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Original Research Article

HELLP syndrome, associated with eclampsia, preeclampsia, in one hundred cases, the complications, maternal morbidity and mortality - the near miss and missed obstetric scenarios

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ABSTRACT

Background: The investigations done, complications observed, mode of delivery, management of complications, the perinatal outcome, the maternal mortality, the lessons learnt have been outlined. The referral to higher tertiary care Institutes has been analysed. The goals of management were, control of hypertension, prevention of convulsions, assessment of the severity of HELLP syndrome, identification of associated complications and chances of fetal salvage, a decision to be made regarding the mode of delivery, keeping the blood products ready, anaesthetist and paediatrician to be informed, consultation of nephrologist, cardiologist, neurophysician, ophthalmologist, gastroenterologist, surgeon as required in the particular case and continued vigilance in the postpartum period.
Methods: This is a prospective observational study of one hundred cases of HELLP syndrome managed at two tertiary care Institutes. Twenty-five cases, managed at CARE Institute of Medical sciences, during the years 2011 to 2013 and 75 cases from the Institute of Obstetrics and Gynaecology at Modern Government Maternity Hospital, MGMH, Osmania Medical College, OMC, between 2021 to 2023, were included in the study.
Results: Labour was induced, in 47.29%, vaginal delivery in 28 cases, 37.83% and lower segment caesarean section (LSCS) was needed in 46, 62.16% in the study. A total of 90.66% of HELLP have occurred in the third trimester of pregnancy. Eclampsia was associated with HELLP syndrome in 39/100=39%. The remaining 61 cases had preeclampsia associated HELLP syndrome. PRAKI in 31/100=31%, DIC in 19%, PRES in 7/100, PPCM 2%, PPH in 18=24%, maternal mortality in 17/100=17%.
Conclusions: Delivery by 37 weeks would have clearly prevented 36% of cases. Delivery by 35 weeks would have prevented 61% of cases of HELLP syndrome.

Keywords: Preeclampsia, Eclampsia, HELLP syndrome, AFLP, Maternal mortality

INTRODUCTION

Weinstein regarded signs and symptoms to constitute an entity separate from severe preeclampsia and in 1982 named the condition HELLP (H=haemolysis, EL=elevated liver enzymes, LP=low platelets) syndrome.[1] The HELLP syndrome is currently regarded as a variant of severe preeclampsia or a complication.[2,3] The majority of women with the HELLP syndrome have had hypertension and proteinuria, up to 15% of the patients lacking either hypertension or proteinuria.[4]

Diagnostic criteria

Diagnosis of the complete form of the HELLP syndrome requires the presence of all 3 major components, while

partial or incomplete HELLP syndrome consists of only 1 or 2 elements of the triad (H or EL or LP).

Maternal mortality in India

Maternal mortality ratio (MMR) is defined as the number of maternal deaths during a given time period per 100,000 live births during the same time period. For 2018-20, MMR estimate for India is 97. It is heartening that the maternal mortality ratio in India has declined over the years to 97 in 2018-20 from 103 in 2017-19 and 130 in 2014-2016, as indicated in the graph (Figures 1 and 2).[5]

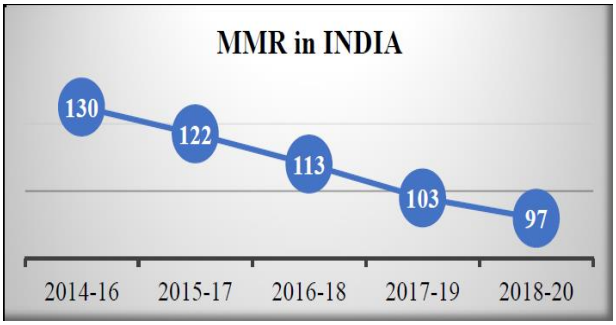

Figure 1: MMR in India.

