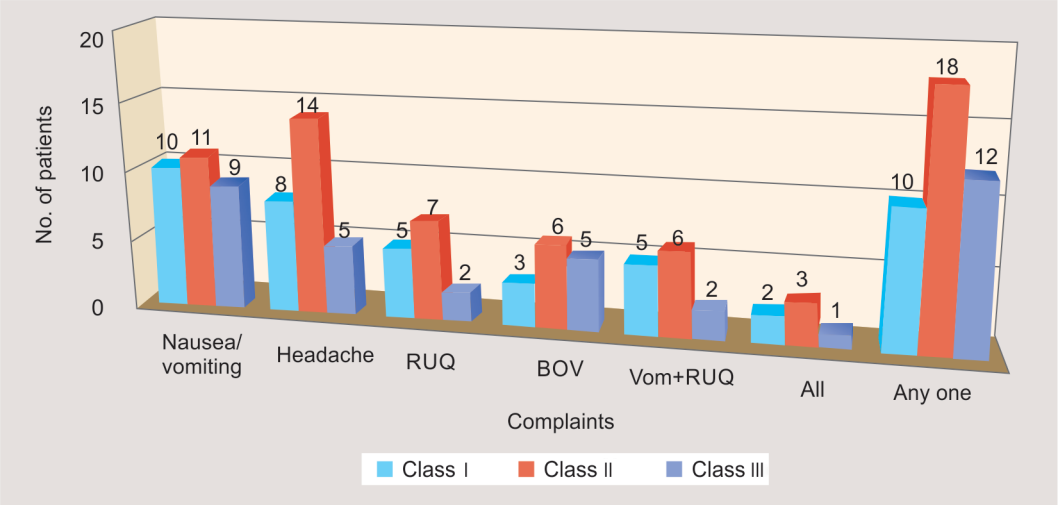

Fig. 2: Distribution of cases according to symptoms (complaints)

Mortality

Maternal deaths can occur by variety of pathologic process including:[19]

- Sepsis
- Shock
- Hemorrhage
- Intracerebral bleeding, and
- Cardiopulmonary failure

Perinatal Mortality and Morbidity

High mortality is associated with early gestational age <28 weeks and its complication including intrauterine growth retardation, abruptio placenta, and asphyxia.[19,20] Preterm occurs in 70%, with 15% prior to 28 weeks of gestation.[4,19]

Management

Since the identification of importance of HELLP syndrome and its associated high maternal and perinatal adverse outcomes, many investigators have advocated multimodality treatment, although definitive treatment is the delivery or termination of pregnancy.

University Mississippi Medical Centre has advocated 12-step approaches for the optimal treatment of patients with HELLP syndrome.

1. Anticipate and make the diagnosis
2. Assessment of maternal condition
   Pregnant women with signs and symptoms suggestive of preeclampsia and HELLP syndrome should be evaluated with complete blood count with platelet levels, urine analysis, serum creatinine, LDH, uric acid, bilirubin levels, AST/ALT, coagulation study, and hepatic imaging when indicated.
3. Assessment of fetal condition
   After hospital admission, adequate history should be taken, thorough examination should be done, gestational age confirmed by USG.
   Fetal well-being is evaluated by NST, CST, Doppler, and BPP.
4. Control of blood pressure

The goal is to reduce maternal complication and possible risk of abruption (maintain diastolic BP 90–100 mm Hg)

5. Prevention of seizures with magnesium sulfate when indicated
6. Management of fluid and electrolytes
7. Judicious hemotherapy
   Spontaneous hemorrhage is common when the platelet count is <50,000/µL. Therefore, in general, platelet transfusion is required only in class I HELLP syndrome.[21] For any patient undergoing vaginal delivery with HELLP syndrome, transfusion is required when the platelet count is <20,000/µL. For that of cesarean delivery, the cutoff is 40,000/µL.
8. Management of labor and delivery
   Bishop's score is an important factor to be considered when vaginal delivery is attempted in patients with gestations beyond 32 weeks or in the presence of active labor or membrane rupture.
   Cesarean delivery rate is high (60–70%) in these patients usually undertaken on the basis of a deteriorating maternal or fetal condition, abnormal fetal manifestation, or failure to progress during attempted vaginal delivery.
9. Optimize perinatal care

