The Evaluation of Cases with HELLP Syndrome

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Abstract

Objective: To evaluate the maternal-fetal mortality and morbidity results and relationship between perinatal and maternal complications and maternal laboratory parameters.

Methods: The laboratory findings, maternal– fetal mortality and morbidity results of 25 cases with HELLP syndrome hospitalised in our clinic between 1/1/1998 and 1/11/2004 were evaluated retrospectively. The relation between laboratory parameters and the risk of perinatal and maternal complications of women that had at least one perinatal and maternal complication were evaluated.

Results: Of the cases with HELLP syndrome 92% had preeclampsia. The mean age was 28.6 ± 5,6 years and 72% were multiparas. Mean age of gestation was 31.8 ± 4.8 weeks, mean newborn weight was 1580.9 ± 850.6 g. Of the 88% of the cases caeserian sections were performed. Serious changes were seen in the hematologic results, liver and renal function tests of cases with HELLP syndrome. Maternal mortality occured as a result of DIC in two cases. The most common cause of maternal morbidity was abruptio placenta (28%), the most common perinatal complication was found to be prematurity (76%). Prolongation of prothrombin time, lowered platelets, increased levels of AST, ALT, bilirubin and creatinine were found as laboratory parameters in the group with maternal complications. Decrease in fibrinogen levels was noted in the group with perinatal complications. No significant changes in laboratory parameters were found to predict perinatal complications in groups selected according to laboratory parameters except fibrinogen levels < 200 mg/dl and creatinine levels > 2 mg/ dl. However, platelet numbers < 70 000 mm^3, AST levels < 200 mg/dl and creatinine levels > 2 mg/dl were found to be risk denominators for prediction of maternal complications separately.

Conclusion: HELLP syndrome seriously increases maternal-fetal mortality and morbidity. Laboratory parameters in cases with HELLP syndrome are not efficient in detecting perinatal results, but can be used as risk denominators in evaluating maternal complications.

Keywords: HELLP syndrome, Maternal-fetal mortality and morbidity.

HELLP sendromu olgularımızın değerlendirilmesi

Amaç: HELLP sendromu olgularımızın maternal-fetal mortalite ve morbidite sonuçlarını ve perinatal ve maternal komplikasyonların laboratuvar parametreleri ile olan ilişkisini incelemek.

Yöntem: Kliniğimizde 1/1/1998-1/11/2004 tarihleri arasında takip edilen 25 HELLP sendromu olgusunun laboratuvar bulguları maternal-fetal mortalite ve morbidite sonuçları retrospektif olarak incelendi. En az bir adet perinatal ve maternal komplikasyon gelişen kadınların laboratuvar parametreleri ve laboratuvar parametrelerine göre perinatal ve maternal komplikasyon gelişme riski incelendi.

Bulgular: Olguların %92'si ağır preeklampsi zemininde gelişmişti. Olguların yaş ortalaması 28,6 ± 5,6 yıl olup, %72'si multipar idi. Ortalama gebelik haftası 31.8 ± 4.8 hafta, ortalama yeni doğan ağırlığı 1580.9 ± 850.6 g idi. Olguların %88'i sezaryen ile doğurtuldu. Olguların hematolojik, karaciğer ve böbrek fonksiyon testlerinde önemli değişiklikler izlendi. Maternal mortalite 2 olguda

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dissemine intravasküler koagülasyon (DIK) nedeni ile gerçekleşti. En sık maternal morbidite sebebi dekolman plasenta (%28), en sık perinatal komplikasyon ise prematürite (%76) olarak tespit edildi. Maternal komplikasyon gelişen kadınların laboratuvar parametrelerinde protrombin zamanında uzama, trombosit sayısında azalma, AST, ALT, bilirübin ve kreatinin düzeyinde artma tespit edildi. Perinatal komplikasyon gelişen kadınların laboratuvar parametrelerinden sadece fibrinojen düzeyinde azalma tespit edildi. Laboratuvar parametrelerine göre oluşturulan gruplarda perinatal komplikasyonu belirlemede fibrinojen düzeyinin < 200 mg/dl ve kreatinin > 2 mg/dl olması dışında anlamlı bulgu tespit edilemedi. Ancak trombosit sayısının < 70.000/mm3, AST düzeyinin > 400 IU/l, ALT düzeyinin > 400 IU/l, protrombin zamanının > 14 sn, fibrinojen düzeyinin < 200 mg/dl ve kreatinin düzeyinin > 2 mg/dl olması maternal komplikasyon gelişmesi için birbirinden bağımsız risk belirteci olarak tespit edildi.