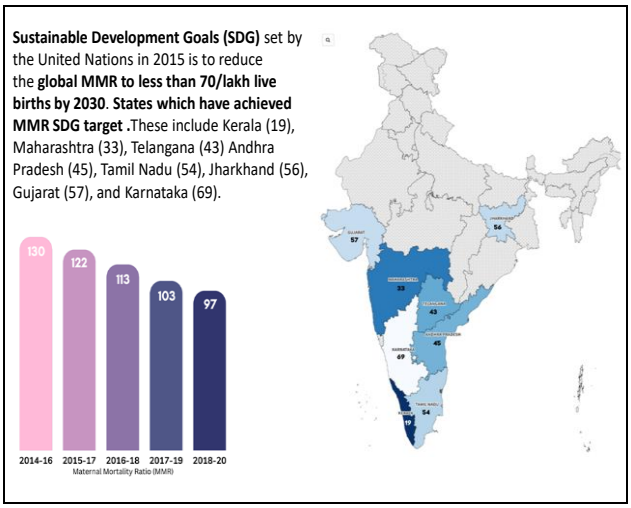

Figure 2: Sustainable development goals set by United Nations in 2015.

Maternal mortality in HELLP syndrome

In a large retrospective cohort study comprising 442 pregnancies complicated by the HELLP syndrome, Isler et al found cerebral haemorrhage or stroke to be the primary cause of death in 26% and the most contributing factor in another 45% of the deaths.[6] Maternal mortality rate in hepatic rupture ranges from 18 to 86%.[7] Complications like placental abruption, DIC, PPH, PRAKI, pulmonary edema, were responsible for maternal deaths in a study.[8] Maternal mortality in the study[8] was 10÷70=14.28%. Whereas a maternal mortality of 19.71% reported is close to this study.[9] A maternal mortality of 6.1%, 5.5% has been reported.[10] A mortality rate higher than the study 30%, has been reported in the literature.[7,11] However, higher maternal mortality, up to 25%, has been reported.[12]

HELLP and COVID 19

The spurt in the number of diagnosed HELLP syndrome cases, 75 cases, during the years, 2021 to 2023, over two years in MGMH has motivated us to review literature regarding the association between COVID 19 and HELLP syndrome. Over a period of two years in 2011 to 2013, at CARE Institute of Medical sciences, we managed twenty-five HELLP cases. In the present study, there were a few cases that were COVID positive and a few who gave a history of illness just prior to this pregnancy, but could not establish with certainty that they had COVID infection, so we cannot provide any figures.

Both COVID 19 and HELLP syndrome may occur in a pregnant woman at the same time. Both have similar features but there are certain differentiating features. Treatment has to be aimed at both the conditions. The complications and mortality rates would be compounded.[13] A pregnant woman with ITP who developed some features of HELLP syndrome and COVID-19 infection has been reported.[14] A case report showcasing HELLP syndrome as a sequalae of long COVID has been described.[15] Overlapping presentation of HELLP syndrome and COVID-19 in pregnancy has been reported.[16] Three cases with COVID 19 infection and HELLP syndrome have been mentioned.[17] A systematic review suggests that maternal COVID-19 infection in the third trimester appears to be associated with low rates of vertical transmission (approximately 3.2%).[18]

We suggest that every case of HELLP syndrome in pregnancy should be tested for concurrent COVID infection by RTPCR test, after doing the rapid test. Also pregnant women who are COVID positive should be evaluated for HELLP syndrome in which condition, prompt delivery would resolve the disease.

Prevention of HELLP syndrome

In the HYPITAT trial, women with gestational hypertension and preeclampsia without severe features after 36 weeks of gestation were allocated to expectant management or induction of labor. The latter option was associated with a significant reduction in a composite of adverse maternal outcome including new-onset severe preeclampsia, HELLP syndrome, eclampsia, pulmonary edema, or placental abruption (RR, 0.71; 95% CI, 0.59–0.86).[19,20] In addition, no differences in rates of neonatal complications or caesarean delivery were reported by the authors.[20] Women should be advised to immediately report any persistent, concerning, or unusual symptoms during pregnancy and puerperium. Suggestions for improvement, at less than 28 weeks, early onset PE, an early decision must be made to terminate the pregnancy.

In some cases, blood pressure was not recorded at the antenatal checkup, the patients were admitted in a severely compromised state. Every woman, pregnant or otherwise should have a BP recording, when she presents with any ailment, which is a basic mandated requirement in medical practice. In some cases, the RMP and ASHA workers are the first persons to be contacted. These RMP Doctors and ASHA workers should be provided with BP apparatus and made to record BP, and institute medicines, to control BP, like oral nifidepine, or labetalol. We need to educate the doctors, nurses, ANMs, RMPs, ASHA workers, regarding the need to monitor BP at every antenatal checkup, and referral to higher centres, unless this is done, some women would be victims of HDP and consequences.

