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Original Research Paper

Pathology

MATERNAL AND FETAL OUTCOME IN PATIENTS WITH DERANGED COAGULATION PROFILE IN PIH

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ABSTRACT The incidence of pregnancy induced hypertension is more in developing countries like India due to low socioeconomic status, apathetic attitude, poor health education and lack of regular antenatal supervision. Pregnancy induced hypertension is defined as hypertension that develops as the direct result of gravid state.
The categorization was done according to following diagnostic criteria
1. Gestational hypertension- Occurs in pregnancy for the first time after 20 weeks of gestation and disappear following delivery.
2. Preeclampsia- Minimum criteria
a) BP> 140 mm of Hg systolic or > 90 mm of Hg diastolic
b) Proteinuria> 300 mg/ 24 hours or >1+ dipstick (where quantitative method is not available)
3. Eclampsia- Preeclampsia associated with convulsion/coma.
There is distinct possibility of accentuation of hypercoagulable state of pregnancy during eclampsia and preeclampsia. Coagulation profile can be assessed by tests such as prothrombin time (PT), activated partial thromboplastin time (APTT) and platelet count. The present study was cross sectional, observational and was carried out in the Department of Pathology at Tertiary Health Care Centre during the period of 2 years from December 2020 to December 2022. Total 1131 pregnant women including 351 normotensive pregnant women,307 with mild preeclampsia, 254 with severe preeclampsia, 219 with eclampsia were studied to assess the coagulation profile. Among 780 cases of pregnancy induced hypertension, maximum number of cases were in the age group of 20-24 years (62.69%). The mean platelet count was significantly decreased with increasing severity of disorder as compared to normal pregnant control($p<0.05$). Prothrombin time, activated partial thromboplastin time and D-dimer were significantly prolonged with increasing severity of disorder as compared to normal pregnant control($p<0.05$). Maternal and fetal morbidity/mortality was more in groups of patients with deranged coagulation profile.

KEYWORDS : Platelet, eclampsia, preeclampsia, Coagulation.

INTRODUCTION

The incidence of preeclampsia is more in developing countries like India due to low socioeconomic status, apathetic attitude, poor health education and lack of regular antenatal supervision. (1,2,3)

Pregnancy induced hypertension is defined as hypertension that develops as the direct result of gravid state. It affects 5-15 % of all pregnancies, contributing significantly maternal and perinatal morbidity and mortality (4,5). It is observed that preeclamptic mothers having coagulation indices in severely abnormal ranges were associated with more unfavourable maternal and fetal outcome. (6,7)

Coagulation profile can be assessed by tests such as prothrombin time (PT), activated partial thromboplastin time (APTT) and platelet count. (1,8,9)

Aims and Objectives

1. To study the relationship of coagulation parameters (PT, APTT and D-dimer) and platelet count in patients with pregnancy induced hypertension and comparison with normotensive pregnant women.
2. To corelate coagulation parameters in patients with PIH with maternal and fetal outcome.

MATERIALS AND METHODS

The present study was cross sectional, observational and was carried out in the Department of Pathology at Tertiary Health Care Centre during the period of 2 years from December 2020 to December 2022.

The study was carried out in following groups.

Patients with HTN > 20 weeks of pregnancy were included

1. Mild pre-eclampsia - BP between 140/90 to <160/110 mm hg without proteinuria (307 cases).
2. Severe preeclampsia- BP≥ 160/110 mm Hg, proteinuria 5gm/24 hours (3+ on dipstick) and presence of headache, visual disturbances, oliguria and thrombocytopenia (254 cases).
3. Eclampsia – criteria of pre-eclampsia with convulsions that cannot be attributed to another cause (219).
4. Control group – Healthy pregnant women >20 weeks of gestation (351 cases).

Exclusion Criteria

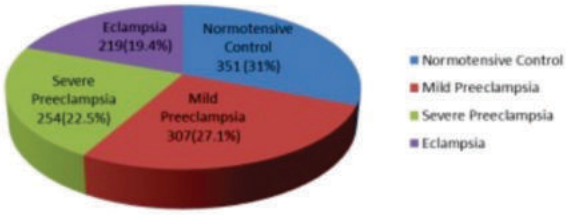
1. Chronic hypertension
2. Renal diseases
3. Epilepsy

Detailed history, important clinical findings and relevant investigations were noted. Coagulation profile was done by using Fully automated coagulation analyser STA Satellite

Max Stago. The haematological parameters were assessed on fully automated 5-part haematological analyser Mindray B65OO.

