Original Research Article

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Is Thrombocytopenia an Alarm for Severe Preeclampsia

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Abstract

Background: Hypertension is the most common medical problem encountered in pregnancy resulting into alteration of hematological profile, most common of which is thrombocytopenia. The present study is conducted to assess whether platelet count can predict severe forms of HDP and fetomaternal outcome. *Methods*: An observational study was conducted in the Department of Obstetrics and Gynaecology at Pt. J.N.M Medical College Dr. BRAMH, Raipur from May 2016 to July 2017. A total of 100 women in their third trimester of pregnancy were investigated. They were divided in two groups on the basis of platelet count and followed till delivery. The mode of delivery, gestational age at the time of delivery and fetomaternal complications were noted. The data collected was tabulated and analyzed. *Results*:A significant association was found between severity of HDP and thrombocytopenia p=(.003). Women of HDP with thrombocytopenia had significantly higher number of pretermbirth (p<0.001). Similarly higher number of complications were noted like HELLP(16%), abruption (16%), pulmonary edema (16%), renal failure (11.1%) and PPH (27%) in women with thrombocytopenia. The mean duration of pregnancy was reduced in women with thrombocytopenia (34.57 weeks) as compared to women with normal platelet count (36.36 weeks). The women with thrombocytopenia had more number of fetal complications. 44% had IUGR, 11.1% had IUD and 88% of neonates required NICU admission. *Conclusion*: A simple test of platelet count which is cost effective, rapid and accurate can be used in in assessing severity of HDP and timely management.

Keywords: HDP; Platelet Count and Fetomaternal Outcome.

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Introduction

Hypertension is the most common medical problem encountered in pregnancy, it complicates about 3-5% of all the pregnancies and continues to be a major cause of maternal and perinatal morbidity and mortality [1]. The national incidence of preeclampsia in India is 8-10% [2]. It is estimated that HDP causes 30000 maternal deaths annually [3] and 30% of maternal near miss are due to HDP [4,5].

Hypertensive disorders of pregnancy still remains nightmare for every obstetrician contributing 2,30,000 HDP related near miss events per year [6]. The majority of cases of HDP are unpreventable [7] and because of its unknown etiology, for now, the definite treatment remains delivery and removal of placenta. Since, it is difficult to predict and prevent PE there is need for a test or marker that can predict atleast the severity of HDP. Severe forms if predicted early can prevent maternal and fetal morbidity could be reduced.

Many researchers gave their efforts to identify the unique screening test that would predict the risk of developing Preeclampsia much before the classic symptoms appear. Unfortunately, none of the predictors could provide convincing evidence of any clinical use either because of low sensitivity or high cost or not being available.

Various hematological abnormalities develop as a complication of preeclampsia, one among which is the changes in platelet count which is well established and studies show that with evolution of severe preeclampsia there was a fall in circulating platelet count much earlier than development of serious complications.

In preeclampsia it probably occurs as a result of immunologically mediated process or more likely due to increased platelet deposition at the the site of endothelial damage and activation of coagulation system in small vessels. Out of all the hematological changes that occur in preeclampsia and eclampsia, thrombocytopenia is the most common hematological abnormality found.

Decreasing platelet count reflects the severity of pathological process. The lower the platelet count, greater is the maternal and fetal morbidity and mortality [8]. Overt thrombocytopenia is platelet count <100000/mm^3 which indicates severe disease[9].

Platelet count is a simple, rapid, cost effective and easily available prognostic laboratory method and can be used in routine monitoring, so as to prevent further complication and help in better outcome of motherhood.

Hence we focused on platelet count to predict the severity of HDP and adverse maternal and fetal outcome.

Materials and Methods

An observational study was conducted in the Department of Obstetrics and Gynaecology at Pt. J.N.M Medical College, Raipur from May 2016 to July 2017 after the approval of Institution of Ethics Committee.

The study group included 100 women with hypertensive disorder of pregnancy (diagnosed on the basis of ACOG Practice bulletin) of varying severity.

