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Study of fetomaternal outcomes in eclampsia in correlation to coagulation profile in a tertiary care center in Mumbai

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ABSTRACT

Background: Eclampsia is the leading cause of maternal and perinatal mortality as well as morbidity. The present study was conducted to assess the severity of eclampsia and coagulopathy by a method that is rapid, cheaper, and easily available and to assess the clinical evaluation and comparison of the fetomaternal outcomes in eclampsia with normal and deranged coagulation profiles. **Aims and Objectives:** This study aims to assess the severity of eclampsia and coagulopathy by a method that is rapid, cheaper, and easily available and to assess the clinical evaluation and comparison of the fetomaternal outcomes in eclampsia with normal and deranged coagulation profiles. **Materials and Methods:** A hospital-based prospective case–control study was done at tertiary care institute in the department of obstetrics and gynecology over a period of 1½ years from February 2018 to August 2019. Template was generated in MS Excel sheet and analysis was done on SPSS software. **Results:** Overall incidence of eclampsia was found to be 2.4%. Majority of the eclampsia patients in both normal coagulation profile group and deranged coagulation profile group were in the age group of 21–25 years (42.8% and 46.6%, respectively). The most common maternal outcome in the eclampsia patients with both normal (50%) and deranged (36.6%) coagulation profile was operative intervention, that is, lower segment cesarean section, followed by the requirement of maternal intensive care in critical care unit or medical intensive care unit. The least common fetal outcome among those with normal coagulation profile being neonatal death and still birth accounting for 2.85% of cases each whereas among those with deranged coagulation profile, the least common outcome being very low birth weight accounting for 3.33% of cases. Of the 46 eclampsia mothers who underwent operative intervention, 93.47% had normal platelet counts and 6.52% had thrombocytopenia. Of the eight neonatal deaths, 50% were among those of eclampsia mothers with normal platelet count and 50% among those with thrombocytopenia. **Conclusion:** In the present study, eclampsia accounted for 2.3% of all deliveries. Hence, relevant investigations need to be promptly done to identify the derangement of the coagulation profile in cases of eclampsia and pre-eclampsia which can alert the obstetrician of the severity of the disease so that appropriate and timely management can be initiated to prevent adverse outcomes.

Key words: Pre-eclampsia; Eclampsia; Coagulation profile

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INTRODUCTION

The term "eclampsia" is derived from a word meaning "like a flash of lightening." This is the occurrences of generalized convulsions, associated with signs of pre-eclampsia during pregnancy, labor, or within 7 days of delivery and not caused by epilepsy or other convulsive disorders. Some authors considered that eclampsia can occur up to 10 days following delivery. Eclampsia remains an important cause of maternal and perinatal morbidity and mortality worldwide.[1-3]

It is estimated that it accounts for more than 50,000 maternal deaths globally.[2] A large majority of these

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deaths occur in low-income countries where the quality of maternity care is often inadequate. Although it affects around 1–2% of the pregnant women population, it contributes approximately 10% of maternal morbidity in India and other developing countries. In Europe and other developed countries, eclampsia complicates about 1 in 2000 deliveries, while in the developing countries, estimates vary widely from 1 in 100 to 1 in 1700.[4] The incidence of eclampsia has reduced considerably in the developing countries due to good antenatal care (ANC) and increased awareness within the population. The incidence quoted from the leading centers of India varies from 0.18% to 4.6% and approximately 75% of cases occur in primigravidae. Maternal mortality according to various Indian authors is 8–14% but a low maternal mortality was reported by Menon.[5-7] In fact, worldwide maternal morbidity varies widely at different places with almost identical management indicating that there may be important differences in socioeconomic condition of a nation and the quality of obstetric care. Early assessment of severity of pre-eclampsia and eclampsia is necessary to prevent complications such as HELLP (hemolysis, elevated liver enzymes, and low platelet count) syndrome and increased maternal and fetal morbidity and mortality.