Sonuç: HELLP sendromu maternal-fetal mortalite ve morbiditeyi ciddi oranda arttırmaktadır. Ayrıca HELLP sendromu olan olgularda laboratuvar parametreleri perinatal sonucu belirlemede yeterince etkin olmayıp, maternal komplikasyonları belirlemede risk belirteci olarak kullanılabilir.

Anahtar kelimeler: HELLP sendromu, Maternal-fetal mortalite ve morbidite.

Introduction

HELLP syndrome is seen by hemolysis (H), elevated liver enzymes (EL) and low platelets (LP) which are found by laboratory results in 0.1-0.6% of all gestations and 5-10% of heavy preeclampsia and eclampsia patients and it was first mentioned in 1954 by Pritchard and defined by Weinstein in 1982.[1,2] There are still debates on its diagnosis and treatment, characteristics of the illness are microangiopathic hemolytic anemia and local thrombocyte aggregation.[3] Generally, a severe preeclampsia accompanies it. 70% of cases are observed in antenatal period 30% of cases are observed in postpartum period.[4] Different frequency values are reported in the literature due to different criteria and methods used for the diagnosis of HELLP syndrome. Even though there is not any standard definition, most used criteria for the diagnosis of HELLP syndrome is Sibai's criteria[3,4]

If case has one or two of hemolysis, low platelets or thrombocytopenia criteria, it is called partial HELLP syndrome and if case has three criteria, then it is called as complete HELLP syndrome.[5]

Martin et al suggested Mississippi classification after retrospective examination of 302 cases with HELLP syndrome. They classified cases as; Class I: thrombocyte count < 50.000/ mm^3, Class II: thrombocyte count 50.000 – 100.000/ mm^3, Class III: thrombocyte count 100.000 – 150.000/ mm^3.[6]

HELLP syndrome is a serious maternal – perinatal mortality and morbidity reason and it may include or result with DIC, acute kidney failure (AKF), ablatio placentae, pulmonary edema, acute respiratory distress syndrome (ARDS), serious complications such as haematoma and liver rupture in incision line or abdomen.[5] Birth timing is decided as to gestational week of fetus and general situation of mother. If fetal lung maturation exists, birth is suggested; if lung maturation is not occurred yet, generally urgent birth is offered but also studies including conservative approach are available.[7,8]

Our purpose in this study is to examine clinical and laboratorial qualities of our cases with HELLP syndrome, to determine maternal-fetal morbidity and mortality rates and also to evaluate the relationship between laboratory diagnoses and maternal and perinatal complications.

Methods

Cases that were diagnosed as having HELLP syndrome within 148 preeclamptic cases monitored in between 1/1/1998 and 1/11/2004 in Clinics of Gynecology and Obstetrics of Haydarpasa Numune Training and Research Hospital were inspected. Hematological examinations, function tests of liver and kidney in laboratory analyzes which were done routinely when cases with HELLP syndrome applied to hospital were evaluated.

HELLP syndrome diagnosis was done by the definition of Sibai which was described as hemolysis, abnormal peripheral blood spreading (schistocyte existence), increased bilirubin level (> 1.2 mg/dl), high LDH level (> 600 IU/L), increase in liver enzymes (AST > 70 IU/L) and thrombocyte count < 100.000/mm^3.[3,4]

Mother age (year), gestation count (number), birth count (number), gestational week (week), newborn weight (g), birth type, systolic blood pressure (SBP), diastolic blood pressure (DBP), hemoglobin (hb), hematocrit (hct), thrombocyte count, prothrombin count, hematological examinations such as fibrinogen, liver function tests such as total bilirubin, AST, ALT, LDH, also urea, creatinin, uric acid, total protein, albumin and kidney function tests such as protein measurement in urea of 24 hours while applying to hospital were determined. Furthermore, early neonatal death, prematurity, intrauterine growth restriction and intrauterine death in terms of perinatal complications; maternal mortality, ablatio placentae, DIC, AKF, haematoma in incision line in terms of maternal complications and laparotomy and eclampsia existences due to intraabdominal bleeding were researched.

