

## Study of Platelet Indices in Pregnancy Induced Hypertension

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### Abstract

### Original Research Article

**Introduction:** Pregnancy-induced hypertension (PIH) is the most common disorder of pregnancy affecting approximately 5-7% of pregnancies and is a significant cause of maternal and fetal morbidity and mortality. Platelet count and platelet indices are simple and cost effective method of prediction of pregnancy induced hypertension. This study is aimed to compare platelet indices between normal pregnancy and cases with pregnancy induced hypertension and study the association of platelet indices and pregnancy induced hypertension. **Materials and methods:** Prospective case control study, conducted in the department of pathology with cases having BP > 140/90, detected after 20 weeks of pregnancy and control group with uneventful pregnancies. Under aseptic precautions samples are collected in EDTA containers and analyzed for platelet indices using automated analyzer. **Result:** Maximum gestational age of incidence of pregnancy induced hypertension is between 26 and 41 weeks with mean gestational age of 35 weeks. Platelet count showed gradual decrease in pregnancy induced hypertension cases when compared to normal pregnancy. Mean platelet volume showed gradual increase when compared to normal pregnancy. **Conclusion:** Study shows platelet count and platelet indices are simple and cost effective modality for early recognition of pregnancy induced hypertension so that it will help in prevention of complications.

**Keywords:** Pregnancy induced hypertension, pre- eclampsia, platelet indices, platelet count.

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## INTRODUCTION

Pregnancy-induced hypertension (PIH) is the most common disorder of pregnancy affecting approximately 5-7% of pregnancies and is a significant cause of maternal and fetal morbidity and mortality. The incidence of PIH in India ranges from 5% to 15% [1].

Majority of patients remains in mild to moderate group and does not have any obstetric problem, certain proportion of patients; the risk to the mother can be significant and includes the possible development of disseminated intravascular coagulation (DIC), intracranial hemorrhage, renal failure, retinal detachment, pulmonary edema, liver rupture, abruptio placentae, and death [1].

PE is characterized by hypertension (blood pressure >140/90 mm Hg), proteinuria (>0.3 g/d), edema and other symptoms and may begin as early as the 20th gestational week and last for 6 weeks after

delivery [2]. PIH is associated with 16 % of all maternal mortality and 20% of all perinatal mortality in India [3].

Pregnancy induced hypertension (PIH) is defined as hypertension that develops as the direct result of the gravid state. It includes, i) Gestational hypertension, ii) Preeclampsia, iii) Eclampsia [3].

Various major hematological changes like quantitative and qualitative platelet abnormalities, alteration in hemoglobin concentration and altered blood indices parameters and hypercoagulable state may be seen [4].

Preeclampsia is a highly thrombotic and pro-coagulant state with platelet activation and thrombin and fibrin formation. About 20% of PIH patients have altered coagulation study profile [4].

Recent studies suggest that platelet parameters like platelet indices are most simple and cost effective methods for prediction of PIH, way before the

appearance of derangements in PT, APTT, TT values [5].

So we undertook this study to see that if there is any variation in platelet count and indices like MPV & PDW in pregnancy induced hypertension.

## MATERIALS & METHODS

### AIM

To study association of platelet indices between normal pregnancy and pregnancy induced hypertension.

### OBJECTIVES

- 1) To study the platelet indices in pregnancy induced hypertensive patients.
- 2) To study the platelet indices in normal pregnant women of more than 20 weeks.
- 3) To compare the platelet indices between the normal and hypertensive pregnant patients.

### Study area

The study was conducted in Sri Venkateshwaraa Medical College Hospital & Research Institute, Ariyur, and Puducherry.

### Study design

Cross sectional study

### Sample Size

- 50 pregnant women with PIH
- 50 pregnant women with no complications

### Inclusion Criteria

CASES: Women having (B.P.>140/90 mmHg) and significant proteinuria (>300 mg per 24 hrs) and/or edema were treated as preeclampsia.

CONTROLS: Normotensive pregnancies more than 20 weeks.

### Exclusion Criteria

- Cardiovascular disease.
- Renal and Hepatic disorders.
- Eclampsia.
- Chronic hypertension.

## METHODOLOGY

The present study is a cross sectional study carried out in pregnant women in the department pathology at Sri Venkateshwaraa Medical College Hospital & Research Institute, after obtaining consent from the patient. Clinical details like blood pressure, G P L A, weeks of gestation, any history of past illness will be obtained.

Then 5 ml of venous blood will be drawn from the study population by venipuncture using a disposable syringe under aseptic precautions and are taken in tubes containing EDTA. Then the sample is processed for platelet indices in automatized counter Mindray IP 5051 five part automated analyzer.