Aims and objectives

Hence, the present prospective case–control study was done at our tertiary care center to assess the severity of eclampsia and coagulopathy by a method that is rapid, cheaper, and easily available and to assess the clinical evaluation and comparison of the fetomaternal outcomes in eclampsia with normal and deranged coagulation profiles.

MATERIALS AND METHODS

The present hospital-based prospective case–control study was done on 100 patients of eclampsia who were admitted in our tertiary care center to assess the severity of pre-eclampsia, eclampsia, and coagulopathy by a method that is rapid, cheap, and easily available and to assess the clinical evaluation and comparison of the fetomaternal outcomes in eclampsia with normal and deranged coagulation profiles.

Study design

This was a hospital-based prospective case–control study.

Study duration

The study duration was 1.5 years (February 2018–August 2019).

Study area

The study was done at our tertiary care institute in the Department of Obstetrics and Gynaecology, Grant Government Medical College and Sir JJ Group of Hospitals, Mumbai, Maharashtra.

Study population

All pregnant women attending the ANC outpatient department (OPD) with new onset of grand mal seizure activity and/or unexplained coma during pregnancy or postpartum with signs or symptoms of pre-eclampsia who fulfilled the inclusion criteria.

Sample size

One hundred patients. Considering a confidence level of 95% and confidence interval of 10, the number of patients in our study to achieve statistical significance is 96. This was calculated by survey system.

Inclusion criteria

All pregnancies and gestational age >20 weeks were included in the study.

Exclusion criteria

Pregnant women with known case of bleeding disorders were excluded from the study.

The study was done in the Department of Obstetrics and Gynaecology, ANC OPD, after due permission from the Institutional Ethics Committee and Review Board and after taking written valid informed consent from the patients.

After approval from the Institutional Ethics Committee, a valid informed consent was taken. Once the patients were enrolled for the study, a thorough history and physical examination was done as per pro forma. An informed consent was taken in written from patients and/or patient's attendant(s).

Complete clinical examination was done at the start of the study. The anthropometric parameters such as height and weight of subject were measured. Blood pressure (BP) was measured with patients in supine position and resting comfortably on her right hand at 30° to the horizontal with the sphygmomanometer cuff at the level of the heart. Fetal status evaluated with non-stress test and ultrasonographical evaluation if required.

Treatment included rest, control of BP (antihypertensive drugs), and Inj. MgSO as per Pritchard's regimen, strict monitoring of input/output, deep tendon reflexes, and vital signs monitoring. Obstetric management done by termination of pregnancy and by giving steroid prophylaxis for eclampsia patients with preterm gestation.

Ethical clearance

The study was conducted after obtaining written approval from the Institutional Ethics Committee. Written informed

consent was taken from every study patient or their logical representative.

Statistical analysis

The data were checked and entered into Excel sheet and analyzed with Microsoft Excel and SPSS version 20. Quantitative data are presented with the help of mean and standard deviation. Comparison among the study groups is done with the help of unpaired t-test as per results of normality test. Qualitative data are presented with the help of frequency and percentage table. Association among the study groups is assessed with the help of Fisher test, Student's 't'-test, and Chi-square test. "P"<0.05 is taken as statistically significant.

RESULTS

A hospital-based prospective case–control study was undertaken with 100 eclampsia patients admitted during the study period to study the fetomaternal outcomes in eclampsia in correlation to the coagulation profile.

A total number of deliveries during the study period from February 2018 to August 2019 were 4342. During the study period all 100 patients with eclampsia based on account of inclusion and exclusion criteria were included in the study. Overall incidence of eclampsia was found to be 2.4%.