Majority of PE and HELLP are occurring from 30 to 40 weeks of pregnancy. The diagnosis of HELLP should mandate immediate delivery. Delay in delivery in HELLP syndrome would lead to severe DIC, abruption, IUD, PPH more difficult to control due to DIC. Delay in delivery would lead to other complications like PRAKI, pulmonary edema and a greater requirement of blood products. To prevent HELLP, cases with less severe PE should be delivered at 37 weeks of gestation, the severe cases by 34 weeks or earlier, which would have prevented HELLP syndrome in 30% of the cases as observed from the data. These messages need to be communicated to all those attending women during pregnancy.

METHODS

This is a prospective observational study of one hundred cases of HELLP syndrome managed at two tertiary care centres. Twenty-five cases, managed at CARE Institute of Medical sciences, during the years 2011 to 2013 and 75 cases from the Institute of Obstetrics and Gynaecology at Modern Government Maternity Hospital, MGMH, Osmania Medical College, OMC, between 2021 to 2023, were included in the study. The referral to higher tertiary care Institutes has been analysed. The investigations done, complications observed, mode of delivery, management of complications, the perinatal outcome, the maternal mortality, the lessons learnt and the suggestions for prevention of preeclampsia, eclampsia and HELLP syndrome have been outlined.

The goals of management would be – control of hypertension, prevention of convulsions, assessment of the severity of HELLP syndrome, identification of associated complications and chances of fetal salvage. 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, blood sugar, LDH, uric acid, bilirubin levels, AST/ALT, coagulation study, and hepatic imaging when indicated. Assessment of fetal condition: USG, Doppler study of the umbilical artery, MCA, BPP. The management of the clinical condition was as per the institutional protocol. A decision to be made regarding the mode of delivery, keeping the blood products ready, anaesthetist and paediatrician to be informed, counselling the patient and her attendants regarding the status of the patient. Consultation of nephrologist, cardiologist, neurophysician, ophthalmologist, gastroenterologist, surgeon as required in the particular case and treatment individualized. Continued vigilance in the postpartum period and counselling regarding future pregnancy was carried out.

Ethics committee approval was obtained from the hospital ethics committee.

Statistical analysis

The percent frequency distribution of the associated conditions and resulting complications are presented. Statistical analysis was done using Microsoft excel programme.

RESULTS

Prevalence of HELLP syndrome in primies and multies

Primigravidae constituted 42.66%, second gravidae were 36.0%, third were 16.0% and fourth were 5.33%. Though we are tempted to say that as gravida status increased the number of HELLP cases reduced, it would in all probability reflect less numbers of multigravidae among the total deliveries (Table 1).

Table 1: Prevalence of HELLP syndrome in primies and multies (relation to gravida and para status) in 75 cases (MGMH).

Gravida, para	Number =75	%
Primigravida-31	32	42.66
Para 1, L1 - 1		
Multigravida	43	57.33
Second - G2 - 27	27	36.0
G2A1 - 4		
G2P1L0 - 3		
G2P1L1 - 19		
P2L2 - 1		
Third-G3 - 12	12	16.0
G3A2 - 2		
G3P2L2 - 6		
G3P2L1 - 3		
G3P1L1 A1 - 1		
Fourth- G4 - 4	4	5.33
G4P3L3- 1		
G4P3L2 - 2		
G5P2L2A2 - 1		

Associated conditions

Recurrent preeclampsia history was elicited in 12.0% of cases with HELLP syndrome. Hypothyroidism in HELLP

cases was 10.66%. Hyperthyroidism was noted in 1.33%, thyroid disorders associated with HELLP was in 12%. Diabetes was present in 8.0%, twins in 5.33%. It appears from this study that recurrent preeclampsia and thyroid disorders appear to be significant predisposing factors for the development of HELLP syndrome.

HELLP syndrome - mode of delivery in 74 pregnancies

Labour was induced in 35/74 women, in 47.29% of HELLP cases. Vaginal delivery was recorded in 28 cases, 37.83% and LSCS was needed in 46, 62.16 % in the study. Some were referred after delivery in the peripheral centers for complications. The methods of labour induction were mostly vaginal placement of PGE1, PGE2. Induction of labour was carried out in haemo dynamically stable women, already IUD had occurred, awaiting blood products if surgery had to be done, in cases of favourable cervix. Cases of previous caesarean section were taken up for abdominal delivery in these high risk cases, and for other obstetric indications (Table 2).