DIC diagnosis were made for cases who at least one of the parameters of 1) Thrombocyte < 100.000/mm^3, 2) Fibrinogen < 300 mg/dl, 3) D-dimer > 40 mg/dl, 4) Prothrombin time > 14 sec, 5) Partial thromboplastin time > 40 sec.

AKF was formed of cases having oligo/anuria, creatinin clearance < 20 ml/min and serum creatinin > 2 mg/dl.

Early neonatal death was including deaths occurred within first 7 days after livable birth. First, maternal general state and later fetal gestational week of case that had HELLP syndrome diagnoses are evaluated in our clinic and it is decided to direct. $MgSO_4$ as 1.5- 2 gr/hour i.v. infusion were applied to all pregnants after convulsion prophylaxis, 4.5 gr i.v. charging dose. Misoprostol (vaginal 50 µg in every 4 hours) was applied to pregnants who were not in research in order to provide cervical maturation. Oxytocin infusion and induction were applied later if required. First of all, vaginal birth was planned as birth type. The birth was ended by cesarean due to no response induction and obstetric reasons.

Clinical and laboratory diagnoses of women who had and did not have at least 1 maternal and perinatal complication were examined.

Cases were separated into groups as to their some laboratory diagnoses while they applied to hospital, maternal and perinatal complications were compared as to these values. Importance of these laboratory parameters for determining maternal and perinatal complications was statistically evaluated. Groups separated as to laboratory diagnoses were:

1. a. Thrombocyte < 70.000/mm^3
   b. Thrombocyte > 70.000/mm^3
2. a. SGOT ≥ 400 IU/l
   b. SGOT < 400 IU/l
5. a. SGPT ≥ 400 IU/l
   b. SGPT < 400 IU/l
6. a. LDH ≥ 1400 IU/l
   b. LDH< 1400 IU/l
7. a. Prothrombin time ≥ 14 sec
   b. Prothrombin time < 14 sec
8. a. Fibrinogen < 200 mg/dl
   b. Fibrinogen ≥ 200 mg/dl
9. a. Creatinin ≥ 2 mg/dl
   b. Creatinin < 2 mg/dl

All biochemical parameters were done in biochemistry laboratory in our hospital and hemogram tests were done ABBOT cell DYN 3700 and biochemistry tests were done by Aeroset autoanalysts.

Statistical analyzes were done by "SPSS for Windows, standard version 11.5" program. Continual variables were evaluated as average (x) ± standard deviation (Sx). Age, primipara, multiparity, gestation count, birth count, newborn weight, gestational week at birth, SBP, DBP, Hb, Hct, prothrombin count, fibrinogen, AST, ALT, LDH, bilirubin, creatinin, uric acid, total protein, albumin and protein levels in urea of 24 hours of groups which had and did not have at least one maternal and perinatal complication were evaluated. Maternal and perinatal complication existence of these groups separated as to aforementioned laboratory diagnoses were compared by means of ki-square

test by Yates correction and they were compared by means of Fisher absolute X^2 test in the existence of frequency lower than five and Odds Ratio (OR) and Confidence Intervals (CI) about 95% of maternal and perinatal complication incidence risk in these groups were calculated.

Results

25 (16.9%) of 148 eclamptic and preeclamptic cases had HELLP syndrome. As to Mississippi classification, 28% (n=7) of our cases were determined as Class I, 36% (n=9) of our cases were determined as Class II and 36% (n=9) of our cases were determined as Class III. 92% of cases had heavy preeclampsia. Age average of cases was 28.6 ± 5.6 years and their gestation count was 3.1 ± 2.1. 72% of our cases with HELLP syndrome were found as multipara. 32% of cases were observed before 28th week and 68% of them were observed after 28th week. Average gestational week was 31.8 ± 4.8 and average newborn weight was 1580.9 ± 850.6 g. 22 (88%) of cases gave birth by cesarean and 3 (12%) of them gave birth by vaginal way. The cesarean was done in 2 cases with HELLP syndrome who had intrauterine death due to the fact that one of them could not had cervical maturity by misoprostol, did not response oxytocin and maternal case of this case got worse and due to the fact that other case had placenta praevia. Important demographic and clinical parameters of cases are shown in Table 1.