Majority of the eclampsia patients in both normal coagulation profile group and deranged coagulation profile group were in the age group of 21–25 years (42.8% and 46.6%, respectively) followed by 21.4% of patients with normal coagulation profile in the age group of 16–20 years and 33.3% of patients with deranged coagulation profile in the age group of 26–30 years. Mean age among patients with normal coagulation profile is 24.61 years and that with deranged coagulation profile is 24.8 years. Majority of the eclampsia patients were primigravidae, in both the groups, that is, 75.71% of the patients with normal coagulation profile and 40% of the patients with deranged coagulation profile. About 14.29% of the eclampsia patients with normal coagulation profile were 2nd gravida whereas 23.33% of the patients with deranged coagulation profile belonged to both 2nd gravida and 3rd gravida groups. Majority of the patients with normal coagulation profile, that is, 57.14% were of 36–40 weeks (term) gestation followed by 24.29% of patients of 34–36 weeks gestational age. Among patients with deranged coagulation profile, 43.33% of them were of 36–40 weeks gestation followed by 26.67% of them belonging to 34–36 weeks gestational age (Table 1).

Out of the 100 eclampsia patients, 89% had platelet count above 1.5 lakh/cu. mm and 11% had thrombocytopenia.

Table 1: Distribution of patients according to age, parity, and gestational age

Age	Normal coagulation profile	Deranged coagulation profile
16–20 years	15 (21.4%)	4 (13.3%)
21–25 years	30 (42.8%)	14 (46.6%)
26–30 years	14 (20%)	10 (33.3%)
31–35 years	8 (11.4%)	-
36–40 years	3 (4.2%)	2 (6.6%)
Total	70 (100%)	30 (100%)
Mean	24.61 years	24.8 years
Parity		
Primigravida	53 (75.71%)	12 (40%)
2nd gravida	10 (14.29%)	7 (23.33%)
3rd gravida	4 (5.71%)	7 (23.33%)
4th gravida	2 (2.86%)	3 (10%)
5th gravida	1 (1.43%)	1 (3.33%)
Total	70 (100%)	30 (100%)
Gestational age		
<32 weeks	6 (8.57%)	2 (6.67%)
32–34 weeks	1 (1.43%)	5 (16.67%)
34–36 weeks	17 (24.29%)	8 (26.67%)
36–40 weeks	40 (57.14%)	13 (43.33%)
>40 weeks	6 (8.57%)	2 (6.67%)
Total	70 (100%)	30 (100%)

Out of 100 eclampsia patients, 79% had normal international normalized ratio (INR) in the range of 0.6–1.2 and 21% had INR <0.6. Prothrombin time was found normal between 11–16. About 79% of the eclampsia patients had normal PT in the range of 11–16 s and 21% had prolonged PT. Out of the 100 eclampsia patients, 92% had normal bleeding time (BT) in the range of 3–5 min, whereas 8% had prolonged BT (>5 min). About 93% of the patients had a normal clotting time (CT) within the range of 4–10 min and 7% had prolonged CT (>10 min) (Table 2).

Mean hemoglobin of normal coagulation profile group was 9.85 g% while that of deranged coagulation profile group was 10.66 g% and P=0.084 (not significant). Mean platelet count of normal coagulation profile group was 238,665 while that of deranged coagulation profile group was 165153 and P=0.001 (significant). Mean serum bilirubin of normal coagulation profile group was 0.484 while that of deranged coagulation profile group was 1.17 and P=0.004 (significant). Mean serum glutamate oxaloacetate transaminase (SGOT) of normal coagulation profile group was 38.91 while that of deranged coagulation profile group was 56.27 and P=0.142 (not significant). Mean serum glutamate pyruvate transaminase (SGPT) of normal coagulation profile group was 33.24 while that of deranged coagulation profile group was 48.2 and P=0.125 (not significant) (Table 3).

Mean serum urea of normal coagulation profile group was 23.49 while that of deranged coagulation profile group was 23.77 and P=0.853 (not significant). Mean serum creatinine

of normal coagulation profile group was 0.798 while that of deranged coagulation profile group was 0.803 and P=0.899 (not significant). Mean PT of normal coagulation profile group was 13.42 s while that of deranged coagulation profile group was 18.39 and P=0.00001 (significant). Mean INR of normal coagulation profile group was 1.017 while that of deranged coagulation profile group was 1.616 and P=0.000004 (significant). Mean sodium of normal coagulation profile group was 139.56 while that of deranged coagulation profile group was 139.57 and P=0.991 (Not significant). Mean serum potassium of normal coagulation profile group was 4.217 while that of deranged coagulation profile group was 3.941 and P=0.004 (significant) (Table 4).