Inclusion Criteria

Pregnant women from 28-32 weeks of gestational age with-

1. Gestational hypertension. Patients with BP ≥ 140/90 mm Hg without proteinuria.
2. Mild preeclampsia. Patients with BP ≥ 140/90 mm Hg but less than 160 mmHg systolic or 110 mmHg Diastolic with urine albumin ≥ 300 mg / 24 hour urine.
3. Severe preeclampsia. Patients with :
   - Systolic BP ≥ 160 mm Hg or diastolic ≥ 110 mm Hg on 2 occasions 4 hours or more apart while the patient is on bed rest.
   - Thrombocytopenia (platelet count < 100,000/μL).
   - Impaired liver function as indicated by abnormally elevated blood levels of liver enzymes (to twice normal concentration), severe persistent right upper quadrant or epigastric pain unresponsive to medication and not accounted for by alternative diagnoses, or both.
   - Progressive renal insufficiency (serum creatinine > 1.1 mg/dL or a doubling of the serum creatinine in the absence of other renal disease.
   - New-onset cerebral or visual disturbances.
   - Pulmonary edema.
4. Eclampsia. Patients with BP ≥ 140/90 mm Hg with urine albumin ≥ 300 mg / 24 hour urine with convulsions or coma.

Exclusion Criteria

Previous history of –

- Hematological disorder
- Epilepsy
- Preexisting hypertension
- Drug intake affecting platelet
- Diabetes mellitus
- Renal diseases

These were addressed by taking proper history, clinical examination and relevant laboratory investigations.

Data sources and measurements

- All the cases were selected from antenatal clinic.
- A demographic sheet including information about name, age, socioeconomic status, education, parity, duration of pregnancy,

obstetric examination, systemic examination, blood pressure and complications if any, was filled.

- Investigations mainly complete blood count, RFT, LFT, blood glucose, coagulation profile, urine analysis, fundus examination, ultrasonography and uric acid were carried out.
- After completing the demographic sheet, all the women enrolled for study were subjected to laboratory investigations. 2ml venous blood samples was obtained in EDTA vacutainers and appropriately labeled. Platelet count was done using three dimensional Hematology Auto Analyzer (BECKMAN COULTER, U.S.A.) and checked manually.

Platelet values

• Normal	1.5 to 4 Lakhs/mm^3
• Mild Thrombocytopenia	1.5-1 Lakhs/mm^3
• Moderate thrombocytopenia	1 Lakhs-50,000/mm^3
• Severe thrombocytopenia	< 50,000/mm^3

- Platelet count was done once when HDP was diagnosed in a pregnant lady presenting to hospital.
- All the patients were then followed till delivery and mode of delivery, gestational age at the time of delivery, maternal as well as fetal complications were noted.
- HDP was managed according to standard management protocol.
- The platelet count thus detected was compared with severity of HDP, mode and time of delivery and maternal and fetal outcome.

Statistical Analysis

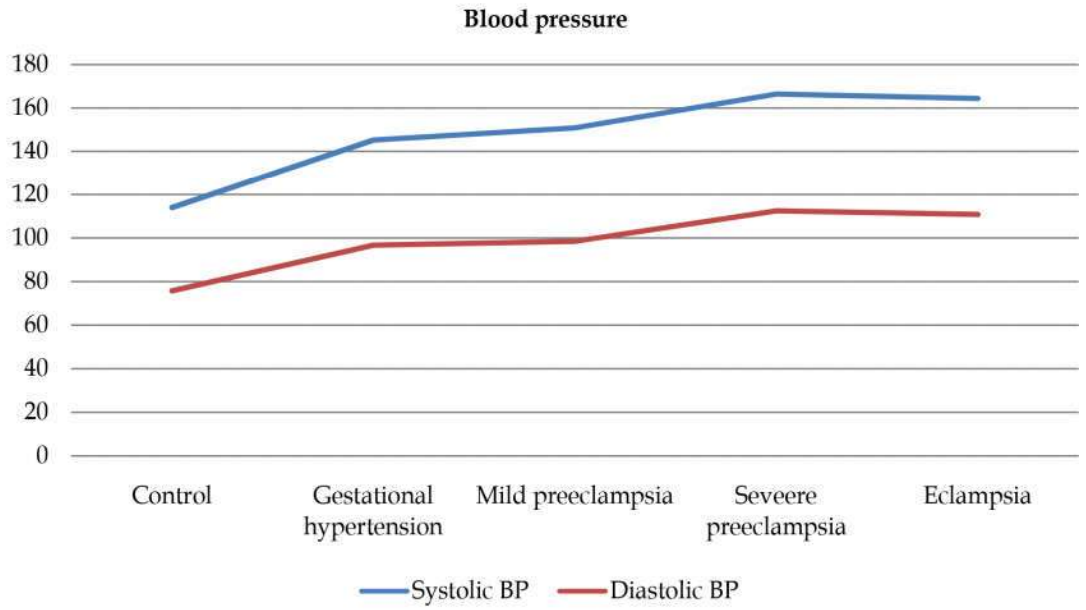
Data was recorded, tabulated, analyzed at the end of study. Analysis of observed data collected and observation was performed using relevant statistics. Data was analyzed using SSPS for Windows version 17 IBM corp NY & Microsoft INC USA values are expressed as frequencies and percentages, means±standard deviations. The differences were considered to be statistically significant when the p-value obtained was <0.05.