HELLP syndrome –75 cases- gestational age in weeks when HELLP syndrome manifested

Between 31-34 weeks, 25.33%, between 35-37 weeks another 25.33%, between 38-40 weeks, 26.66% and 9.33% of HELLP cases occurring after 40 weeks of gestation, clearly prove that HELLP syndrome, eclampsia and preeclampsia are diseases of the third trimester of pregnancy. Which fact points to the relation to placental ageing, ischaemia are related to the onset of pre-eclamptic process. Between 22-28 weeks, 9.33% and 4% at 28-30 weeks of gestation indicate the early occurrence of HELLP syndrome in the second trimester. A total of 90.66% of HELLP have occurred in the third trimester of pregnancy (Table 2).

Table 2: HELLP syndrome - mode of delivery and gestational age in weeks when HELLP syndrome manifested (total=74, one died undelivered).

Parameters	N	%
Mode of delivery, N=74		
Labour induced	35	47.29
Vaginal delivery	28	37.83
LSCS	46	62.16
Gestation in weeks (22-40 weeks), N=75		
22-28	7	9.33
28-30	3	4.0
31-34	19	25.33
35-37	19	25.33
38-40	20	26.66
40+	7	9.33

Delivery by 37 completed weeks would have clearly prevented 36% of cases. Delivery by 35 weeks would have prevented 61% of cases of HELLP syndrome. It would be advisable to encourage women to indulge in walking and exercise, so that they would set into spontaneous labour by 36-37 weeks of gestation.

There were 13 newborns in the <1 kg group, none of whom survived, 13/77=16.88%. In the more than 1.0 kg group, there were 64 newborns, the survival was 53/64= 82.81% (Table 3).

Foetal wastage including the less than 1.0 kg, was 24/77=31.16%, Corrected perinatal mortality, excluding the less than 1.0 kg group, was 11/64=17.18%, The perinatal survival in the above 1.0 kg births was 53/64=82.81% in this very high risk group of HELLP syndrome (Table 4).

Direct admissions to MGMH, referrals from hospitals in Hyderabad and from districts. Analysis of 32 cases. (we do have data for the 75 cases of HELLP managed at MGMH).

We have analysed the referral data, direct admissions to MGMH, as the first health facility the patient was taken to, were 9/32=28.12%, referrals from hospitals in Hyderabad were 8/32=25%, referrals from other district hospitals were 14/32=43.75%, one case was a referral from Bidar Medical College, state of Karnataka, 1/32=3.12% (Table 5). When facilities for management of these complicated cases like many units of blood products, high risk anaesthesia, management in the postpartum period of PRAKI, PPH, DIC and the need for ICU is recognized, the referral system is considered. Suggested that before referral of the case if there is interaction with the doctors at the higher institute (is provided), they can guide as to what medications should be instituted prior to referral, so that preliminary treatment is initiated.

Complications in cases of HELLP syndrome N=75, managed at MGMH

In 75 cases of HELLP syndrome**,** PRAKI was the most common complication, in 26.66% of cases, PPH in 24.0%, Placental abruption and DIC in 17.33%, pulmonary oedema in 6.66%, vision impairment, retinopathy in 4.0%. Severe anaemia was noted in 41.33%, blood products had to be transfused in 35/75, 46.66%, significant ascites was documented in 13.33%. Scar dehiscence in previous LSCS was present in 4.0% of HELLP cases (Table 6).

Eclampsia was associated with HELLP syndrome in 39/100=39% of cases. Hence, the maternal mortality was due to both the conditions. The remaining 61 cases had preeclampsia associated HELLP syndrome.

PRAKI, pregnancy related acute kidney injury was managed in 31/100=31%. DIC, disseminated intravascular coagulation occurred in 19%. Due to DIC, intra peritoneal bleeding, necessitating exploratory laparotomy was reported in 4/100, 4% cases. Abdominal wall haematoma had to be evacuated and bleeder ligated in 3/100, 3%.

PRES, posterior reversible encephalopathy was diagnosed in seven of the cases, 7/100, based on the clinical manifestations and confirmation by MRI findings.

PPCM, peri partum cardiomyopathy was noted in two of the cases, 2/100, 2%. Massive blood transfusion was given, (more than 10 units) in 10 patients of HELLP syndrome who died 10/17=58.82%.