Table 2: Distribution of patients according to platelet count, INR (normal INR=0.6–1.2), prothrombin time (normal PT=11–16), bleeding time (normal BT=3–5 min), and clotting time (normal CT=4–10 min)

Platelet count	Frequency	Percentage
Normal platelet count	89	89%
Thrombocytopenia	11	11%
Total	100	100%
INR		
Normal	79	79%
Deranged	21	21%
PT		
Normal	79	79%
Deranged	21	21%
BT		
Normal	92	92%
Deranged	8	8%
CT		
Normal	93	93%
Deranged	7	7%

INR: International normalized ratio, PT: Prothrombin time, BT: Bleeding time, CT: Clotting time

Of the 70 patients with normal coagulation profile, 37.1% had pallor and 65.7% had pedal edema, and no patient had icterus, whereas of the 30 patients with deranged coagulation profile, 20% had pallor, 76.6% had pedal edema, and 6.6% had icterus. Majority of the eclamptic patients with normal coagulation profile (41.43%) had a hemoglobin of 7-9.9g% and deranged coagulation profile (46.67%) had a hemoglobin of ≥11 g%. Among the cohort of normal coagulation profile, three patients had deranged liver function tests (LFTs), out of which two of them had normal serum bilirubin with deranged SGOT/SGPT. Among the cohort of deranged coagulation profile, all the four patients had complete deranged LFT. Majority of the fetal Doppler studies were found to be normal with 88.57% being in eclamptic patients with normal coagulation profile and 83.33% being in those with deranged coagulation profile. About 8.57% of the patients with normal coagulation profile had fetoplacental insufficiency whereas 6.67% among those with deranged coagulation profile had uteroplacental insufficiency. Out of the remaining cases, there were two intrauterine fetal deaths (IUFDs) among patients with normal coagulation profile and three IUFDs among patients with deranged coagulation profile. Majority of the eclamptic patients in both the groups had reactive NST, that is, 92.86% among those with normal coagulation profile and 70% among those with deranged coagulation profile (Table 5).

The most common maternal outcome in the eclampsia patients with both normal (50%) and deranged (36.6%)

Table 3: Association of hemoglobin, platelets, bilirubin, SGOT, and SGPT with coagulation profiles

Hemoglobin	N	Mean	Standard deviation	Minimum	Maximum	F	P value
Not deranged coagulation	70	9.85	2.10	5.9	14.3	3.042	0.084
Deranged coagulation	30	10.66	2.11	6	15.4		
Total	100	10.099	2.12	5.9	15.4		
Platelets						12.814	0.001
Not deranged coagulation	70	238665.7	89353.05	104000	583000		
Deranged coagulation	30	165153.3	104561.2	17200	336000		
Total	100	216612	99566.61	17200	583000		
Bilirubin						8.47	0.004
Not deranged coagulation	70	0.4847	0.28132	0.2	2.4		
Deranged coagulation	30	1.17	1.93554	0.2	7.4		
Total	100	0.6903	1.11901	0.2	7.4		
SGOT						2.188	0.142
Not deranged coagulation	70	38.91	38.814	10	261		
Deranged coagulation	30	56.27	78.625	11	330		
Total	100	44.12	54.081	10	330		
SGPT						2.4	0.125
Not deranged coagulation	70	33.24	34.439	11	277		
Deranged coagulation	30	48.2	61.595	11	234		
Total	100	37.73	44.559	11	277		

SGOT: Serum glutamate oxaloacetate transaminase, SGPT: Serum glutamate pyruvate transaminase

Table 4: Association of urea, creatinine, PT, INR, sodium, and serum potassium with coagulation profiles