Data was analyzed by using following statistical method

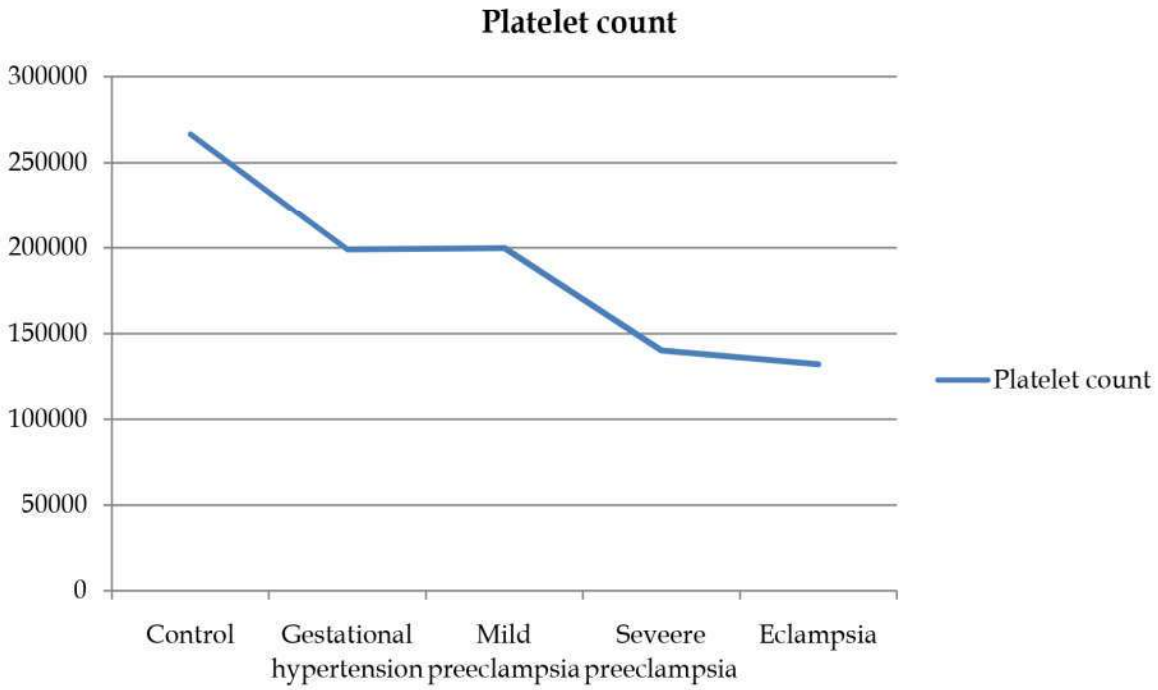
- Mean ± standard deviation
- Tabulated representation
- Diagrammatic representation
- p Value

The data were statistically analyzed for various parameters like age incidence, incidence of primigravida, mean systolic BP and diastolic BP, mean platelet count and association with HDP was formulated.

Results



Graph 1: Showing relationship between blood pressure and platelet count



Graph 2: This graph indicates that as the blood pressure rises the platelet count goes on decresing

Table 1: Association of platelet count with fetomaternal complications

Maternal complications	Thrombocytopenia (18)	Normal (26)	P value
Preterm labour pains	08(44%)	04(15.3%)	<0.001
Preterm lscs	08(44%)	02(7.6%)	<0.001
Imminent eclampsia	05(27%)	00	0.01
Hellp	03(16%)	00	0.06
Abruption	03(16%)	01(3.8%)	0.17
Pulmonary edema	03(16%)	00	0.04
Blindness	04(22.2%)	00	0.022
Renal failure	02(11.1%)	00	0.16
Pph	05(27%)	01(3.8%)	0.03
Post partum eclampsia	01(5.5%)	00	0.4
Iud	02(11.1%)	01(3.8%)	0.36
Iugr	08(44%)	02(7.6%)	0.006
Admitted in nicu	16(88%)	06(23%)	<0.0001