OBSERVATION AND RESULTS

Chart No.1: Division of Study Groups



Age Wise Distribution

Maximum number of patients were seen in age group 20-24 years in patients with preeclampsia, eclampsia and control group.

Our finding's regarding age was in agreement with MA Sameer et al (2017), Suresh Arjunrao Chaware et al (2017).

Comparison Of Parity Wise Distribution

Out of total 780 cases of pregnancy induced hypertension; 519 cases (66.54%) were primigravidae in our study and was in concordance with MA Sameer et al (2014), Suresh Arjunrao Chaware et al (2017) studies.

Mean gestational age in control group (34.69±3) and women with pregnancy induced hypertension had no significant difference (34.7±2).

In present study mean gestational age in mild preeclampsia, Severe Preeclampsia, Eclampsia was 34.79 wks., 33.85 wks., 33.17 wks. respectively and was correlated with MA Sameer et al (2014), Naveed Tamboli et al (2017) studies.

Table 1- Mean Haemoglobin, Platelet Count And Coagulation Parameters In All Groups.

Tests (Mean+ SD	Normal pregnant control (n=351)	Mild pree-clampsia (n=307)	Severe pree-clampsia (n=254)	Eclampsia (n=219)
Haemoglobin (gm%)	10.05 + 0.9	9.95 + 1.08	8.97 + 1.49	10.45 + 1.40
Platelet count (lac/cumm)	2.48 + 0.58	2.24 + 0.79	1.74 + 0.90	1.01 + 0.48
PT (sec)	13.12 + 0.96	13.95 + 1.59	15.97 + 2.93	15.94 + 3.05
APTT (sec)	31.88 + 3.47	33.68 + 7.16	39.46 + 7.32	44.53 + 13.60

Table 2: Comparison Of Mean Platelet Count In Preeclampsia And Eclampsia As Compared To Controls With Other Studies.

Authors	Normal pregnant control (lac/ cumm)	Mild pree-clampsia (lac/ cumm)	Severe pree-clampsia (lac/ cumm)	Eclampsia (lac/ cumm)
MA Sameer et al (2014)	2.42	2.39	1.60	1.51
Chaware S A et al (2015)	2.4	2.23	1.73	1.38
Tamboli (2021)	2.38	2.25	1.75	1.44
Present study (2022)	2.49	2.23	1.77	1.10

Decrease in platelet count was noted with increasing severity of PIH. Our finding was in agreement with Sameer et al (2014), Chaware S A et al (2015) and Tamboli et al (2021).

Table 3: Comparison Of Mean Prothrombin Time (sec) As Compared To Controls With Other Studies

Authors	Priyanka Chauhan et al (2014)	Suresh Chaware et al (2017)	Haldar B et al (2020)	Naveed Tamboli et al (2021)	Present study (2022)
Control	13.58 ±1.08	13.74 ±1.19	13.8 ± 1.10	13.27± 0.81	13.16 ± 0.96
Mild preeclampsia	13.78 ±1.82	13.87 ±1.02	14.81 ± 1.02	13.3± 0.86	13.98 ±1.59
Severe preeclampsia	13.83 ±1.82	14.22± 1. 11	15.75 ± 1.61	13.30± 2.65	15.97 ± 2.93
Eclampsia	14.14 ±1.50	14.48± 1. 41	16.73 ± 3.14	13.40± 2.13	15.95 ± 3.05

Mean prothrombin time increases with increasing severity of disorder.