Urea	N	Mean	Standard deviation	Minimum	Maximum	F	P value
Not deranged coagulation	70	23.49	7.199	15	54	0.034	0.853
Deranged coagulation	30	23.77	6.263	16	35		
Total	100	23.57	6.901	15	54		
Creatinine						0.016	0.899
Not deranged coagulation	70	0.798	0.163	0.4	1.6		
Deranged coagulation	30	0.803	0.186	0.5	1.5		
Total	100	0.801	0.169	0.4	1.6		
PT						42.21	0.0001
Not deranged coagulation	70	13.42	1.6229	10	16		
Deranged coagulation	30	18.39	5.9355	11	37		
Total	100	14.91	4.1704	10	37		
INR						46.703	0.0004
Not deranged coagulation	70	1.017	0.143	0.7	1.31		
Deranged coagulation	30	1.616	0.704	0.6	3.5		
Total	100	1.197	0.485	0.6	3.5		
Sodium						0	0.991
Not deranged coagulation	70	139.56	3.541	130	146		
Deranged coagulation	30	139.57	4.264	132	145		
Total	100	139.56	3.751	130	146		
Serum potassium						8.642	0.004
Not deranged coagulation	70	4.217	0.460	3.2	5.4		
Deranged coagulation	30	3.941	0.353	3.2	4.7		
Total	100	4.134	0.448	3.2	5.4		

INR: International normalized ratio, PT: Prothrombin time

Table 5: Distribution of patients according to general examinations and tests

General examinations and tests	Total	Normal coagulation profile	Deranged coagulation profile
Pallor	32	26 (37.1%)	6 (20%)
Icterus	2	-	2 (6.6%)
Pedal edema	69	46 (65.7%)	23 (76.6%)
Hemoglobin			
≥11 g%		22 (31.43%)	14 (46.67%)
10–10.9 g%		13 (18.57%)	6 (20%)
7–9.9 g%		29 (41.43%)	9 (30%)
4–6.9 g%		6 (8.57%)	1 (3.33%)
Total		70 (100%)	30 (100%)
LFT			
Normal LFT		67 (95.71%)	26 (86.67%)
Deranged LFT		3 (4.29%)	4 (13.33%)
Total		70 (100%)	30 (100%)
Fetal Doppler			
Normal Doppler study		62 (88.57%)	25 (83.33%)
Fetoplacental insufficiency		6 (8.57%)	-
Uteroplacental insufficiency		-	2 (6.67%)
Total		68	27
NST			
Reactive		66 (94.28%)	22 (73.33%)
Non-reactive		2 (2.86%)	5 (16.67%)
Total		68	27

NST: Non-stress test, LFT: Liver function test

coagulation profile was operative intervention, that is, lower segment cesarean section (LSCS), followed by the requirement of maternal intensive care in critical care unit (CCU) or medical intensive care unit (MICU). Out of the 7 (23.33%) patients with deranged coagulation profile who required intensive care monitoring, four succumbed. No maternal mortality was encountered among the eclampsia patients with normal coagulation profile. The least common maternal outcomes among patients with normal coagulation profile were disseminated intravascular coagulation (DIC) and acute renal failure accounting for 2.86% of cases each and that among patients with deranged coagulation profile was acute renal failure accounting for 6.67% of cases. Majority of the babies is 50% among those with normal coagulation profile and 56.66% among those with deranged coagulation profile group had prematurity.

The least common fetal outcome among those with normal coagulation profile being neonatal death and still birth accounting for 2.85% of cases each whereas among those with deranged coagulation profile, the least common outcome being very low birth weight (VLBW) accounting for 3.33% of cases (Table 6).