It was found that 76% of cases with HELLP syndrome did not get any monthly care before gestation. Also 88% of cases were formed of patients who were dispatched to our hospital for requirement of intensive care.

Important changes were observed about determining laboratory parameters of cases. Especially, Hb was found as 9.4±1.8 g/dl, prothrombin time was found as 18.1±7.7 sec and thrombocyte count was found as 61666.7±21696.4/mm^3 within hematological parameters. Changes in hematological parameters are shown in Table 2.

For liver and kidney function tests of cases, values were found as following; AST 654.8 ± 545.8 IU/L, ALT 495.3±388.1 IU/L, LDH 2021.5±2016.6 IU/L, albumin 2.7±0.5 g/dl and protein in urine for 24 hours 4.7±2.4 g. Changes in parameters of liver and kidney function tests are shown in Table 3.

Maternal mortality occurred in 2 cases due to DIC. Relaparotomy was done for determination in terms of maternal morbidity due to DIC in 6 cases (24%), ablatio placentae in 7 cases (28%), AKF in 5 cases (20%), eclampsia in 3 cases (12%), haematoma in incision line in 4 cases (16%), intraabdominal bleeding in 3 cases (12%). Total abdominal hysterectomy was done in one case which had laparotomy and uterine artery ligation was done in 2 cases. Maternal morbidity reasons and rates of cases are shown in Table 4.

Early neonatal death was found in 6 cases (24%) and death in intrauterine period was found in 5 cases (20%). Prematurity which is one of perinatal morbidity reasons was observed in 19 cases (76%) and IUGR was observed in 10 cases (40%) (Table 5).

Statistically no significant difference was found between clinical parameters of women who had and did not have at least one maternal complication. Extension in prothrombin time (p= 0.023), decrease in thrombocyte count (p= 0.012), increase in AST level (p= 0.03), increase in ALT level (p= 0.037), increase in bilirubin level (p= 0.012) and increase in creatinin level (p= 0.019) was found in laboratory parameters of women who had maternal complication (Table 6).

While statistically a significant difference (p= 0.005) was found between clinical parameters of women who had and did not have at least one perinatal complication in terms of only newborn weight, a decrease (p= 0.04) in fibrinogen level of women who had only perinatal complication was found (Table 7). No significant laboratory diagnosis was found for determination of perinatal complication in groups formed as to their laboratory parameters except fibrinogen level < 200 mgr/dl (p= 0.041) and creatinin level > 2 mg/dl (p= 0.008) (Table 8). Laboratory parameters as being thrombocyte count < 70.000/mm3 (p= 0.005 OR: 17.2), being AST level > 400 IU/l (p= 0.014 OR: 9.4), being ALT level > 400 IU/l (p= 0.045 OR: 6.4), being prothrombin time > 14 sec (p= 0.013 OR: 15.8), being fibrinogen level < 200 mgr/dl (p= 0.001 OR: 26) and being creatinin level > 2 mg/dl (p=0.008) were found as a free risk determinant for maternal complication growth (Table 9).

Table 1. Demographic qualities and clinical parameters of cases with HELLP syndrome.

	HELLP sendromlu olgular
Age (year)	28.6±5.6
Primipara	%28
Multipara	%72
Fetal birth weight (g)	1580.±850.6
Gestational week (week)	31.8±4.8
Gravida (number)	3.1±2.1
Parity (number)	1.57±2.1
Systolic blood pressure (mmHg)	173.8±43.1
Diastolic blood pressure (mmHg)	113.3±23.3

Values are given as average (x) ± Standard variation (Sx).

Table 2. Hematological parameters in cases with HELLP syndrome.