Out of 100 women with HDP pregnancy of 56 women could not be prolonged because of severe preeclampsia or fetal complications (27 out of 56 women had low platelet count <1.5 lac/mm^3). Remaining 44 women with milder forms of HDP were managed conservatively and were followed till delivery. 18 out of these 44 women had thrombocytopenia on admission and rest 26 had normal platelet count. 8 out of 18 women with thrombocytopenia had spontaneous preterm delivery (2 had IUD, 1 had abruption, 3 had IUGR and 2 had symptoms of imminent eclampsia) while another 8 women underwent preterm LSCS (5 for IUGR with evidence of fetal hypoxia in doppler, 3 had features of imminent eclampsia and 2 had Abruption). All 5 women with PPH managed conservatively. 16 newborns required NICU admissions (8 due to prematurity, 5 due to severe IUGR and 3 due to fetal distress). 2/18 had IUD (1 because of abruption and 1 due to severe IUGR and prematurity).

Fetomaternal Complications were higher in patients with severe thrombocytopenia suggesting that lower the platelet count higher will be the complication.

Table 2: Association of fetomaternal complications with severity of thrombocytopenia

Fetomaternal complications	Thrombocytopenia			Total
	Severe	Moderate	Mild	
Preterm labour pain	2 25%	2 25%	4 50%	08 100%
Preterm LSCS	1 12.5%	3 37.5%	4 50%	08 100%
Imminent eclampsia	1 20%	2 40%	2 40%	05 100%
HELLP	2 66.6%	1 33.3%	0 0%	03 100%
Blindness	1 25%	2 50%	1 25%	4 100%
PPH	3 60%	1 20%	1 20%	05 100%
IUGR	3 37.5%	2 25%	3 37.5%	08 100%
NICU Admisssion	3 18.75%	5 31.25%	8 50%	16 100%

Table 3: Comparison of period of gestational age between study groups

Parameter	Diagnosis	Mean GA	S.D	Std. Error Mean	t	p value
Gestational Age (Weeks)	HDP with thrombocytopenia	34.57	3.74	0.37	-4.45	<0.0001
	Without thrombocytopenia	36.36	1.50	0.15		

Significant difference was detected between two groups indicating that mean gestational age in thrombocytopenic subjects was significantly lower compared to subjects with normal platelet.

Discussion

Majority of cases of preeclampsia are unpreventable but severity of the disease can be prevented, thus the present study aimed to evaluate platelet count as an independent predictor of severe preeclampsia and its complications.

Thrombocytopenia in preeclampsia is due to immunological process and increased deposition at the site of endothelial damage. Significant association (<0.0001) was noted between decreasing platelet count and worsening spectrum of disease. Similar trends were observed by Ellora Devi et al. [10]. In our study 45 out of 100 women had thrombocytopenia which is in accordance to the study by A. Gupta et al. [11] who noticed thrombocytopenia in 30 out of 70 women with HDP. We followed 44 women with mild preeclampsia till their confinement for fetal and maternal outcome. 18 out of these 44 women had thrombocytopenia. 6.8% women with mild preeclampsia had severe thrombocytopenia which is similar to the incidence reported (7.1%) by F. Sultana et al. [12].

Maternal and fetal outcomes in women of HDP with thrombocytopenia was poorer as compared to women with normal platelet count emphasizing that platelet count is an independent risk factor for development of complications. In our study we found that life threatening complications of HDP were significantly more in women with thrombocytopenia than with normal platelet count. We noticed 16% cases of Abruption in women of HDP with thrombocytopenia while it was noted in only 3.8% of women with normal platelet count. A study from Memphis also reported similar incidence of abruption (16%). This reflects that thrombocytopenia may prove as an additive risk factor for placental separation. A higher incidence of Abruption (25%) was noted by Shazly et al. [13] who recruited 840 women of HDP far from term and managed them conservatively. The difference in results was due to patient selection as patients with severe forms of HDP were also included in their study.

Pulmonary edema is another life threatening complication of preeclampsia which develop as a result of endothelial damage in pulmonary

vasculature. 16% of women with thrombocytopenia in our study developed pulmonary edema (p value 0.04) which is similar to the incidence by Shazly et al. (15.4%). Kidneys also have the brunt of HDP. The hallmark of renal lesion in preeclampsia is glomerular endotheliosis. In our study the incidence of ARF was 11% in women with thrombocytopenia and none in women with normal platelet count. Celik et al.[14] reported still higher incidence of ARF (36%) probably because of the fact that he conducted the study in women who already had full blown HELLP. 27% women of mild preeclampsia whose platelet count was low developed signs of imminent eclampsia which was significantly higher as compared to the women with normal platelet count.