Of the 46 eclampsia mothers who underwent operative intervention, 93.47% had normal platelet counts and 6.52% had thrombocytopenia. Of the 11 eclampsia mothers who received intensive care, 63.63% of them had normal platelet counts and 36.36% had thrombocytopenia. Of the four maternal mortalities, 25% of them had normal platelet counts and 75% had thrombocytopenia. Of the four eclampsia mothers who had acute renal failure, 50% had normal platelet counts and 50% had thrombocytopenia. Of the six eclampsia mothers who developed pulmonary edema, 100% of them had normal platelet counts. Of the 10 eclampsia mothers who had posterior reversible encephalopathy syndrome (PRES), 60% of them had normal platelet counts and 40% had thrombocytopenia. Of the five eclampsia mothers who had DIC, 60% of them had normal platelet counts and 40% had thrombocytopenia. Of the eight neonatal deaths, 50% were among those of eclampsia mothers with normal platelet count and 50% among those with thrombocytopenia. Out of six still births, 83.33% were among those of eclampsia mothers with normal platelet count and 16.66% were among those with thrombocytopenia. Out of 10 low birth weight (LBW) babies, 80% were among those of eclampsia mothers with normal platelet count and 20% among those with thrombocytopenia. Out of five VLBW babies, 100% were among those of eclampsia mothers with normal platelet count. Out of seven babies with 5 min Apgar <7, 85.71% were among those of eclampsia mothers with normal platelet count and 14.28% were among those with thrombocytopenia. Out of 52 premature babies, 86.53% were among those of eclampsia mothers with normal platelet count and 13.56% were among those with thrombocytopenia. Out of 10 intrauterine growth retardation (IUGR) babies, 80% were among those of eclampsia mothers with normal platelet count and 20% were among those with thrombocytopenia (Table 7).

DISCUSSION

The present study observed a total of 4342 deliveries from February 2018 to August 2019 out of which 100 patients of eclampsia were found during the same period with the incidence of eclampsia in the present study of 2.3%, which is consistent with the reported incidence of eclampsia in India which varies from 0.179 to 3.7%.[8-10]

In the present study, majority of the eclamptic patients with both normal (42.8%) and deranged (46.6%) coagulation profiles belonged to the age group of 21–25 years. About 30% of the patients had deranged coagulation profiles while 70% had normal coagulation profiles. Majority of the eclampsia patients in both normal coagulation (75.71%) and deranged coagulation (40%) profile groups were primigravidae. This is similar to the studies of Priyadarshini and Mohanty[11] Awolola and Enaruna[12] and Mishra et al.[13]

Mishra et al.,[13] prospective comparative study comparing the coagulation profiles of pre-eclamptic and eclamptic women found that maximum numbers of cases were in the age group of 24–29 years. Most patients in normotensive pregnant control group and patients with pregnancy-induced hypertension (PIH) were in age group of 18–29 years.

Mishra et al.,[13] prospective comparative study comparing the coagulation profiles of pre-eclamptic and eclamptic

Table 6: Distribution of maternal and fetal outcome as per coagulation profile

Maternal outcome	Total	Normal coagulation profile (70)	Deranged coagulation profile (30)
Operative intervention (LSCS)	46	35 (50%)	11 (36.67%)
Intensive care	11	4 (5.71%)	7 (4 died) (23.33%)
Maternal mortality	4	- (0%)	4 (13.33%)
Acute renal failure	4	2 (2.86%)	2 (6.67%)
Pulmonary edema	6	4 (5.71%)	2 (6.67%)
PRES	10	4 (5.71%)	6 (20%)
DIC	5	2 (2.86%)	3 (10%)
Fetal outcome			
Baby with mother	64	50 (71.42%)	14 (46.66%)
Neonatal death (NND)	8	2 (2.85%)	6 (20%)
Still birth	6	2 (2.85%)	4 (13.33%)
LBW (1.5–2.5 Kg)	10	7 (10%)	3 (10%)
VLBW (1–1.5 Kg)	5	4 (5.71%)	1 (3.33%)
5 min Apgar score <7 (RD)	7	5 (7.14%)	2 (6.67%)
Prematurity	52	35 (50%)	17 (56.66%)
IUGR	10	6 (8.57%)	4 (13.33%)

VLBW: Very low birth weight, NND: Neonatal death, LBW: Low birth weight, LSCS: Lower segment cesarean section, DIC: Disseminated intravascular coagulation