	Cases with HELLP syndrome
Hemoglobin (g/dl)	9.4 ± 1.8
Hematocrit (%)	28.1 ± 6.2
Coagulation Time (sec)	18.1 ± 7.7
Platelet (/mm^3)	61666.7 ± 21696.4
Fibrinogen (mg/dl)	224 ± 144.5
MPV (Mean platelet volume)	10.1 ± 1.5

Values are given as average (x) ± Standard variation (Sx).

Table 3. Important laboratory parameters evaluated within liver and kidney function tests in cases with HELLP syndrome.

	Cases with HELLP syndrome
AST (IU/L)	654.8 ± 545.8
ALT (IU/L)	495.3 ± 388.1
LDH (IU/L)	2021.5 ± 2016.6
Bilirubin (mg/dl)	1.6 ± 1.4
Urea (mg/dl)	32.1 ± 19.6
Creatinin (mg/dl)	0.9 ± 0.4
Uric acid (mg/dl)	7,2 ± 1,9
Total protein (g/dl)	5 ± 1.3
Albumin (g/dl)	2.7 ± 0.5
Proteinuria (g/24 saat)	4.7 ± 2.4

Values are given as average (x) ± Standard variation (Sx).

Table 4. Maternal morbidity reasons and rates in our cases with HELLP syndrome.

	Count	%
DIC	6	24
Ablatio placentae	7	28
Acute kidney failure	5	20
Eclampsia	3	12
Haematoma in incision line	4	16
Laparotomy	3	12

Values are given as n, %.

Table 5. Perinatal mortality and morbidity reasons and rates in our cases with HELLP syndrome.

	Number	%
Perinatal mortality	11	44
Intrauterine death	5	20
Early neonatal death	6	24
Prematurity	19	76
IUGR	10	40

Values are given as n, %.

The relationship with maternal death (p= 0.009), ablatio placentae (p= 0.016), laparotomy (p= 0.001), AKF (p= 0.0001), haematoma in incision line (p=0.009) and early neonatal death (p= 0.005) was found statistically significant for determining our cases with DIC (Table 10).

Discussion

HELLP syndrome is a serious maternal – perinatal mortality and morbidity reason which frequently grow in a severe preeclampsia medium and causes considerable changes at function hematological and liver functions.

As to general literature information, HELLP syndrome is observed in 4-12% of severe preeclampsia and eclampsia cases.[9] Kesim et al found this rate as 8.75% in hypertension cases that gestation induces and Zeng et al similarly found this rate as 8% in their work.[10,11] This rate was found in our work as 16.9%. We think that this high rate arises from that our hospital is a center and dispatching hospital which gives third level of care.

Contrary to preeclampsia, HELLP syndrome is frequently seen in multipara and older pregnants.[12] Age average was 30 ± 5.9 years and 70% of cases were multipara in the study of Celik et al.[13] In our work, age average was found as 28.6 ± 5.6 years and 72% of cases were multipara.

Debates on direction of cases with HELLP syndrome which do not have fetal lung maturation still continue. Discussion about direction of ending the illness by birth as in severe preeclampsia cases and waiting shows similarity. Actual treatment is birth.

Table 6. Clinical and laboratory diagnoses of women who have and do not have at least 1 maternal complication.