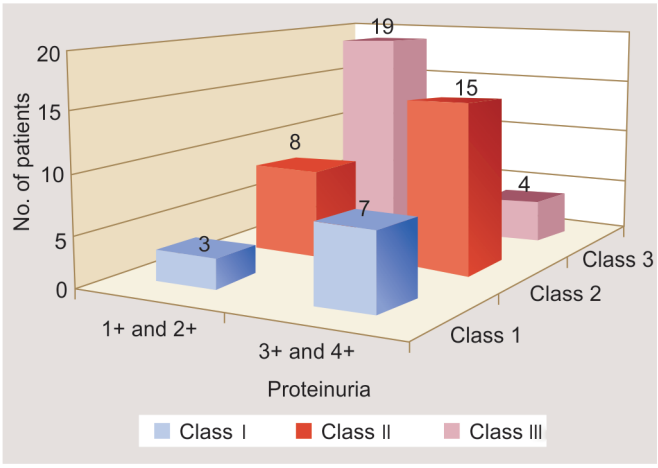

Fig. 3: Distribution of cases according to urine protein

The primary risk to the fetus in HELLP syndrome is prematurity. By postponing delivery in selected cases, we can reduce the risk of prematurity.
Mothers are administered corticosteroids as soon as possible to enhance fetal lung maturity and to decrease risk of necrotizing enterocolitis and intraventricular hemorrhage in pregnancies between 24 and 34 weeks.

10. Intensive management of postpartum period

    In all, 30 to 40% of HELLP syndrome cases are recognized postnatal, most likely during the first 24- to 48 hours postpartum.[22]
    Severe PE–HELLP syndrome patients are managed in recovery room/ intensive care unit as many hours as it takes until:

    - Maternal platelet count exhibits a consistent upward trend, and there is a consistent downward trend in values of LDH.
    - Patient begins a diuresis (>100 mL/hour for over 2 consecutive hours without a fluid bolus or diuretic.)
    - Hypertension is well controlled with BP <150/100 mm Hg.
    - Clinical improvement is obvious to providers, and there are no significant complications.

    Corticosteroids should be continued in the postpartum care of patients with HELLP syndrome for 24 to 48 hours.

Dexamethasone

- 10 mg—2 doses with 12 hours apart
- 5 mg—2 doses with 12 hours apart

If a patient's condition deteriorates after delivery, exclude other diagnosis such as TTP, HUS, and AFLP.

11. Remain alert to the development of multiple organ system failure
    Women with worsening parameters of HELLP syndrome are at an increased risk of maternal morbidity and mortality.
    Plasma exchange is done in refractory cases to facilitate resolution.[23]
12. Counseling regarding future pregnancy