Table 7: Distribution of maternal and fetal outcome as per platelet count

Maternal outcome	Total	Normal platelet count	Thrombocytopenia
Operative intervention (LSCS)	46	43 (93.47%)	3 (6.52%)
Intensive care	11	7 (63.63%)	4 (36.36%)
Maternal mortality	4	1 (25%)	3 (75%)
Acute renal failure	4	2 (50%)	2 (50%)
Pulmonary edema	6	6 (100%)	0
PRES	10	7 (60%)	3 (30%)
DIC	5	3 (60%)	2 (40%)
Fetal outcome			
Baby with mother	64	61 (95.31%)	3 (4.68%)
Neonatal death (NND)	8	4 (50%)	4 (50%)
Still birth	6	5 (83.33%)	1 (16.66%)
LBW (1.5–2.5 KG)	10	8 (80%)	2 (20%)
VLBW (1–1.5 KG)	5	5 (100%)	0
5 min Apgar score <7 (RD)	7	6 (85.71%)	1 (14.28%)
Prematurity	52	45 (86.53%)	7 (13.46%)
IUGR	10	8 (80%)	2 (20%)

LSCS: Lower segment cesarean section, PRES: Posterior reversible encephalopathy syndrome, IUGR: Intrauterine growth retardation, DIC: Disseminated intravascular coagulation

women observed that PIH was more common in primigravida as compared to mild and severe pre-eclampsia, eclampsia was more common in primigravida.

Mishra et al.,[13] prospective comparative study comparing the coagulation profiles of pre-eclamptic and eclamptic women observed that maximum women were in the gestational age group of 33–40 weeks. PIH cases had significantly lesser duration of pregnancy. Gestational age at the time of admission varied from 32 weeks till term.

The parameters of the coagulation profile considered in this study are platelet count, BT, CT, PT, and INR. About 89% of the eclampsia patients had normal platelet count, while 11% had thrombocytopenia. About 92% of the eclampsia patients had normal BT, whereas 8% had deranged BT. About 93% of the eclampsia patients had normal CT, while 7% had deranged CT. About 79% of the eclampsia patients had normal INR, while 21% had deranged INR. About 79% of the eclampsia patients had normal PT, while 21% had deranged PT. This is consistent with the studies of Mishra et al.,[13] and Priyadarshini and Mohanty.[11]

It was observed in our study that majority of the eclamptic patients with normal coagulation profile (41.43%) had a hemoglobin of 7-9.9g% and deranged coagulation profile (46.67%) had a hemoglobin of ≥11 g%. Among the eclamptic patients with normal coagulation profile, 3 (4.29%) patients had deranged LFTs, out of which two of them had normal serum bilirubin with deranged SGOT/SGPT. Among the eclamptic patients with deranged coagulation profile, all the 4 (13.33%) patients had complete deranged LFT. The correlation of deranged and normal coagulation profile with respect to Hb and platelets parameters was significant. This is in concordance to the studies of Priyadarshini and Mohanty.[11]

Priyadarshini and Mohanty[11] cross-sectional study observed in the study group, 13 (26%) cases had platelet count below 1 lac/mm^3, out of which 2 (4%) cases had mild pre-eclampsia and 11 (22%) cases were of severe pre-eclampsia. Twenty-five (50%) cases had platelet count between 1 lac and 1.5 lacs/mm^3.

In the present study, the correlation of deranged and normal coagulation profile with respect to bilirubin, SGOT, SGPT, urea, and creatinine parameters was significant. The correlation of deranged and normal coagulation profile with respect to PT, INR, serum sodium, and potassium parameters was significant. Priyadarshini and Mohanty[11] and Mishra et al.,[13] noted similar observations in their studies.

It was observed in the present study that the most common maternal outcome in the eclampsia patients with both normal (50%) and deranged (36.6%) coagulation profile was operative intervention, that is, LSCS, followed by the requirement of maternal intensive care in CCU or MICU. Out of the 7 (23.33%) patients with deranged coagulation profile who required intensive care monitoring, four succumbed.