	Maternal complication exists	Maternal complication does not exist	P value
Age (year)	28.7 ± 6.9	28.3 ± 4.6	0.851
Primipara	0.4 ± 0.5	1.6 ± 0.5	0.295
Multipara	1.6 ± 0.5	1.8 ± 0.4	0.295
Gravida (number)	2.5 ± 1.8	3.1 ± 2.2	0.451
Parity (number)	0.9 ± 1.2	1.9 ± 2.3	0.230
Weight (g)	1476 ± 947.2	1800.4 ± 744	0.348
Gestational Age (Week)	31 ± 5.3	32 ± 3.7	0.510
SBP (mmHg)	171 ± 43.1	174.7 ± 39.1	0.827
DBP (mmHg)	116 ± 22.7	110 ± 21.4	0.509
Hemoglobin (g/dl)	8.9 ± 1.5	9.7 ± 1.7	0.231
Hematocrit (%)	28.2 ± 4.5	28.4 ± 6.5	0.927
Prothrombin Time (sec)	25.6 ± 23.9	10.6 ± 2.3	0.023*
Thrombocyte (/mm^3)	56600 ± 18422.2	94533.3 ± 41064	0.012*
Fibrinogen (mg/dL)	187.7 ± 157.5	270.9 ± 112,3	0.136
AST (IU/L)	1044.2 ± 1275.5	297.9 ± 163.4	0.03*
ALT (IU/L)	743.4 ± 776.5	291.8 ± 156.1	0.037*
LDH (IU/L)	2344.6 ± 275.5	1471.1± 996.2	0.269
Biluribin (mg/dL)	2.5 ± 2.2	0.9 ± 0.5	0.012*
Urea (mg/dL)	38.1 ± 24.8	29.8 ± 12.6	0.283
Creatinin (mg/dL)	1.6 ± 0.9	0.9 ± 0.4	0.019*
Uric acid (mg/dL)	7.4 ± 2.5	7.1 ± 1.4	0.646
Total protein (g/dL)	4.8 ± 1.1	4.9 ± 1.5	0.792
Albumin (g/dL)	2.8 ± 0.5	2.6 ± 0.5	0.541
Protein (g/urea of 24 hours)	5.4 ± 2.6	3.9 ± 1.9	0.1

Values are given as average (x) ± Standard variation (Sx).
* Statistically significant difference is found.

Table 7. Clinical and laboratory diagnoses of women who have and do not have at least 1 perinatal one complication

	Maternal complication exists	Maternal complication does not exist	p value
Age (year)	28.6 ± 5.2	27.8 ± 7.1	0.777
Primipara	0.3 ± 0.4	0.4 ± 0.6	0.524
Multipara	1.7 ± 0.4	1.6 ± 0.6	0.524
Gravida (number)	3.1 ± 2.1	2.2 ± 1.3	0.4
Parity (number)	1.6 ± 2.1	1.2 ± 1.3	0.726
Weight (g)	1448.3 ± 772.6	2560 ± 210.4	0.005*
Gestational Age (Week)	30.9 ± 4.3	34.8 ± 3,1	0.07
SBP (mmHg)	178 ± 39.6	154 ± 39.1	0.236
DBP (mmHg)	116 ± 18.5	98 ± 29.5	0.097
Hemoglobin (g/dl)	9.2 ± 1.7	9.7 ± 1.5	0.588
Hematocrit (%)	29 ± 5.3	25.6 ± 6.9	0.226
Prothrombin Time (sec)	17.9 ± 18.3	11.3 ± 3.3	0.437
Thrombocyte (/mm^3)	80800 ± 39291.9	73600 ± 37931.5	0.716
Fibrinogen (mg/dl)	210.2 ± 118.3	347.4 ± 15.9	0.04*
AST (IU/L)	668.8 ± 967.6	306.8 ± 105.8	0.419
ALT (IU/L)	519.7 ± 190.9	283.6 ± 183.5	0.393
LDH (IU/L)	1851.8 ± 1987.5	1645.2 ± 1699.9	0.873
Bilirubin (mg/dl)	1.2 ± 0.9	2.6 ± 3.1	0.075
Urea (mg/dl)	34.1 ± 19.6	29.6 ± 14.1	0.639
Creatinin (mg/dl)	1.3 ± 0.7	0.7 ± 0.2	0.098
Uric acid (mg/dl)	7.4 ± 1.8	6.4 ± 1.9	0.317
Total protein (g/dl)	4.8 ± 1.4	4.9 ± 1.1	0.875
Albumin (g/dl)	2.6 ± 0.5	2.9 ± 0.3	0.283
Protein (g/urea of 24 hours)	4.7 ± 2.4	3.7 ± 1.6	0.395

Values are given as average (x) ± Standard variation (Sx).
* Statistically significant difference is found.

Table 8. Rates of perinatal complications as to laboratory diagnoses of cases with HELLP syndrome.

