



## COMPARATIVE ANALYSIS OF COAGULATION PROFILE IN PREGNANCY INDUCED HYPERTENSIVE WOMEN AND IN NORMOTENSIVE PREGNANT WOMEN IN A TERTIARY CARE HOSPITAL

### Pathology

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### ABSTRACT

**INTRODUCTION:** Pregnancy induced hypertension is an elevated blood pressure that appears first time after five months of pregnancy. Coagulation profile studied in pregnancy induced hypertension is helpful in assessing the severity of coagulation abnormalities at an earlier stage prior to the occurrence of complications. We studied the changes in Platelet Count, Bleeding Time, Clotting Time, Prothrombin Time and Activated Partial Thromboplastin Time in pregnancy induced hypertension and in normal pregnant women and compare the above parameters between the two groups and correlate the above parameters with severity of pregnancy induced hypertension

**METHODS AND MATERIALS:** Study group consists of 120 pregnant women with 39 weeks in which 60 pregnant women were selected for control group with normal blood pressure. The remaining 60 pregnant women are with systolic blood pressure of 140 mm of Hg and above and diastolic blood pressure of 90 mm of Hg and above. Both study groups were matched.

**RESULTS:** Present study showed the mean Clotting Time for normal pregnancy was 310 seconds, Clotting Time for the non severe PIH was 290 seconds and the severe PIH was 292 seconds and the P-value arrived is 0.269 which is not significant. In the present study the mean Platelet Count of normal pregnancy, non severe PIH and severe PIH patients were 2.89 lakhs/cubic mm, 2.17 lakhs/cubic mm and 1.58 lakhs/cubic mm respectively with significant P-value of 0.000. In the present study the mean prothrombin time for normal pregnancy, non-severe PIH and severe PIH patients were 11.05 seconds, 10.19 seconds and 13.06 seconds respectively with significant P-value of <0.000. In the present study the mean APTT for normal pregnancy, non severe PIH and severe PIH patients were 29.3 seconds, 29.5 seconds and 32.2 seconds respectively with significant P-value of <0.007.

**CONCLUSION;** Bleeding Time, Prothrombin Time and Activated Partial Thromboplastin Time showed prolonged values with severe pregnancy induced hypertension. With increasing severity of blood pressure in pregnant women significant changes are noted in the coagulation parameters. Coagulation abnormalities include HELLP Syndrome and Disseminated Intra vascular Coagulation which contribute the causes for maternal deaths in pregnancy induced hypertension. Present study can be helpful in identifying the coagulation abnormalities in patients with pregnancy induced hypertension in earlier stage and can be helpful in the management of complications in relation to pregnancy induced hypertension. Maternal and fetal mortality and morbidity can be reduced with the help of this study.

### KEYWORDS

Pregnancy Induced Hypertension, Prothrombin Time, Bleeding Time, Coagulation Profile

#### INTRODUCTION

Aim of the study is to find out the changes that occur in the coagulation parameters in pregnancy induced hypertension as compared to that in normal pregnancy. This study may help in reducing the mortality and morbidity that is caused by the coagulation abnormalities of the pregnancy induced hypertension.

This study is to find out the changes that occur in the coagulation parameters in pregnancy induced hypertension as compared to that in normal pregnancy. In this study we studied the changes in Platelet Count, Bleeding Time, Clotting Time, Prothrombin Time and Activated Partial Thromboplastin Time in pregnancy induced hypertension and in normal pregnant women.

#### MATERIALS AND METHODS

##### DESIGN, METHODOLOGY AND TECHNIQUES

##### SOURCE OF DATA

Pregnant women with pregnancy induced hypertension admitted in The Department Of Obstetrics, Coimbatore Medical College Hospital, Coimbatore.

Normal pregnant women, attending outpatient clinic in the above department,

#### STUDY PLACE, PERIOD, DESIGN and SAMPLE SIZE

The Department of Pathology, Coimbatore Medical College Hospital, Coimbatore, Prospective Case control study from July 2013 to July 2014 and 120 patients

#### INCLUSION CRITERIA:

Normotensive pregnant women consists of 60 persons.

Pregnancy induced hypertension patients are divided into two groups.

**GROUP I:** Non severe pregnancy induced hypertension – 30 cases.

**GROUP II:** Severe pregnancy induced hypertension – 30 cases.

#### EXCLUSION CRITERIA:

- Previous history of Hypertension, Diabetes Mellitus, Renal disease and Coagulation abnormalities..

#### METHODOLOGY:

Study group consists of 120 pregnant women with 39 weeks in which 60 pregnant women with normal blood pressure were selected for control group. The remaining 60 pregnant women are with systolic blood pressure of 140 mm of Hg and above and diastolic blood pressure of 90 mm of Hg and above. Both study groups were matched.

The non severe PIH group consists of 30 pregnant women with blood pressure between 140/90 mm of Hg and 160/110 mm of Hg. The severe PIH group consists of 30 pregnant women with systolic blood pressure above 160 mm of Hg and diastolic blood pressure above 110 mm of Hg with symptoms like vomiting, headache, Visual Disturbances, Upper abdominal Pain, Oliguria, Convulsion, Low platelet Count, Elevated serum enzymes and Elevated creatinine.