Significant PPH did occur in 16 cases (total 18=24%). In addition to the medical methods of management of PPH, surgical procedures to control the bleeding had to be adopted in certain cases. Caesarean hysterectomy was done in one, when removal of placental products resulted in uncontrollable bleeding. Uterine artery ligation was done in two PPH cases, B Lynch sutures along with uterine artery ligation was done in two cases. Hayman's sutures were applied in one. Multiple vaginal tears had to be sutured in one (Table 7). MCDA twins, atonic PPH, relaparotomy, balloon tamponade was done in one. In one re-exploration was done and sub cutaneous bleeder was ligated.

Maternal mortality in 17/100=17%, a summary has been presented in Table 7.

Comparative data for the complications is presented in Table 8.

Table 3: Birth weight in 74 cases, (77 newborns) (weight of one twin was not recorded, one patient died undelivered out of 75 cases, there were 4 sets of twins).

S. no.	Birth weight (kg)	Number	%	Actual weight in kg.
1	<1	13	16.88	400 gms, 1.0 kg-IUD, 1.0 kg-dead, SB1.0 kg, IUD-550 gms, dead 250 gms, 1.0 kg-NND 600 gms-IUD, 500, IUD, 520, 900 gms, 800 gms NND, 1.0 kg, IUD
2	1.1-1.5	9	11.68	1.5, 1.2, 1.2, 1.5, 1.5, 1.5, 1.5 1.1 kg, 1.3 kgs
3	1.6-2.0	21	27.27	2.0, 2.0, 2.0, 1.7, 2.0, 1.6, 1.8, 1.7, 1.9, 2.0, 1.8, 2.0, 1.8, 1.8, 1.9, 1.7 IUD, 1.7, 1.8, 1.8 NND, IUD 2.0, 1.9, stillbirth, 2.0 kg
4	2.1-2.5	14	18.18	2.5, 2.1, 2.3, 2.5, 2.2, 2.3, 2.5, -IUD, 2.5, 2.3, 2.3, 2.5, 2.5, 2.2 kgs, NND, 2.3 kgs IUD
5	2.6-3.0	12	15.58	3.0, 2.6, 2.8, 2.9, 3.0, 2.9, 2.9, 3.0 IUD, 3.0, 2.6, 2.6, 3 kgs
6	3.1-3.5	7	9.09	3.4, 3.5, 3.3, 3.2 NND, 3.5, 3.2 SB, 3.2
7	3.6-4.0	1	1.29	3.7

Table 4: Perinatal mortality and perinatal survival, 75 cases, MGMH.

S. no.	Birth weight (kg)	Number	%	IUD	Still birth	NND	PNM	Survival
1	<1	13	16.88				13/13	Nil
2	1.1-1.5	9	11.68					
3	1.6-2.0-	21	27.27	2	1	1	4/21	17
4	2.1-2.5	14	18.18	2	-	1	3/14	11
5	2.6-3.0	12	15.58	1	-	-	1/12	11
6	3.1-3.5	7	9.09	1	1	1	3/7	4
7	3.6-4.0	1	1.29	-	-	-	-	
Total N, %		77		6	2	3	24/77=31.16% Corrected=11/64=17.18%	53/64=82.81 %

Table 5: Direct admissions to MGMH, Referrals from hospitals in Hyderabad and from districts (analysis of 32 cases).

S. no.	Case no.	Direct admission	Case no.	Referral Hyderabad city	Case no.	Referral Other districts	Case no.	Referral Other states
1	4	MGMH	7	Referral khatedan polyclinic, Hyderabad	1	CHC, Shadnagar	11	Bidar Medical College
2	8		14	Balnagar PHC	2	Nalgonda Govt. hospital		

Continued.

S. no.	Case no.	Direct admission	Case no.	Referral Hyderabad city	Case no.	Referral Other districts	Case no.	Referral Other states
3	9		16	Meena hospital Mehdhipatnam	3	Kozigi		
4	10		17	Birthzone hospital Chandrayangutta	5	Tandur		
5	12		20	Sai hospital	6	Mahabubnagar. Wanaparthy, Govt		
6	19		21	Apollo clinic ou colony	13	Tandur Govt. Hospital		
7	25		29	Jayabhushan hospitals	15	Narayanpet Mahabubnagar		
8	26		32	Panipura Booked MGMH	18	SVS medical college, Mahabubnagar		
9	30				22	CHC Shadnagar		
10					23	Vikarabad		
11					24	zaheerabad		
12					27	GGH, Nagarkurnool		
13					28	Kalwakurthy CHC		
14					31	Narayanpet, Mahboobnagar.		
	9/32=28.12%		8/32=25%		14/32=43.75%		1/32=3.12%	

Table 6: Complications in 100 cases of HELLP syndrome N=75, managed at MGMH and 25 managed at CARE Institute.