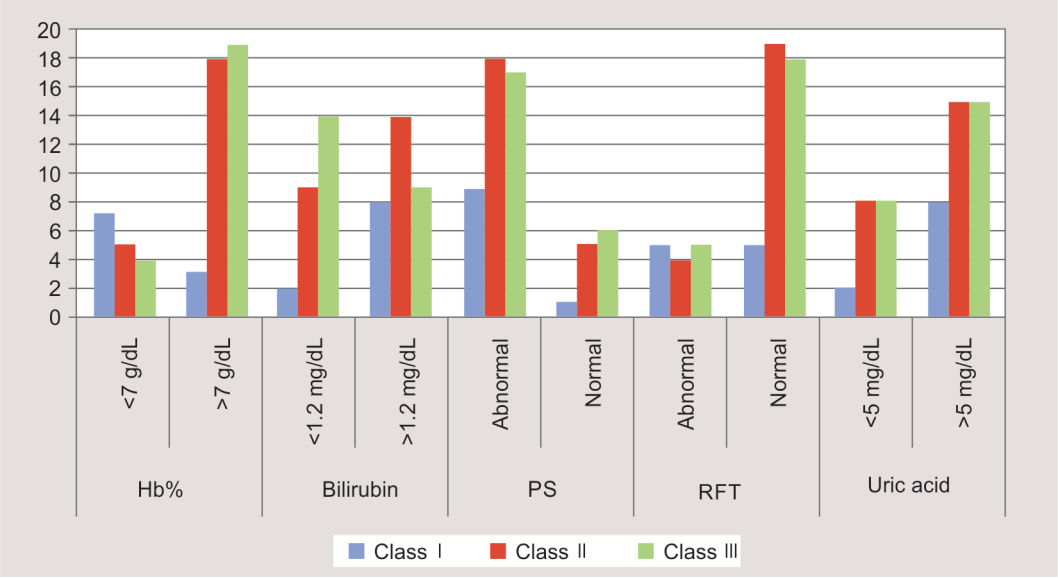

Fig. 4: Distribution of cases according to laboratory findings

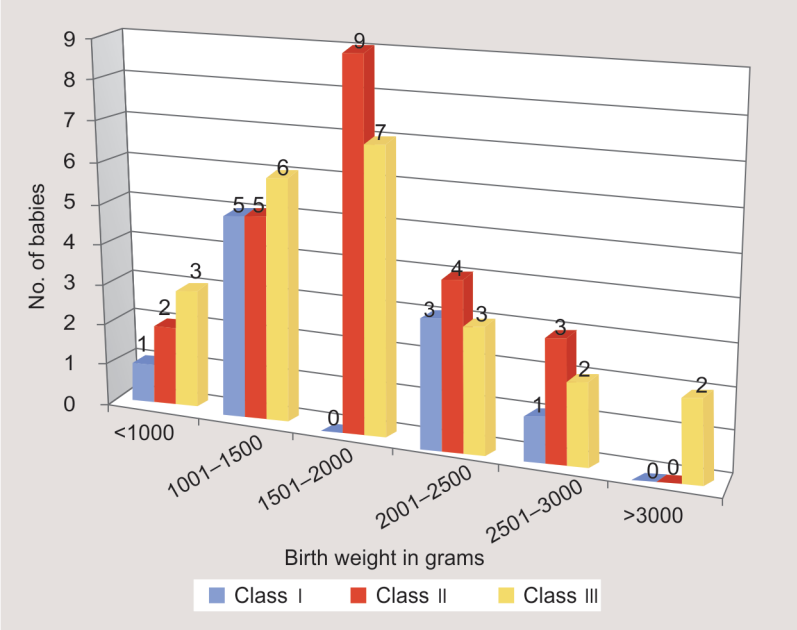

Fig. 5: Distribution of cases according to birth weight (g)