	Perinatal complication exists n (%)	Perinatal complication does not exist n (%)	p value	OR (%95 CI)
Thrombocyte < 70000 (/mm³)	12(60)	2(40)	0.420	1.4(0.1-14.1)
Thrombocyte > 70000 (/mm³)	8(40)	3(60)		
AST >400 (IU/l)	7(35)	1(20)	0.520	1.3(0.9-18.8)
AST<400 (IU/ l)	13(65)	4(80)		
ALT >400 (IU/l)	6(30)	1(20)	0.0.659	1.1(0.8-14.7)
ALT <400 (IU/l)	14(70)	4(80)		
LDH >1400 (IU/l)	10(50)	2(40)	0.870	1.5(0.2-11.3)
LDH <1400 (IU/l)	10(50)	3(60)		
Prothrombin Time >14 (sec)	5(25)	1(20)	0.815	0.6(0.3-11.5)
Prothrombin Time <14 (sec)	15(75)	4(80)		
Fibrinogen <200 mg/dl	10(50)	0	0.041	
Fibrinogen >200 mg/dl	10(50)	5(100)		
Creatinin >2 mg/dl	4(20)	0	0.008	
Creatinin <2 mg/dl	16(80)	5(100)		

Values are given as average (x) ± Standard variation (Sx), n % and Odds Ratio (Confidence Interval at 95% in parenthesis)

Table 9. Rates of maternal complications as to laboratory diagnoses of cases with HELLP syndrome.

	Maternal complication exists n (%)	Maternal complication does not exist n (%)	p value	OR (%95 CI)
Thrombocyte < 70000 (/mm³)	9(90)	5(33.3)	0.005	17.2(1.6-179.6)
Thrombocyte > 70000 (/mm³)	1(10)	10(66.6)		
SGOT > 400 (IU/l)	6(60)	2(13.3)	0.014	9.4(1.3-68.5)
SGOT< 400 (IU/l)	4(40)	13(86.7)		
SGPT >400 (IU/l)	5(50)	2(13.3)	0.045	6.4(0.9-46.7)
SGPT <400 (IU/l)	5(50)	13(86.7)		
LDH >1400 (IU/l)	5(50)	7(46.7)	0.870	1.1(0.2-5.5)
LDH <1400 (IU/l)	5(50)	8(53.3)		
Prothrombin Time >14 (sec)	5(50)	1(6.7)	0.013	15.8(13-196.4)
Prothrombin Time <14 (sec)	5(50)	14(93.3)		
Fibrinogen <200 mg/dl	8(80)	2(13.3)	0.001	26(3.1-222.9)
Fibrinogen >200 mg/dl	2(20)	13(53.3)		
Creatinin >2 mg/ dl	4(40)	0	0,008	
Creatinin <2 mg/ dl	6(60)	15(100)		

Values are given as average (x) ± Standard variation (Sx), n % and Odds Ratio (Confidence Interval at 95% in parenthesis).

Table 10. Relationship of DIC cases with maternal and perinatal complications and delivery type.

	Cases found DIC	Cases not found DIC	p value
Cesarean	6(100)	13(68.4)	0.114
Maternal death	2(100)	0	0.009*
Ablatio placente	4(66.7)	3(15.8)	0.016*
Laparotomy	3(100)	0	0.001*
AKF	5(83.3)	1(26.7)	0.0001*
Haematoma in incision line	3(50)	1(5.3)	0.009*
Prematurity	6(100)	13(68.4)	0.114
Intrauterine death	1(16.7)	4(21.1)	0.815
Early neonatal death	4(66.7)	2(10.5)	0.005*
IUGR	3(50)	7(36.8)	0.566

Values are given as n, %.
* Statistically significant difference is found.

First preference should be vaginal birth if cervical maturation is enough and if there is no presentation anomaly, placenta praevia and fetal distress in gestations higher than 32nd gestational weeks.[14,15] Different results are reported in literature about cesarean rates. Celik et al found cesarean rate as 64%, Rodriguez et al found this rate as 97.5%.[13,16] Cesarean rate was found as 88% in our work.