## RESULTS

The mean gestational age of incidence of pregnancy hypertension is 35 with a range between 26 and 41 weeks. The mean platelet count in PIH cases in both primi and multigravida are reduced when compared with platelet count in normal pregnancy. The mean platelet volume is increased in PIH when compared to that of normal pregnancy. Though platelet distribution width showed increase in pregnancy induced hypertension it was not significant with p value of more than 1.

## DISCUSSION

Present prospective observational analytical case control study included 100 subjects, out of which 50 were controls and 50 were having PIH. In this study an attempt was made to assess the role of platelet indices in assessment of preeclampsia.

In present study we found an increase in MPV & PDW values from normotensive pregnant women to pre-eclampsia which correlated well with other studies.

In our study mean Platelet count is 1.8 lakhs in preeclampsia which is comparable with Mohapatra *et al.* who observed platelet count as 1.8 lakhs & Vrunda *et al.* who observed the value of Platelet count as 1.4 in preeclampsia [5-8]

In our study MPV in preeclampsia which is comparable with Giles *et al.* who observed MPV of 9.9, Annam *et al.* observed the value of MPV as 10.3 in preeclampsia [5-8].

In our study PDW is 12 in preeclampsia which is comparable with Giles *et al.* who observed PDW of 16 & Annam *et al.* who observed the value of PDW as 15.51 in preeclampsia [5, 6, 7, 8].

Pre-eclampsia affects approximately 6% of all pregnancies. Women with severe pre-eclampsia may develop variety of hematological aberrations. Thrombocytopenia complicating pregnancy is reported relatively frequently in severe pre-eclampsia with occurrence ranging at 11 to 29%. The incidence of thrombocytopenia associated with pregnancy induced hypertension in our study was 42.11%, which is much higher than earlier reported cases [9, 10].

**COMPARISON WITH OTHER STUDIES**

GROUP	PARAMETER	Mohapatra et al. [6]	Vrunda et al. [7]	Rabia et al. [5]	Present study
NORMAL PREGNANCY	Platelet count(lakhs)	2.3	2.2	2.4	2.2
PIH	Platelet count(lakhs)	1.8	1.4	1.9	1.8

GROUP	PARAMETERS	Annam et al. [5]	Giles et al. [8]	Rabia et al. [5]	Present study
NORMAL PREGNANCY	MPV	8.6	8.7	8.4	9
	PDW	11.07	12	12	11
PIH	MPV	10.3	9.9	9	10
	PDW	15.5	16	16.29	12

**STATISTICAL ANALYSIS****GESTATIONAL AGE**

GROUP	N	MINIMUM	MAXIMUM	MEAN	SD
Normal pregnancy	50	22	41	32.80	4.853
Pregnancy induced hypertension	50	26	41	35.16	3.727

**DESCRIPTIVE STATISTICS- CASES**

PARITY		N	MINIMUM	MAXIMUM	MEAN	SD
Primi	Platelet Count (lakhs)	35	72000	410000	194571.43	84136
	PDW (fl)	35	8.00	18.20	12.2571	2.4
	MPV (fl)	35	7.80	38.30	10.4971	4.9
Multi	Platelet Count (lakhs)	15	100000	260000	167333.33	47729
	PDW ( fl)	15	8.00	16.60	11.4800	2.4
	MPV ( fl)	15	7.60	10.90	9.3533	0.9

**DESCRIPTIVE STATISTICS-CONTROL**

PARITY		N	MINIMUM	MAXIMUM	MEAN	SD
Primi	Platelet Count (lakh)	29	150000	400000	221586.21	57101.737
	PDW ( fl)	29	8.10	15.10	10.9414	1.77432
	MPV (fl)	29	8.00	10.40	9.2517	.67062
Multi	Platelet Count (lakh)	21	150000	400000	218761.90	56044.540
	PDW (fl)	21	8.40	14.20	11.3429	2.01880
	MPV (fl)	21	8.00	12.10	9.3095	.94123