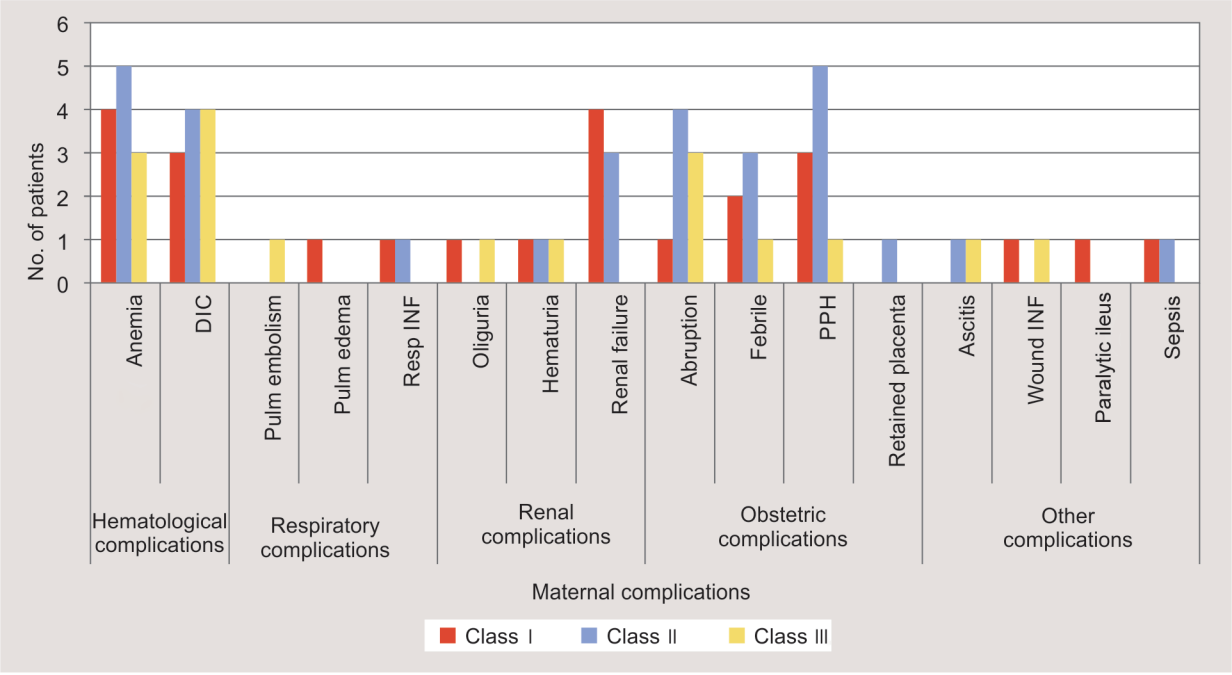

Fig. 6: Distribution of cases according to maternal complications

Recurrence risk of preeclampsia/eclampsia was 42 to 43% with risk of HELLP syndrome ranging from 19 to 27%.[24] Hypertensive disorders of pregnancy may have significant psychological impact on women and their partners, and many parents may refrain from future pregnancies because of their earlier experiences. Therefore, informed counseling about future pregnancies is important.

Materials and Methods

In our observational study, a total number of 56 cases of HELLP syndrome above 24 weeks of gestational age was admitted in Vanivilas Hospital, Bengaluru, during the study period of 24 months from October 2010 to October 2012. Ethical clearance from the hospital Ethical Committee was obtained.

Inclusion Criteria

All pregnant women above 24 weeks of gestational age with preeclampsia / eclampsia with one or more of the following:

- Hemolysis detected by either peripheral smear or elevated indirect bilirubin or elevated LDH levels.
- Elevated liver enzymes.
  - Serum lactate dehydrogenase > 600 IU/L

- Serum aspartate aminotransferase > 70 IU/L
- Serum alanine aminotransferase > 70 IU/L
- Decreased platelet count < 150,000/mm.^{3}

Details and relevant data were recorded through a structured proforma.

Intervention

General nursing care, electrolyte balance, monitoring urine output (by indwelling catheter in eclampsia), maternal and perinatal risk counseling, maintaining hydration, and monitoring of vitals.

Medical Management

- Blood and blood products were used to correct coagulation abnormalities and anemia as needed.
- Inj Dexamethasone 10 mg two times daily for 2 days and 5 mg two times daily for 2 days.
- Antihypertensives
- Prophylactic magnesium sulfate with Pritchard regimen

Obstetric Management

Once the patient was stabilized, Bishop's score was assessed by per vaginal examination. Mode of termination depended upon the period of gestation, favorability of cervix, and the urgency for termination. Cesarean section was done for obstetric indication or worsening parameters. All the women and newborn were followed and monitored for 1 week in the postpartum period or till the hospital stay.

Major maternal complications and associated morbidity were looked for and analyzed. Outcome was measured.

The data obtained for all the patients with class I, II, and III HELLP syndrome has been tabulated and analyzed systematically. The Excel and SPSS (SPSS Inc, Chicago) software packages were used for data entry and analysis. Statistical comparisons were performed with χ^2 and Fischer exact tests with a p value of <0.05 considered statistically significant.

Results

Majority of the cases belonged to class II and class III HELLP, 23 each (41.07%) followed by class I HELLP, 10 (17.86%). According to Tennessee class, partial HELLP (59%) was more common than complete HELLP (41%) (Tables 1 to 10).

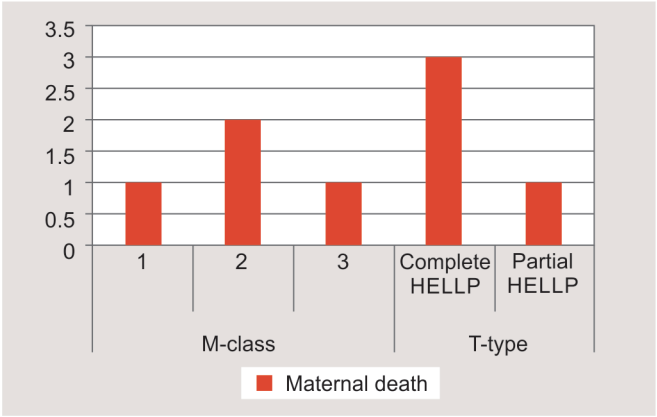

Fig. 7: Distribution of cases according to maternal mortality

Table 1A: Classification of HELLP as per Mississippi's classification class

Class	*No. of patients*	*Percentage*
Class I	10	17.86
Class II	23	41.07
Class III	23	41.07
Total	56	100.00