Detailed medical and obstetric history taken from the study group and procedure explained. After getting consent, the following tests were done.

1. Bleeding Time – By Duke's method.
2. Clotting Time – Wright's capillary tube method.
3. Platelet count- By using Automated Hematology Analyzer SYSMEX XP-100.
4. Prothrombin Time and APTT – By using Automated Analyser SYSMEX CA-50.

#### OBSERVATION AND RESULTS

Statistical methods used for analysis of Coagulation Parameters include SPSS 18 software, Anova, Scheffe, Post Hoc test and one way.

**Table 1 : Mean Bleeding Time for Normal Pregnancy, Non Severe PIH and Severe PIH Patients Bleeding time (in seconds)**

	Number	Mean	Std. Deviation	Std. Error
Normal Pregnancy	60	153.5333	23.95014	3.09195
Non Severe PIH	30	178.5333	23.83815	4.35223
Severe PIH	30	227.4667	21.21114	3.87261
Total	120	178.2667	38.09491	3.47757

**Table 2 : Analysis of variance of Bleeding Time among group Normal Pregnancy, Non severe PIH and Severe PIH Anova**

	Sum of squares	Df	Mean square	F	Sig.
Between Groups	109325.6	2	54662.800	100.924	0.000
Within Groups	63369.867	117	541.623		
Total	172695.5	119			

**Table 3: Multiple Comparisons of Bleeding time among group Normal Pregnancy, Non severe PIH and Severe PIH Dependantvariable : Bleeding Time (Seconds) Scheffe**

(I) Blood Pressure	(J) Blood Pressure	Mean Difference (I-J)	Std. Error	Sig.
Normal Pregnancy	Non Severe PIH	-25.00000*	5.20395	0.000
	Severe PIH	-73.93333*	5.20395	0.000
Non Severe PIH	Normal Pregnancy	25.00000*	5.20395	0.000
	Severe PIH	-48.93333*	6.00901	0.000
Severe PIH	Normal Pregnancy	73.93333*	5.20395	0.000
	Non Severe PIH	48.93333*	6.00901	0.000

**CLOTTING TIME**

**Table 4: Mean Clotting time (in seconds) for Normal Pregnancy, Non Severe PIH and Severe PIH Patients.**

	Number	Mean	Std. Deviation	Std. Error
Normal Pregnancy	60	310.5667	70.73857	9.13231
Non Severe PIH	30	290.2000	55.07950	10.05610
Severe PIH	30	292.4000	61.90850	11.30289
Total	120	300.9333	65.18026	5.95012

**Table 5: Multiple Comparisons of Clotting time among group Normal Pregnancy, Non severe PIH and Severe PIH Dependantvariable : Clotting Time (Seconds) Scheffe**

(I) Blood Pressure	(J) Blood Pressure	Mean Difference (I-J)	Std. Error	Sig.
Normal Pregnancy	Non Severe PIH	20.36667	14.53494	0.378
	Severe PIH	18.16667	14.53494	0.460
Non Severe PIH	Normal Pregnancy	-20.36667	14.53494	0.378
	Severe PIH	-2.20000	16.78350	0.991
Severe PIH	Normal Pregnancy	-18.16667	14.53494	0.460
	Non Severe PIH	2.20000	16.78350	0.991

**PLATELET COUNT:**

**Table 6: Distribution of patients according to Platelet Count**

Platelet Count (lacs/mm <sup>3</sup> )	CLINICAL DIAGNOSIS						TOTAL
	Normal Pregnancy	%	PIH Non severe	%	PIH severe	%	
0.6-1.6	02	3	02	7	18	60	22
1.6-2.6	14	23	24	80	12	40	50
2.6-3.6	34	57	04	13	00	0	38
3.6-4.3	10	17	00	0	00	0	10
Total	60	100	30	100	30	100	120

**PROTHROMBIN TIME**

**Table 7: Distribution of patients according to Prothrombin Time:**

Prothrombin Time (seconds)	Clinical Diagnosis						Total
	Normal Pregnancy	%	PIH Non severe	%	PIH severe	%	
8-10	100	17	15	50	03	10	28
10-12	36	60	12	40	06	20	54
12-14	14	23	03	10	15	50	32
14-20	00	0	00	0	06	20	06
Total	60	100	30	100	30	100	120

**Activated Partial Thromboplastin Time:**

**Table 8: Distribution of patients according to APTT:**

APTT (seconds)	CLINICAL DIAGNOSIS						Total
	Normal Pregnancy	%	PIH Non severe	%	PIH severe	%	
22-25	11	18	04	13	03	10	18
25-28	10	17	06	20	05	17	21
28-31	21	35	08	27	06	20	35
31-36	18	30	12	40	10	33	40
36-40	00	0	00	0	06	20	06
Total	60	100	30	100	30	100	120

**DISCUSSION :**

**Bleeding Time :**

Present study showed the mean bleeding time for normal pregnancy, non-severe PIH and severe PIH were 153 seconds, 178 seconds and 227 seconds respectively, P-value <0.000 is significant.