Pregnancy of 88% of women with thrombocytopenia could not be prolonged till term because of progression of disease to severe form in 44% of women, 11.1% had IUD and 44% had IUGR. The resulting mean duration of pregnancy in thrombocytopenic arm was therefore reduced to 34.57 week and the mean duration of pregnancy in non thrombocytopenic group was 36.36 week (p value<0.0001). In our study PPH was significantly higher in women with thrombocytopenia (27%) than in non thrombocytopenic women (3.8%) (p value=0.03).

In our study fetal complications like growth restriction and NICU admissions were significantly higher in thrombocytopenic limb (44%) as compared to non thrombocytopenic limb (7.6%). Celik et al recorded a significant increase in incidence of IUD (19%) which is only 11.1% in our study probably because of inpatient management and intensive fetal monitoring. Savita et al. [15] reported higher incidence of neonatal complications in patients with preeclampsia and thrombocytopenia (19.61%). Different studies mainly emphasized on HELLP syndrome as a whole but did not analyze platelet count or elevated liver enzymes as separate predictors.

Conclusion

Preeclampsia is a multiorgan disease which imposes significant risk to the maternal and fetal life. It behaves as a double edged sword. If pregnancy is continued the chances of maternal complications significantly rise and with immediate delivery the chances of fetal lung immaturity are high, so it is required to prolong the pregnancy in some cases to attain fetal lung maturity. In such cases platelet count proves to be a good predictor of development of severe complications of preeclampsia. Thus, it is of great help to investigate women with platelet count to predict severity as early as possible, so as to intervene timely and prevent complications.

References

1. Mihran V. Naljayan, S. Ananth Karumanchi. New developments in the pathogenesis of Preeclampsia. Advances in chronic kidney disease. 2013 May;20 (3):265-270.
2. https://nhp.gov.in/disease/gynaecology-and-obstetrics/preeclampsia.
3. Kassebaum, NJ, Bertozzi-Villa, A, Coggeshall, MS et al. Global, regional and national levels and causes of maternal mortality during 1990-2013:a systemic analysis for the Global Burden of disease Study 2013. Lancet. 2014;384:980-1004.
4. Lotufo FA, Parpinelli MA, Haddad SM, et al. Applying the new concept of maternal near-miss in an intensive care unit. Clinics (Sao Paulo). 2012;67(3):225-30.
5. T. Naderi, S. Foroodnia, Omidi S et al. Incidence and Correlates of Maternal Near Miss in southeast Iran. Int. J. Reprod. Med, 2015(2015):914713.
6. Von Dadelszen P, Magee L. presenting deaths due to hypertensive disorders of pregnancy. Best practice and Research clinical Obstetrics and Gynaecology. 2016 Oct;36:83-103.
7. Bezerra Maia E, Holanda Moura S, Marques Lopes L, Murthi P, Da Silva Costa F. prevention of preeclampsia. J Pregnancy 2012;2012:435090.
8. Vinodhini R, Kumari L. Evaluation of platelet count as a prognostic index in eclampsia and pre eclampsia. Int J Mod Res Rev 2014;2(10):447-52.
9. Mohapatra S, PradhanBB, SatpathyU K, Mohanty A, PattnaikJ R. Platelet estimation: Its prognostic value in pregnancy induced hypertension. Indian J PhysiolPharmacol 2007;51(2):160-164.
10. Devi E, Combination of Platelet & Uric Acid Estimation Can Predict Severity of PIH Better; Int J Pharm Bio Sci 2012 July;3(3):(B)1039–1045.
11. Lotufo FA, Parpinelli MA, Haddad SM, et al. Applying the new concept of maternal near-miss in an intensive care unit. Clinics (Sao Paulo). 2012;67(3):225-30.
12. Sultana F, Parthiban R, Shariff S. Thrombocytopenia in pregnancy induced hypertension. Journal of Medical Sciences & Health 2015;1(2):19-24.
13. Shazly S, Ali M, Abdel Badee A, Alsokkary A, Khodary M, Salem H. Low platelet count as a predictor of complications in severe preeclampsia managed conservatively Anatol J Obstet Gynecol 2012;2:1.
14. Celik C, Gezginc K, Altintepe L, et al. Results of the pregnancies with HELLP syndrome. Ren Fail 2003; 25(4):613-8.
15. Singhal S, Deepika, Anshu, Nanda S. Maternal and Perinatal Outcome in Severe Pre-eclampsia and Eclampsia JSAFOG. 2009;1(3):25-28.