Table 1B: Classification as per Tennessee type

Class	*Number of patients*	*Percentage*
Complete	23	41.07
Partial	33	58.93
Total	56	100.00

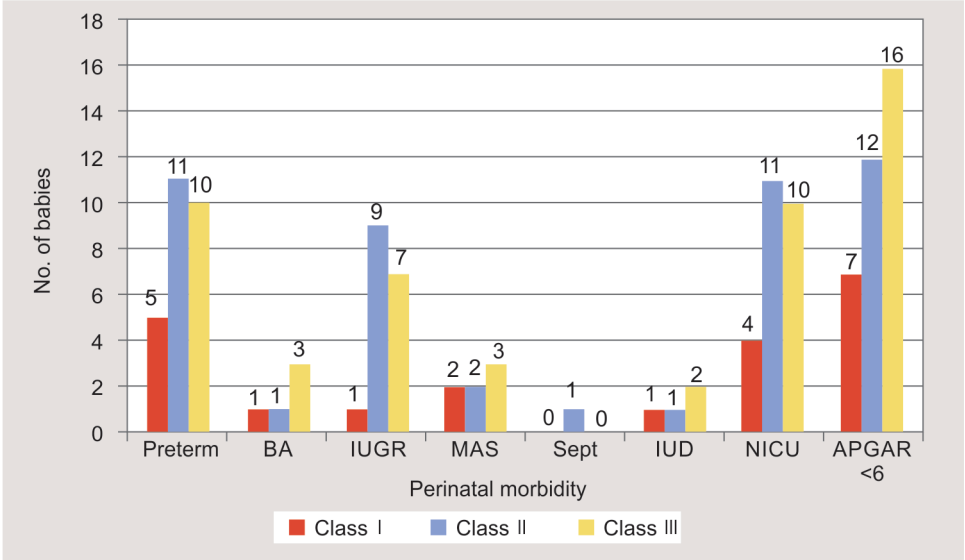

Fig. 8: Distribution of cases according to perinatal outcome

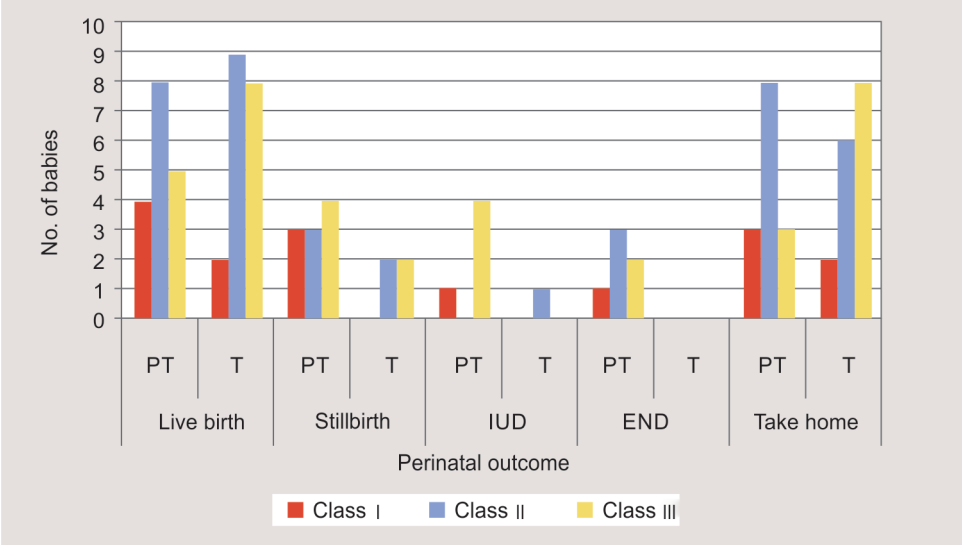

Fig. 9: Perinatal outcome

Table 2: Distribution of cases in relation to parity

Gravida/para	*Class I*	*Class II*	*Class III*	*Total*	*Percentage*
Primi	5	12	16	33	58.93
Multi	5	11	7	23	41.07
Total	10	23	23	56	100.00

Table 3: Distribution of booked and unbooked cases along with referral status

	Class I	*Class II*	*Class III*	*Grand total*	*Percentage*
Booked	1	7	8	16	28.57
Unbooked	9	16	15	40	71.43
Total	10	23	23	56	100.00
Not referred	2	9	9	20	35.71
Referred	8	14	14	36	64.29
Total	10	23	23	56	100.00