Complication	No. of cases MGMH total -75	%	No. of cases CARE, total - 25	Total – 100 cases of HELLP, %
Eclampsia with HELLP (remaining – HELLP with PE) no. 8	31	41.33	8	39
Placental abruption	13	17.33	2	15
PPH	18	24	-	
DIC	13	17.33	6	19
PRAKI	20	26.66	11	31
Severe anaemia	31	41.33	-	
Blood products	35	46.66	-	
Ascites	10	13.33		
Pulmonary oedema ARDS	5	6.66	2	7
Pleural effusion	3	4.0	1	4
Aspiration pneumonitis		1.33		
Vision impairment, retinopathy	3	4.0	1	4
Status eclampticus	3	4.0		
PRES	4	5.33	3	7
CVA	1	1.33		
AFLP	2	5.33	1	5
PPCM	1	1.33	1	2
Pancreatitis	1	1.33		
Septic shock	1	1.33		
Scar dehiscence in previous LSCS	3	4.0		
Intra peritoneal bleeding	1	1.33	3	4
Abdominal wall haematoma	1	1.33	2	3
Maternal mortality	13	17.33	4	17

Table 7: Maternal deaths in HELLP syndrome, 100 cases, 17/100=17%, (1 LAMA, outcome not known), CARE-4/25, MGMH- 13/75.

S. no.	Obstetric	Complications	Blood products	Remarks
1 CARE	P_3L_3, 27 years LSCS + tubectomy done at Karimnagar	6th POD AKI, DIC, sepsis, shock, complete HELLP, class-1, PLT-28,000, LDH-3695, SGOT-171, SGPT-94, ALK.P- 445	Multiple units	Ischaemic hepatitis, AKI, hypotension, shock, polycythemia, hypoalbuminemia, metabolic acidosis
2 CARE	LSCS for previous LSCS with IUFD due to abruption at 34 weeks at Durgabai D. hospital	Hypotension, abdominal distension, oliguria, AKI so intubated at private hospital. LSCS later laparotomy	42 FFP, 22 cryo, 6 RDP, 2 SDP, 6 PRBCs, 2 whole blood, total-80	Gross intraperitoneal collection so taken for laparotomy. DIC, complete HELLP syndrome/class 1 with AKI and pulmonary oedema. Plasmapharesis -2 times, factor VII given
3 CARE		LSCS		HELLP in a patient with Eisenmenger syndrome, cardiac failure
4 CARE		HELLP, LSCS		Septic shock with AKI
5 MGMH	Primi 22 weeks 6 days	HELLP, abruption, IUD, hysterotomy	Blood- 7 units	Atonic PPH, haemorrhagic shock and pulmonary edema
6	Primi, 30 weeks	HELLP, status eclampticus, CVA, cerebral infarcts, LSCS		Status eclampticus left hemiparesis. Large cerebral infarcts. obstructive hydrocephalus. emergency MPVP shunt done. Aspiration pneumonitis
7	G2PILI previous CS, 34 weeks	HELLP, MCDA twins, LSCS	11 units blood products	Atonic PPH, relaparotomy, haemorrhagic shock. Died 6 hours after LSCS
8	Primi, 34 weeks	HELLP, IUGR, LSCS	17 units of blood products	Atonic PPH, PRAKI, dialysis -2 times, sepsis
9	G2P1L1, 32 weeks	Complete HELLP, severe anaemia	2 PRBC	Severe anaemia, pulm edema after 2 PRBC transfusion. Died undelivered
10	G3P2L2, 38 weeks, 3 days	HELLP, abruption with IUD, LSCS		LSCS, atonic PPH, haemorrhagic shock and pulmonary edema
11 2.9.22	G2P1L1, 22 years, 33w3d	Abruption, HELLP, AKI, vaginal delivery, IUD, cord prolapse	2 PRBC	Under correction of FFP
12 22.9.22	Primi, 25 years, 40w2d, TVVP Narayanpet	HELLP complete, jaundice, AFLP, DIC, uremic encephalopathy, metabolic acidosis, death, 3.2 kg, still birth	4 FFP, 1 SDP 2 PRBC, 10 CRYO, total=17 units	Partial vaginal septum, LSCS, PPH, HAYMANS stitch, final diagnosis – AFLP
13 22.10.22	Primi, 28 years, 38W 4D, SVS medical college	Jaundice HELLP, complete, DIC, AFLP, sepsis, AKI	6 RDPS, 8 FFP, 2 PRBC 10 CRYO, total=26	Final diagnosis – AFLP, PPH, medical & surgical, MODS death
14	Primi 35 weeks 2d	IUD early labour vaginal , 2 kg, IUD abruption AKI DIC	3 PRBC, 6 FFP, CRYOS 1SDP, >10 units	Referral private Sai hospital HELLP MODS AKI
15 24.12.22	Delivered term, P1L1	Vaginal, alive, PPH, hypovolemic shock, complete HELLP, USG – RPOC	5PRBC+6 FFP, total-11	Ref CHC Shadnagar Hb-3.5 g, anti-shock garment or tamponade not considered at referral, caesarean hysterectomy
16 31.12.22	Primi, 22 years, 38 w, referal Vikarabad	Complete, antepartum eclampsia, HELLP, drowsy, labour induced mechanical, PGE2, 1.9 kg		One hour after LSCS pulmonary edema CVA, ICH, PRES