Priyanka Chauchan<sup>1,2,3,4</sup> et al 2014 study showed bleeding time for normal pregnancy, nonsevere PIH and severe PIH were 180 seconds, 294 seconds and 324 seconds respectively, with significant p-value (<0.001). So this study correlated well with present study.

**Clotting Time:**

Present study showed the mean clotting time for normal pregnancy was 310 seconds, clotting time for the non-severe PIH was 290 seconds and the severe PIH was 292 seconds, the P-value 0.269 is not significant.

The mean clotting time compared with PriyankaChauchan et al 2014 study, which showed the mean clotting time for normal pregnancy was 358 seconds, for the non-severe PIH was 368 seconds and for the severe PIH was 378 seconds. P-value more than 0.05 was not significant.

There will be interobserver variations in doing clotting time estimation.

**Platelet Count :**

In the present study the mean platelet count of normal pregnancy, non-severe PIH and severe PIH patients were 2.89 lakhs/cubic mm, 2.17 lakhs/cubic mm and 1.58 lakhs/cubic mm respectively with significant P-value 0.000. These values correlated with following studies:

Shete Anjali<sup>5,6,7</sup> et al 2013 study showed the mean platelet count in normal pregnancy was 3.41 lakhs/cubic mm and in severe PIH 1.27 lakhs/cubic mm with significant P-value <0.0001.

Priyanka Chauchan<sup>13,14,15,16</sup> et al 2013 study exhibited the mean ± standard deviation of platelet count in normal pregnancy was 2.47 ± 0.75 lakhs/cubic mm, mean ± standard deviation of platelet count in non severe PIH was 1.62 ± 0.678 lakhs/cubic mm and mean ± standard deviation of platelet count in severe PIH 1.63 ± 0.742 lakhs/cubic mm. The P-value was significant (0.0001).

Studies above mentioned correlated well with present study for the mean platelet count and the P-value.

**Prothrombin time:**

In present study the mean prothrombin time for normal pregnancy, non-severe PIH and severe PIH patients were 11.05 seconds, 10.19 seconds and 13.06 seconds respectively with significant P-value <0.000.

Wale Mohamed Aref<sup>25,26,27</sup> et al 2012 study showed the mean Prothrombin Time for normal pregnancy and severe PIH patients were 13.24 ± 0.86 seconds and 13.41 ± 0.68 seconds respectively with P-value more than 0.05.

Tashin Mushtaque<sup>28,29,30</sup> et al 2013 study revealed the mean Prothrombin Time for normal pregnancy, Non severe PIH and severe PIH patients were 10.9 seconds, 10.1 seconds and 9.8 seconds respectively with P-value less than 0.0001 was statistically significant

The above two studies statistically correlated with present study.

**APTT:**

In present study the mean APTT for normal pregnancy, non-severe PIH

and severe PIH patients were 29.3 seconds, 29.5 seconds and 32.2 seconds respectively, with significant P-value 0.007.

TashinMushtaque<sup>31,32,33</sup> et al 2013 study revealed the mean APTT for normal pregnancy, Non severe PIH and severe PIH patients were 26.68 seconds, 26.71 seconds and 26.25 seconds respectively with P-value less than 0.005 was statistically significant.

The present study correlated well with the above study

## SUMMARY

- Present study showed the mean bleeding time for normal pregnancy, non severe PIH and severe PIH were 153 seconds, 178 seconds and 227 seconds respectively. P-value 0.000 is significant.
- Present study showed the mean clotting time for normal pregnancy was 310 seconds, clotting time for the non severe PIH was 290 seconds and the severe PIH was 292 seconds, the P-value 0.269 is not significant.
- In the present study the mean platelet count of normal pregnancy, non severe PIH and severe PIH patients were 2.89 lakhs/cubic mm, 2.17lakhs/cubic mm and 1.58 lakhs/cubic mm respectively, with significant P-value 0.000.
- In present study the mean prothrombin time for normal pregnancy, non-severe PIH and severe PIH patients were 11.05 seconds, 10.19 seconds and 13.06 seconds respectively, with significant P-value <0.000.
- In present study the mean APTT for normal pregnancy, non severe PIH and severe PIH patients were 29.3 seconds, 29.5 seconds and 32.2 seconds respectively, with significant P-value <0.007.

## CONCLUSION

- Present study revealed changes in the coagulation parameters in women with severe Pregnancy Induced Hypertension
- Platelet count showed inverse relationship with severity of Pregnancy Induced Hypertension.
- Bleeding Time, Prothrombin Time and Activated Partial Thromboplastin Time showed prolonged values with severe Pregnancy Induced Hypertension.
- With increasing severity of blood pressure in pregnant women significant changes noted in the coagulation parameters.
- Present study can be helpful in identifying the coagulation abnormalities in relation to Pregnancy Induced Hypertension in earlier stage and can be helpful for the management of complications in relation to Pregnancy Induced hypertension.
- Maternal and fetal mortality and morbidity can be reduced with the help of this study.

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