Table 4: Comparison Of Mean APTT (sec) As Compared To Controls With Other Studies

Authors	Priyanka Chauhan et al (2014)	Suresh Chaware et al (2017)	Thakur Bhavana et al (2018)1	Naveed Tamboli et al (2021)	Present study (2022)
Control	29.31 ± 3.39	28.23 ± 2.35	30.54 ± 1.35	31.61±4 .06	31.84 ± 3.47
Mild pree-clampsia	29.50 ± 1.78	28.56 ± 2.56	32.08 ± 2.93	31.87±3 .80	33.62 ± 7.16
Severe pree-clampsia	30.80 ± 1.62	30.80 ± 6.01	34.73 ± 5.72	36.44± 13.15	39.42 ± 7.32
Eclampsia	32.84 ± 2.01	31.75 ± 6.74	35.67 ± 6.66	41.15± 9.37	44.58 ± 13.60

Increase in APTT was observed with increasing severity of the PIH and was in agreement with other authors.

Table 5- D-Dimer Levels In Cases And Controls.

D-dimer (mcg/ml)	Control (n=351)	Mild pree-clampsia (n=307)	Severe pree-clampsia (n=254)	Eclampsia (n=219)
<0.5	351(100%)	228 (74.27%)	121 (47.64%)	97 (44.29%)
>0.5	0	79 (25.73%)	133 (52.36%)	122 (55.71%)

Our finding of rise in the D-dimer level with increasing severity of the disorder was in agreement with all other authors.

Table 6: Correlation Of Coagulation Profile With Maternal Outcome In Cases Of Severe Preeclampsia And Eclampsia Combined

Coagulation profile	No of cases	Unfavour-able Maternal Outcome	Favour-able maternal Outcome	Unfavour-able fetal outcome	Favour-able fetal outcome
Normal	215	1 (0.47%)	214 (99.53%)	2 (0.93%)	213 (99.07%)
Deranged	258	59 (22.87%)	199 (77.13%)	81 (31.40%)	177 (68.60%)
Total (n)	473	60 (12.68%)	413 (87.32%)	83 (17.55%)	390 (82.45%)

Poor antenatal care and delayed hospitalization was noted in all women who died.

Table 7: Causes Of Maternal Mortality (Among 780 Cases)

Causes of maternal mortality	Percentage (%)
DIC	15(1.92%)
Abruptio placenta	13(1.66%)
HELLP syndrome	9(1.15%)
Acute respiratory distress syndrome	8(1.03%)
Pulmonary embolism	3(0.38%)

Acute renal failure	8(1.03%)
Cerebrovascular accidents	4(0.51%)
Total	60

Table 8: Comparison Of Maternal Complications In Severe Preeclampsia

Complication	Savita Rani Singhal et al (2009) (n=49)	Vidyadhar B et al (2011) (n=42)	Tamboli et al (2021) (n=42)	Present study (2022) (n=254)
No complications	61.22% (30)	69.04% (29)	83.33% (35)	72.04% (183)
Abruptio placentae	20.41% (10)	19.04% (8)	2.38% (1)	7.48% (19)
Postpartum haemorrhage	10.20% (5)	4.76% (2)	4.76% (2)	5.90% (15)
Acute renal failure	4.08% (2)	2.38% (1)	2.38% (1)	5.12% (13)
HELLP syndrome	2.04% (1)	4.76% (2)	2.38% (1)	4.72% (12)
Pulmonary edema	2.04% (1)	-	-	2.76% (7)
DIC	0	-	4.76% (2)	1.97% (5)

In present study, abruptio placentae was seen in 7.48%, postpartum haemorrhage in 5.90%, acute renal failure in 5.12%, HELLP syndrome in 4.72%, pulmonary edema in 2.76% and DIC in 1.97% of cases with severe preeclampsia.

Abruptio placentae was the commonest complication in present study as well as in other studies followed by postpartum haemorrhage, acute renal failure and HELLP syndrome.

Table 9: Comparison Of Fetal Complications In Severe Preeclampsia

Complications	Vidyadhar B et al (2011) (n=42)	Parveen M. Aabidha et al (2015) (n=63)	Present study (2022) (n=254)
Prematurity	47.62% (20)	23.65% (15)	40.56% (103)
Intrauterine growth retardation (IUGR)	26.19% (11)	39.7% (25)	22.44% (57)
Perinatal death	26.19% (11)	36.5% (23)	11.42% (29)

Prematurity was the commonest fetal complication seen in severe preeclampsia and it was a major risk factor for increasing perinatal mortality.