Continued.

S. no.	Obstetric	Complications	Blood products	Remarks
17 15.3.23	Primi, 38 weeks, GGH, Nagarkurnool	Severe preeclampsia, jaundice complicating, AFLP, complete, labour induced, LSCS, NND, 2.2 kg	FFP 4 units CRYO 7 units, total- 11	HELLP AKI, AFLP, on day 2 LAMA
17 21.2.23	Primi, 32 years, 31w 7d, ref Jayabhushan hospitals	Complete, HELLP, mechanical, PGE1 10 mg, failed induction	SDP 12, 6 FFP, 7 cryo, total- 25	LSCS, PPH UTA ligation Blynch DIC MODS ARDS, post LSCS, 5 g, 39,000 2231, 382, 195, haematuria, intraoperative convulsion, bleeding from surgical site, After LSCS, rexploration done 3 hours later

Table 8: AKI in HELLP syndrome, placental abruption, DIC, maternal mortality and the need for blood and blood products in various studies.

Author	Year	Total HELLP no.	AKI- no.	%	Placental abruption %	DIC %	M. mortality in HELLP %	Blood, blood products (%)
Gedik et al	2017	77	19	25				
Erdemoglu et al	2010	126	14	11.11	20.63		7.93	46.03
Sibai et al	1993	442		7.7	16	21	1.1-	55
Osmanagaoglu et al	2000	37		11	11	5	30	
Gul et al	2004	132	20	15				
Novotny et al	2020			14.4				
Martinez de Ita et al	1998	173	34	20				
Wang et al	2021	110	65	59.1				
Ye et al	2019			48.1				
Huang et al	2017			60				
Kaur et al		71		11.26	16.90	5.63	19.71	
Bahadur		40		30	2.5	22.9	Nil	
Devabhaktuni et al	2022	70	16	22.85	14.28	21.42	14.28	48.88
Haddad		183			10	8		22
Devabhaktuni et al, present study	2023	100	31	31	15	19	17	46.66

DISCUSSION

Labour was induced in 35/74 women, in 47.29% of HELLP cases. Vaginal delivery was recorded in 28 cases, 37.83% and LSCS was needed in 46, 62.16 % in the study. Induction of labour in these high risk cases of HELLP syndrome and vaginal delivery in 37.83% would be possible in the Institutes only and not in the private set up.

Between 31-34 weeks, 25.33%, between 35-37 weeks another 25.33%, between 38-40 weeks, 26.66% and 9.33% of HELLP cases occurring after 40 weeks of gestation, clearly prove that HELLP syndrome, eclampsia and preeclampsia are diseases of the third trimester of pregnancy. Which fact points to the relation to placental ageing, ischaemia are related to the onset of pre-eclamptic process. A total of 90.66% of HELLP have occurred in the third trimester of pregnancy.

Delivery by 37 weeks would have clearly prevented 36% of cases. Delivery by 35 weeks would have prevented 61% of cases of HELLP syndrome. It would be advisable to encourage pregnant women to indulge in walking and exercise, so that they would set into spontaneous labour by 36-37 weeks of gestation, so that hypertensive disorders of pregnancy near term could be avoided.