It was observed in our study that majority of the babies is 50% among those with normal coagulation profile and 56.66% among those with deranged coagulation profile group had prematurity. The least common fetal outcome among those with normal coagulation profile being neonatal death and still birth accounting for 2.85% of cases each whereas among those with deranged coagulation profile, the least common outcome being VLBW accounting for 3.33% of cases. Of the 46 eclampsia mothers who underwent operative intervention, 93.47% had normal platelet counts and 6.52% had thrombocytopenia. Of the 11 eclampsia mothers who received intensive care, 63.63% of them had normal platelet counts and 36.36% had thrombocytopenia. Of the four maternal mortalities, 25% of them had normal platelet counts and 75% had thrombocytopenia. Of the four eclampsia mothers who had acute renal failure, 50% had normal platelet counts

and 50% had thrombocytopenia. Of the six eclampsia mothers who developed pulmonary edema, 100% of them had normal platelet counts.

This is similar to the studies of Leduc et al.,[14] Priyadarshini and Mohanty,[11] Jambhulkar et al.,[15] Prieto et al.,[16] Mishra et al.,[13] Mohapatra et al.,[17] and Awolola and Enaruna.[12]

Leduc et al.,[14] study on coagulation profile in severe pre-eclampsia observed thrombocytopenia is reported frequently in severe pre-eclampsia. There is progressive fall of mean platelet count with the increasing severity of disease.

In the present study, of the eight neonatal deaths, 50% were among those of eclampsia mothers with normal platelet count and 50% among those with thrombocytopenia. Out of six still births, 83.33% were among those of eclampsia mothers with normal platelet count and 16.66% were among those with thrombocytopenia. Out of 10 LBW babies, 80% were among those of eclampsia mothers with normal platelet count and 20% among those with thrombocytopenia. Out of five VLBW babies, 100% were among those of eclampsia mothers with normal platelet count. Out of seven babies with 5 min Apgar <7, 85.71% were among those of eclampsia mothers with normal platelet count and 14.28% were among those with thrombocytopenia. Out of 52 premature babies, 86.53% were among those of eclampsia mothers with normal platelet count and 13.56% were among those with thrombocytopenia. Out of 10 IUGR babies, 80% were among those of eclampsia mothers with normal platelet count and 20% were among those with thrombocytopenia.

In our study, of the 46 eclampsia mothers who underwent operative intervention, 93.47% had normal BT and 6.52% had deranged BT. Of the 11 eclampsia mothers who received intensive care, 54.54% of them had normal BT and 45.45% had deranged BT. Of the four maternal mortalities, 25% of them had normal BT and 75% had deranged BT. Of the four eclampsia mothers who had acute renal failure, 100% had normal BT. Of the six eclampsia mothers who developed pulmonary edema, 83.33% of them had normal BT and 16.66% had deranged BT. Of the 10 eclampsia mothers who had PRES, 100% of them had normal BT. Of the five eclampsia mothers who had DIC, 80% of them had normal BT and 20% had deranged BT. This is comparable to the study of McDonagh et al.[18]

Limitations of the study

The present study has some limitations. The sample size was small. Therefore, further studies should be conducted with bigger sample size and hospitals in rural and urban areas.

CONCLUSION

In the present study, eclampsia accounted for 2.3% of all deliveries. Normal pregnancy is a procoagulant state which is aggravated in PIH because of the constant endothelial damage that causes repeated activation of the coagulation cascade, leading to consumption of platelets and coagulation factors. This leads to maternal and fetal complications. Hence, relevant investigations need to be promptly done to identify the derangement of the coagulation profile in cases of eclampsia and pre-eclampsia which can alert the obstetrician of the severity of the disease so that appropriate and timely management can be initiated to prevent adverse outcomes. Health workers need to be instructed to ensure 100% registration of pregnant women and provide good quality of ANC including all essential components, especially record of weight, blood pressure, and urine analysis with an appropriate system of referral to tertiary care center at the earliest. All family physicians and medical officers need to be advised to follow a standard management protocol in a case of pre-eclampsia and eclampsia with an awareness for prompt referral of women who require to be managed by specialists. A well-equipped obstetric and neonatal intensive care unit manned by a team of consultant with special expertise need to be made available in every tertiary care center to provide the best maternal and fetal outcomes.

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