Table 10: Comparison Of Maternal Complications In Eclampsia Of Our Study With Other Studies

Complication	Savita Rani Singhal et al (2009) (n=51)	Tukur A Jido et al (2012) (n=120)	Dodiya HN et al (2020) (n=180)	Tamboli et al (2021) (n=60)	Present study (2022) (n=219)
No complications	23.52% (12)	79.16% (95)	60% (108)	63.3% (38)	20.54% (45)
Status epilepticus	-	-	3.3% (6)	-	26.94% (59)
HELLP syndrome	1.96% (1)	4.2% (5)	5.6% (10)	13.33% (8)	10.96% (24)
Abruptio placentae	1.96% (1)	2.5% (3)	8.9% (16)	3.33% (2)	10.50% (23)
Pulmonary complications	6.12% (3)	5% (6)	3.9% (7)	3.33% (2)	10.05% (22)
Acute renal failure	11.76% (6)	5% (6)	3.9% (7)	3.33% (2)	7.76% (17)
DIC	3.92% (2)	-	6.7% (12)	6.66% (4)	5.93% (13)
Post-partum haemorrhage	50.98% (26)	-	7.8% (14)	3.33% (2)	3.65% (8)
Cerebrovascular accident	-	4.2% (5)	-	3.33% (2)	3.65% (8)

Our study shows higher percentage of status epilepticus (26.94%) followed by HELLP syndrome (10.96%), abruptio placentae (10.50%), pulmonary complications (10.05%).

Variation in percentage of complications is due to large sample size in our study.

Table 11: Comparison Of Fetal Complications In Eclampsia Of Our Study With Other Studies

Complications	Naveed Tamboli et al (2011) (n=60)	Dodiya HN et al (2020) (n=180)	Present study (2022) (n=219)
Intrauterine growth retardation (IUGR)	25% (15)	-	34.28% (75)
Prematurity	-	28.9% (52)	26.03% (57)
Perinatal death	40% (24)	16.7% (30)	25.11% (54)

In present study, prematurity was seen in 26.03%, IUGR in 34.25% & perinatal death in 25.11% of cases.

Our findings of prematurity were in concordance with Dodiya HN et al (2020), while that of intrauterine growth retardation was in correlation with Vidyadhar B et al (2011).

Correlation Of Coagulation Abnormalities & Maternal And Fetal Outcome

Maternal and fetal outcome was observed and correlated with coagulation profile. In mild preeclampsia there is 100% favourable maternal and fetal outcome

e. Derangement in coagulation profile was significantly associated with unfavourable maternal and fetal outcome in severe preeclampsia and eclampsia ($p<0.05$).

Maternal Outcome

In present study, out of 258 patients with deranged coagulation profile, 59 patients (22.87%) had unfavourable outcome while 199 (77.13%) had normal course in spite of deranged coagulation profile probably due to less severe derangement which was managed with supportive treatment. However, out of 215 patients with normal coagulation profile, 1 (0.47%) had unfavourable outcome and 214 patients (99.53%) had normal course. The deranged coagulation profile was significantly associated with maternal morbidity/mortality in our study.

Present study showed 22.87% maternal death (among 258 patients with deranged coagulation profile) which were comparatively less in percentage due to regular death audits, prompt ANC clinics, early diagnosis and its proper treatment.

Unsupervised antenatal period and delayed hospitalization were noted in all women's who died.

Fetal Outcome

Present study showed reduced rate of perinatal death (17.55%) compared to other authors in patients with deranged coagulation profile. The reduced rate of perinatal mortality can be attributed to timely intervention and well equipped

NICU.

In our study deranged coagulation profile was significantly associated with fetal outcome.

CONCLUSION

Pregnancy induced hypertension is the common complication of pregnancy. Preeclampsia and eclampsia have remained a leading cause of maternal mortality and being higher in developing countries due to illiteracy, poor antenatal care and poverty.

We concluded that deranged coagulation profile is a significant predictor of increased adverse maternal and perinatal outcome. Cases with preeclampsia and eclampsia spectrum and patients with thrombocytopenia should be thoroughly investigated and followed closely to prevent complications. Early diagnosis of preeclampsia, its proper management and timely delivery will improve maternal and fetal outcome.

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