**CHI SQUARE TEST -PLATELETS: P VALUE-0.005 (SIGNIFICANT)**

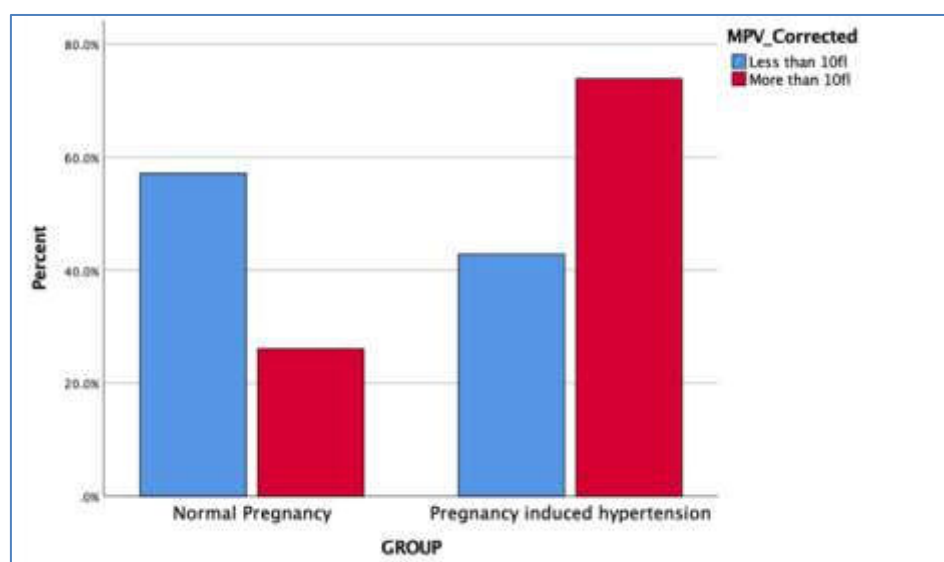
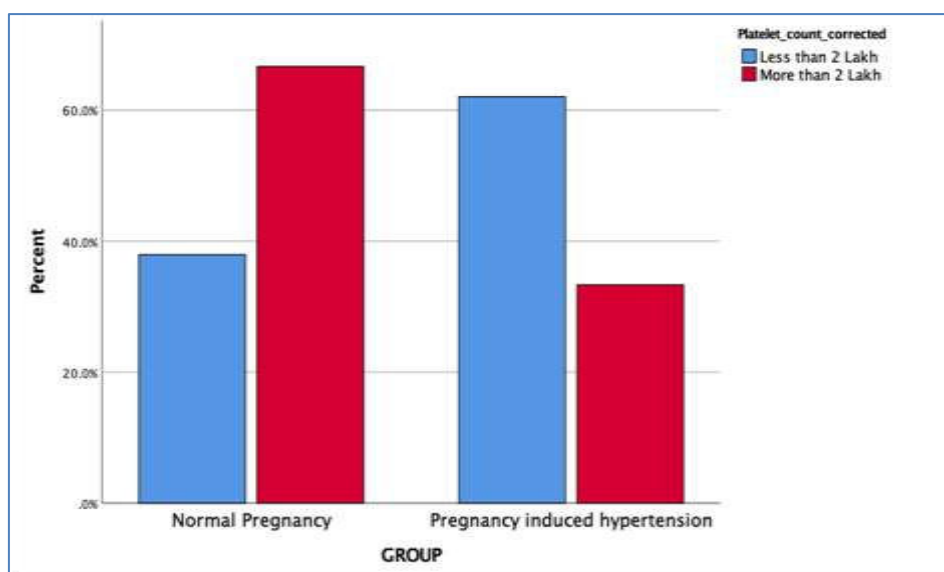
GROUP	< 2 LAKHS/CUMM	>2 LAKHS/CUMM	TOTAL
NORMAL PREGNANCY	22	28	50
PIH	36	14	50
TOTAL	58	42	100

**CHI SQUARE TEST -PDW: P VALUE-0.151 (NOT SIGNIFICANT)**

GROUP	< 12fl	>12fl	TOTAL
NORMAL PREGNANCY	34	16	50
PIH	27	23	50
TOTAL	61	39	100

**CHI SQUARE TEST – MPV: P VALUE-0.009 (SIGNIFICANT)**

GROUP	< 10fl	> 10fl	TOTAL
NORMAL PREGNANCY	44	6	50
PIH	33	17	50
TOTAL	77	23	100



## CONCLUSION

Since pregnancy induced hypertension is the most common disorder complicating pregnancy so it is mandatory to detect and treat earlier to prevent complications.

Since platelet count and platelet indices (PDW, MPV) estimation are simple and cost effective and so it can be used for the assessment of severity of preeclampsia and disease progression to eclampsia.

Since platelet count and indices are routinely done it is selected as an initial parameter for screening and assessment of pregnancy induced hypertension and initiation of earlier treatment.

Drawback of the study is thought it is a screening test its not confirmatory, so further investigations of coagulation parameters like prothrombin time, activated partial thromboplastin time,

fibrin degradation products, d dimer are required for confirmation.

Hence further studies with larger population and further investigation parameters are required to generalize the findings in the population.

Due to low socioeconomic status,, attitude, poor health education and lack of regular antenatal check-up the incidence of PIH is more in developing countries like India

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