Table 4: Distribution of cases according to gestational age

	Class I	*Class II*	*Class III*	*Total*	*Mean ± SD*	*Percentage*
< 28 weeks	3	1	5	9	26.89 ± 1.76	16.07
29–32 weeks	1	5	2	8	31 ± 1.07	14.28
33–36 weeks	3	7	5	15	34.73 ± 0.88	26.78
>37 weeks	3	10	11	24	38.08 ± 0.88	42.85

Table 5: Distribution of cases according to symptoms (complaints)

	Class I	*Class II*	*Class III*	*p value*	*Percentage*
Nausea/vomiting	10	11	9	0.006738	53.57
Headache	8	14	5	0.011109	48.21
RUQ	5	7	2	0.096972	25.00
BOV	3	6	5	0.096972	25.00
Vom + RUQ	5	6	2	0.114559	23.21
All	2	3	1	0.367879	10.71
Anyone	10	18	12	0.001273	71.43

Table 6: Distribution of cases according to clinical signs

Clinical signs		*Class I*	*Class II*	*Class III*	*Total*	*Percentage*	*p value*
BP	Mild	2	8	10	20	35.71	0.5
	Severe	8	15	13	36	64.29	0.5
	Sys	138 ± 4.22	151.48 ± 8.16	175.13 ± 11.71	158.79 ± 17.23		0.548251
	Dia	95 ± 5.6	102.67 ± 7.45	111.48 ± 14.14	112 ± 13.72		0.60904
	MAP	118.1 ± 17.9	121.22 ± 17.98	133.65 ± 17.53	125.77 ± 11.61		0.00022889
Edema	Absent	1	8	19	28	50.00	0.000106
	Present	9	15	4	28	50.00	

Table 7: Distribution of cases according to proteinuria

Urine protein	*Class I*	*Class II*	*Class III*	*Grand total*	*Percentage*
1+ and 2+	3	8	19	30	53.57
3+ and 4+	7	15	4	26	46.43
Grand total	10	23	23	56	100.00

Table 8: Distribution of cases according to laboratory findings

Lab finding		*Class I*	*Class II*	*Class III*	*Total*	*Percentage*
Hb%	<7 g/dL	7	5	4	16	28.57
	>7 g/dL	3	18	19	40	71.43
Bilirubin	<1.2 mg/dL	2	9	14	23	44.64
	>1.2 mg/dL	8	14	9	30	55.36
PS	Abnormal	9	18	17	44	78.57
	Normal	1	5	6	12	21.43
RFT	Abnormal	5	4	5	14	25.00
	Normal	5	19	18	42	75.00
Uric acid	<6 mg/dL	2	8	8	18	32.14
	>6 mg/dL	8	15	15	38	67.86

Table 9: Distribution of cases according to mode of delivery

	Class I	*Class II*	*Class III*	*Grand total*	*Percentage*
Cesarean section	2	2	5	9	16.07
Vaginal	8	21	18	47	83.93
Grand total	10	23	23	56	100.00

Table 10: Distribution of cases according to blood component transfusion

Component transfusion	*Class I*	*Class II*	*Class III*	*Grand total*	*Percentage*
Not transfused	0	8	15	23	41.07
Transfused	10	15	8	33	58.93
Grand total	10	23	23	56	100.00

Maximum number of cases belonged to primipara (33 cases, 58.93%) followed by multipara (23 cases, 41.07. There was no statistical significance of parity between different classes (p value = 0.4).

Majority of the cases were unbooked (40 cases, 71.43%). This is mainly because our hospital is a tertiary referral center. There is a statistical significance of ANC status (booked/unbooked) among different classes ($p = 0.0996324$).

Majority of the patients presented with at least any one symptom (40 cases, 71.43%), 30 cases (53.57%) presented with nausea and vomiting, 27 cases (48.21%) presented with headache, 14 cases (25%) each presented with right upper quadrant pain and blurring of vision. Six (10.71%) cases presented with all the symptoms.

Majority of the patients presented with BP >160/110 mm Hg (36 cases, 64.29%). The mean systolic BP was 158.79 + 17.23, and the mean diastolic BP was 112 + 13.72 with MAP of 125.77 + 11.61.