Thrombocytopenia which is the most important hematological parameter of HELLP syndrome is related with maternal-fetal morbidity. It was found that growth retardation and dead birth in preeclampsia were higher in cases with thrombocytopenia. It was found that death in DIC, ablatio placentae and newborn periods were observed much in Class I cases with thrombocytopenia.[17] Anemia, extension in prothrombin time and thrombocytopenia were considerable within hematological parameters of cases in our study. Increase and decrease may be found in some biochemical parameters after kidney and liver damage due to a multisystemic illness. In our work, increase in AST, ALT, LDH, total bilirubin, uric acid and proteinuria in urine of 24 hours and decrease in total protein and albumin were found.

HELLP syndrome is a serious maternal mortality and morbidity. Sibai evaluated 442 cases with HELLP syndrome and found DIC in 21% of them, ablatio placentae in 16% of them, AKF in 7.7% of them, pulmonary edema in 6% of them, blood transfusion to 55% of cases, subcapsular haematoma in 0.9% of them and ablatio retinae in 0.9% of them and 2% of patients had laparotomy due to intraabdominal bleeding.[3] In our work, we found DIC in 24% of them, ablatio placentae in 28% of them, AKF in 20% of them, eclampsia in 16% of them, hemorrhage in 16% of them and 12% of patients had relaparotomy due to intraabdominal bleeding. Haddad et al reported eclampsia rate as decreased by increase of fetal gestational week and they reported eclampsia rate in < 28 gestational week as 16% and they stated the rate as %3 in > 32 weeks.18 Eclampsia rate was found as 12% in our work.

We think that this high rate for maternal complications in our cases arises from that our hospital is a center which gives third level of care and time loss occurs during dispatching cases to hospital and most of cases did not have any care before birth.

Perinatal mortality and morbidity rose in cases with HELLP syndrome. Chames and Sibai reported perinatal results of next gestations of cases that had HELLP syndrome before 28th gestational week and they found premature birth in 53% of cases and IUGR in 27% of cases and they reported perinatal mortality 11% of them.[19] Roelofsen et al[20] reported perinatal mortality as 17.6%, Kesim et al reported 18.4% dead birth, 51.6% IUGR and 36.8% perinatal mortality.[10] Eeltink et al[21] found early neonatal death as 9.9% and Sibai et al4 found same rate as 17.4. In our study, rates were found as 76% prematurity, 20% intrauterine death, 40% IUGR and 24% neonatal death. Contrary to foreign literature, we believe

that our high rates are related with low socioeconomic level of cases and care before irregular birth.

Risk factors were researched for malign maternal results at cases with HELLP syndrome. Haddad et al showed the relation of malign maternal results with laboratory parameters as being thrombocyte count < 50.000/mm^3, AST>150 IU/L and LDH>1400 IU/L.18 In our work, no laboratory parameter was found which determines perinatal complication in cases with HELLP syndrome except being fibrinogen level < 200 mg/dl and being creatinin level > 2 mg/dl. Being thrombocyte count as < 70.000 / mm^3, being AST level > 400 IU/L, being ALT level > 400 IU/L, being prothrombin time > 14 sec, being fibrinogen level < 200 mg/dl and being creatinin level> 2 mg/dl were found as free determinants which determines maternal complication growth and they were found related with malign maternal results.

DIC which is one of the reasons for maternal mortality and morbidity can be frequently observed with other complications of HELLP syndrome. In the work done with 183 cases having HELLP syndrome, relationship of DIC with ablatio placentae and AKF was considerable.[18] In our study, cases which have both HELLP syndrome and DIC, it was found related with maternal death, ablatio placentae, laparotomy, AKF, haematoma in incision line and early neonatal death.

Consequently, HELLP syndrome is a rare but very dangerous fetal and maternal complication. Initial diagnosis of HELLP syndrome is currently not possible. But it is important to determine clinical and laboratory diagnoses of HELLP syndrome cases which especially grow in the heavy preeclampsia medium, to rapidly transfer to third level centers which give intensive care and rapidly to decide for birth by taking into consideration the fetal-maternal state. Also, laboratory parameters of HELLP syndrome cases may not be effective to determine malign perinatal result, but they can be used as free risk determinant for determining maternal complications.

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