Direct admissions to MGMH, referrals from hospitals in Hyderabad and from districts. Identification of places and hospitals from various districts would enable us to take measures of containment. Would enable us to send protocols of management of preeclampsia, eclampsia and HELLP syndrome. Can conduct training programmes, can send flexies to be put up in their labour rooms to disseminate information about management and what medications should be given prior to referral. Would enable us to assess our referral system, how robust it is.

The perinatal survival in the more than >1.0 kg births was 53/64=82.81% in this very high-risk group of HELLP syndrome.

Eclampsia was associated with HELLP syndrome in 39/100=39% of cases. Hence the maternal mortality was due to both the conditions. The remaining 61 cases had preeclampsia associated HELLP syndrome.

PRAKI, pregnancy related acute kidney injury was managed in 31/100=31%. DIC, disseminated intravascular coagulation occurred in 19%.

PRES, posterior reversible encephalopathy syndrome was diagnosed in seven of the cases, 7/100, 7%, based on the clinical manifestations and confirmation by MRI findings.

PPCM, peri partum cardiomyopathy was noted in two of the cases, 2/100, 2%.

Significant PPH did occur in 18/100 cases. In addition to the medical methods of management of PPH, surgical procedures to control the bleeding had to be adopted in certain cases. Caesarean hysterectomy was done in one, B Lynch sutures along with uterine artery ligation was done in two cases. Hayman's sutures were applied in one. Relaparotomy, balloon tamponade to control atonic PPH was done in one. All these five cases, ended in maternal deaths (Table 7). Uterine artery ligation was done in two PPH cases, who survived.

If the cause of PPH is DIC, then more active replacement of blood products, timely replacement would enable saving more women. Surgical procedures in the presence of ongoing DIC, are risky.

Antifibrinolytic agents such as tranexamic acid that stabilize blood clots may have a role in high-risk patients with coagulopathy, including patients with acute fatty liver of pregnancy.[21] A clinical trial comparing tranexamic acid administration in high-risk patients to placebo demonstrated the safety of its use (including no increased risk of thromboembolism) and a reduction in death caused by bleeding in patients with diagnosed postpartum hemorrhage.[22]

Following caesarean section, PPH occurred in two cases and the management adopted has been mentioned, one was treated with the use of double balloon catheter, and another managed with stitching up the wound.[23] Sitaula et al reported a case where peripartum hysterectomy was done on second postpartum day for uncontrolled postpartum hemorrhage when balloon tamponade could not control PPH following vaginal delivery.[24]

HELLP and AFLP

In this series of one hundred HELLP cases, there were two diagnosed cases of AFLP, who died and two suspected cases who went on left against medical advice (LAMA) and the outcome of survival could not be ascertained. Since all the three criteria, the laboratory parameters for the diagnosis of HELLP syndrome were present and associated with eclampsia and preeclampsia, we are justified in the diagnosis. In addition, the Swansea criteria were fulfilled and persistent hypoglycemia, elevated bilirubin, low fibrinogen, prolonged PT and INR pointed to a diagnosis of AFLP. So we conclude that HELLP syndrome could be a part of AFLP. Whether both the conditions are the result of one pathologic process of varying degrees of severity needs to be confirmed and ratified by the scientific community.

Women with AFLP are more likely to have synthetic liver dysfunction with coagulopathy, hypofibrinogenaemia, lower cholesterol levels, higher bilirubin levels, hypoglycaemia, hepatic encephalopathy, hyperammonaemia, DIC and more severe AKI.[25]

Comparative data for the complications is presented in Table 8.[26-38]

Limitations

Though the cases of HELLP from MGMH have occurred during the COVID pandemic, the association of positive cases and greater morbidity in positive cases could not be ascertained, due to lack of data. The benefit or otherwise, of surgical management of PPH cases could not be commented due to small number of cases and the mortality could be due to the severity of the disease and MODS.

Though the complication rates have been analysed, comparison with other studies would not have significance as the severity of each case could be different, as well as the available infrastructure facilities.

CONCLUSION

Delivery by 37 weeks would have clearly prevented 36% of cases, delivery by 35 weeks would have prevented 61% of cases of HELLP syndrome. We conclude that HELLP syndrome could be a part of AFLP.

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