There was a statistical significance of MAP among different classes (p value = 0.00022889).

Table 11: Distribution of cases according to birth weight (g)

Birth weight in g	*Class I*	*Class II*	*Class III*	*Grand total*	*Percentage*
<1,000	1	2	3	6	10.71
1,001–1,500	5	5	6	16	28.57
1,501–2,000	0	9	7	16	28.57
2,001–2,500	3	4	3	10	17.86
2,501–3,000	1	3	2	6	10.71
>3,000	0	0	2	2	3.57
Grand total	10	23	23	56	100.00
	1725 ± 615.65	1865.22 ± 574.54	1852.17 ± 741.23	1834.82 ± 645.4	

Table 12: Distribution of cases according to maternal complications

		1	*2*	*3*	*Total*	*Percentage*
Hematological complications	Anemia	4	5	3	12	21.43
	DIC	3	4	4	11	19.64
Respiratory complications	Pulm. embolism	0	0	1	1	1.79
	Pulm. edema	1	0	0	1	1.79
	Resp INF	1	1	0	2	3.57
Renal complications	Oliguria	1	0	1	2	3.57
	Hematuria	1	1	1	3	5.36
	Renal failure	4	3	0	7	12.50
Obstetric complications	Abruption	1	4	3	8	14.29
	Febrile	2	3	1	6	10.71
	PPH	3	5	1	9	16.07
	Retained placenta	0	1	0	1	1.79
Others complications	Ascitis	0	1	1	2	3.57
	Wound INF	1	0	1	2	3.57
	Para ileus	1	0	0	1	1.79
	Sepsis	1	1	0	2	3.57

Table 13: Distribution of cases according to maternal death

M-Class	*Maternal death*	*Percentage*
Class I	1	25.00
Class II	2	50.00
Class III	1	25.00
	4	100.00
T-Class	*Maternal death*	*Percentage*
Complete	3	0.75
Partial	1	0.25
	4	1

Maximum number of patients has proteinuria 1+ and 2+ (30 cases, 53.57%) followed by 3+ and 4+ (26 cases, 46.43%).

Majority of the patients in class I HELLP had 3+ and 4+ proteinuria (7 cases, 70%).

There is a statistical significance of proteinuria between different classes. ($p = 0.001$).

Out of the 56 cases of HELLP syndrome, 47 cases (83.93%) delivered by vaginal route. Cesarean section rate in HELLP was 16.07% (9 cases).

Thirty-three cases (58.93%) required transfusion of blood or components, while 23 cases (41.07%) did not require. Out of the cases that required transfusion, 10 cases (30.3%) belonged to class I, 15 cases (45.45%) belonged to class II and 8 cases (24.24%) belonged to class III (Tables 11 to 17).

There is a statistical significance of blood component transfusion among different classes ($p = 0.001$).

Majority of the infants in class I HELLP belonged to 1,001–1,500 g (5 cases, 50%), class II HELLP belonged to 1,501–2,000 g (9 cases, 39.13%), and class III HELLP belonged to 1,501–2,000 g (7 cases, 30.43%). There is no statistical significance of birth weight among different classes (p value = 0.42).

Thirty-four patients out of the 56 patients had maternal complications (60.71%). Severe anemia with Hb <7 g% (12 cases, 21.43%), DIC (11 cases, 19.64%), PPH (9 cases, 16.07%), and abruption (8 cases, 14.29%) were the common complications.

There were four maternal deaths in the study group. Hence, the case fatality rate in HELLP syndrome was 7.14%, and HELLP contributed to 3.57% of the maternal deaths during the study period.

In this present study, 46.43% (26 cases) were preterm babies, out of which, 11 (42.3%) cases belonged to class II HELLP, and 30.36% (17 cases) had IUGR.

In class I HELLP—7 cases (33.3%), in class II—12 cases (25%), and in class III—16 cases (31.37%) had initial APGAR < 6.

The 56 pregnancies resulted in 56 babies. There were 14 (25%) stillbirth, 6 (10.71%) IUD, and 6 (10.71%) resulted in early neonatal deaths.

There were 36 (64.29%) live births. The perinatal mortality in this study was 46.43%.

Discussion

The incidence of HELLP syndrome and total number of deaths from HELLP have dramatically declined in the developed countries due to improvement in antenatal care, prompt diagnosis, and management of preeclampsia. In developing countries, preeclampsia–eclampsia with HELLP and its complication still contribute to maternal and perinatal morbidity and mortality.

In the present study, there was equal distribution of cases in multipara and primipara in class I HELLP.

In the present study, majority (71.43%) of the patients were unbooked. It has been widely accepted that standard antenatal care has immense values in reducing the incidence of HELLP syndrome by early detection of PE and its prompt management. In the present study, majority of the HELLP were in gestational age >37 weeks (42.85%) comparable to Vigil and Gracia[7] 40%. In this present study, proteinuria 3+ 4+ (46.43%) were comparable to Vigil and Gracia et al.[7] 56%. Class I HELLP 70%, class II HELLP 65.22%, class III HELLP 17.4% in this study were also comparable to Vigil and Gracia et al.[7] class I 71%, class II 62%, and class III 30%.

Majority of the patients in this study delivered vaginally, 83.93% higher than Vigil and Gracia[7] 29%. We allowed vaginal delivery mainly because of better stabilization of the disease process and also because of less concern for fetal outcome compared to maternal outcome. Majority of the babies of HELLP mother weighed <2,000 g 67.85% in the present study. This was because majority of the babies were preterm and IUGR. In this present study, maternal mortality is 7.14% and is higher than Vigil and Gracia[7] 2.3% and Sibai[2] 1.8%. This is because our hospital is a tertiary referral center with cases being referred from all over the state and the border districts.

Table 14: Distribution of cases according to maternal mortality

Total number of HELLP syndromes	56
Total number of maternal deaths	4
Case fatality rate in HELLP syndrome	7.14%
Total number of maternal deaths during the study period	112
Proportional mortality rate due to HELLP syndrome	3.57%

Table 15: Causes of maternal mortality

Pulmonary embolism	1
Renal failure	2
Disseminated intravascular coagulation	1

Table 16: Distribution of cases according to perinatal outcome

	Class I	*Class II*	*Class III*	*Grand total*	*Percentage*
Preterm	5	11	10	26	46.43
BA	1	1	3	5	8.93
IUGR	1	9	7	17	30.36
MAS	2	2	3	7	12.50
Sept	0	1	0	1	1.79
IUD	1	1	2	4	7.14
NICU	4	11	10	25	44.64
APGAR < 6	7	12	16	35	62.50

Table 17: Perinatal outcome

		Class I	*Class II*	*Class III*	*Grand total*	*Percentage*
Live birth	PT	4	8	5	17	64.29
	T	2	9	8	19	
	Total	6	17	13	36	
Stillbirth	PT	3	3	4	10	25.00
	T	0	2	2	4	
	Total	3	5	6	14	
IUD	PT	1	0	4	5	10.71
	T	0	1	0	1	
	Total	1	1	4	6	
END	PT	1	3	2	6	10.71
	T	0	0	0	0	
	Total	1	3	2	6	
Take home	PT	3	8	3	14	53.57
	T	2	6	8	16	
	Total	5	14	11	30	

The patients would be already with advanced disease progression with poor maternal and perinatal outcome.

Majority of the causes of PNM in our study was preterm (46.43%), still birth (25%), SGA (30.36%), and birth asphyxia (83.33%). Vigilant fetal monitoring (including electronic fetal monitoring), prompt timely intervention at the periphery, and improvement in neonatal care facilities with good prenatal care at the foremost are needed to reduce the perinatal mortality in the present study.

Conclusion

In our study done in Vanivilas Hospital over a period of 2 years, there were 56 cases of antepartum HELLP syndrome. Once the diagnosis of HELLP syndrome has been made, it warrants aggressive intervention with control of blood pressure, anti-seizure prophylaxis, corticosteroid treatment for fetal lung maturity, and expeditious delivery. HELLP syndrome, among preeclampsia and eclampsia cases, is associated with significant maternal morbidity and perinatal mortality and morbidity. The present study shows maternal mortality of 7.14%, but still perinatal mortality constitutes 46.43%. In order to reduce the maternal and perinatal mortality, it is highly desirable that obstetric care providers at all levels become knowledgeable about the early diagnosis and management of HELLP syndrome.

We have to intensify our efforts to reduce preeclampsia with HELLP syndrome from the grassroot level with regular antenatal care, early detection of preeclampsia, and its prompt management and early detection of complications with timely intervention. This will go a long way in preventing this catastrophic disease.

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