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Research Article

A study on association of thrombocytopenia with pregnancy induced hypertension

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ABSTRACT

Background: Hypertension is common complication of pregnancy and contributes significantly to maternal and perinatal morbidity and mortality. With incidence of 5-7% of all pregnancy. Platelet count is the most simple and economical method of prediction of PIH, way before the derangements in PT, PTT and TT occur. This study sought the importance of platelet count as the most consistent and reliable method in predicting the severity of PIH. The aim and objectives of the study was to correlate severity of PIH with degree of thrombocytopenia and the degree of thrombocytopenia with fetal and maternal outcome.

Methods: Prospective observational study was done during November 2014 to June 2015. A total of 100 cases were included in this period that was diagnosed as PIH. Investigations like platelet count, LFT, RFT, PT were done. Observations were tabulated, analyzed and conclusions were drawn.

Results: 66% of all the cases had severe preeclampsia and 56% had thrombocytopenia. There was very high significant relationship between the degree of thrombocytopenia with the severity of the PIH (at $p < 0.001$). 12% of the fetuses had IUD, 10% had IUGR, 4% died after birth and 2% had severe birth asphyxia. 5 % of the mothers had DIC, 3 % showing HELLP syndrome, and 1% died.

Conclusions: Thrombocytopenia is the most common complications of PIH and at times is life threatening. Therefore, platelet count can be used as an early, simple, and rapid test to assess the severity of pre eclampsia and prevent progression to HELLP syndrome and DIC.

Keywords: PIH, Pre-eclampsia, Thrombocytopenia, Mortality, Morbidity, Economical, Reliable, Fetal/Maternal outcome, IUD, IUGR, DIC, HELLP

INTRODUCTION

PIH is the most common medical disorder of pregnancy that leads to a complicated multi-organ failure in the mother. It is one of the most common causes of both maternal and neonatal morbidity.¹

It is a global problem and complicates approximately 10-17% of pregnancies. The incidence of PIH in India ranges from 5% to 15%.²

Preeclampsia is defined as a multisystem disorder occurring in pregnancy and the puerperium which is characterized by development of hypertension of 140/90

mmHg and above after the 20th weeks of gestation in a previously normotensive patient.³

Preeclampsia is primarily characterized by hypertension and proteinuria. [>300 mg/24 hours]. Preeclampsia may also be accompanied by rapid weight gain and oedema, appearance of coagulation or liver function abnormalities.⁴

Severe preeclampsia is characterized by blood pressure $>160/110$ mm Hg, nephrotic range proteinuria, sudden oliguria, neurologic symptom like headache, hyper-reflexia and laboratory tests demonstrating thrombocytopenia, haemolysis, or abnormal liver

function, although the magnitude of proteinuria alone as a predictor of severity has been questioned.⁵

Profound changes in the coagulation and fibrinolytic system occur during normal pregnancy causing a hypercoagulable state. There is a definite exaggeration of the hypercoagulable state of pregnancy during Pregnancy Induced Hypertension (PIH). Out of all the haematological abnormalities that occur in PIH, thrombocytopenia is the most common seen to occur in 11% to 29% of patients.⁶ These pregnancies also are associated with qualitative changes suggesting increased platelet production and destruction. There is a shortened platelet life span, increased numbers of megakaryocytes in the bone marrow, and an increased number of immature platelets seen in the peripheral blood smear.⁷ The frequency and intensity of maternal thrombocytopenia varies and is dependent on the intensity of the disease process and duration of PIH syndrome.⁸ Overt thrombocytopenia, defined by a platelet count less than 100,000/L, indicates severe disease.⁹ In general, the lower the platelet counts, the higher the maternal and fetal morbidity and mortality. In most cases, delivery is indicated because the platelet count continues to decrease. A variety of haematological abnormalities may occur in women with PIH of which thrombocytopenia is the most common. There is no screening test that would help in identifying which pregnancy will be associated with PIH or assess its severity.¹⁰

Some investigators have proposed biochemical markers to predict the severity of PIH like Placental tissue protein 13 and Endoglin's; but these tests cannot be used for simple, low-cost screening. Therefore, there is a need to identify a simple test specifically designed for routine use in a hospital environment in particular those suitable at a rural setup.¹¹

This study was done to estimate the incidence of thrombocytopenia in pregnant women diagnosed with PIH and to correlate the severity of PIH with the degree of thrombocytopenia.

METHODS

Prospective observational study was carried out in the department of Obstetrics and Gynaecology, KIMS Hubli from November 2014 to June 2015. A total of 100 cases were included in this study period who were diagnosed as PIH with BP >140 mmHg Systolic and >90 mmHg and Diastolic after 20 weeks of gestation were included in the study. Clinical details were collected from all the cases which included the demographic data, symptoms, examination findings, and investigations (platelet count, LFT, RFT, PT, INR) done were analysed, effects on multiple factors were studied, 'P' values were statistically derived and evaluated.

Inclusion criteria

- Gestational age more than 34 weeks.
- All newly diagnosed PIH patients.

Exclusion criteria

- Gestation age <34 weeks.
- Pre-existing renal disease, diabetes.
- Pre-existing endocrine disorders.
- ITP, TTP, APLA, SLE.
- Patients on medications which are known to cause thrombocytopenia.
- Patients with chronic hypertension.

Study method

- PIH was classified into MILD and SEVERE, which were predefined as
 - *Mild*: Gestational hypertension, Mild pre eclampsia.
 - *Severe*: Severe pre eclampsia, Imminent and Antepartum eclampsia.
- A detailed history, clinical findings and relevant investigation were noted as per pro forma.
- Whole blood sample was obtained after informed consent, under aseptic precaution by venepuncture of anterior cubital vein into EDTA and PLAIN bulbs and sample was tested for platelet counts, PT, INR, RFT and LFT.
- The details were recorded as per pro forma and analyzed to fulfill the aims and objectives of the study.
- The data was then tabulated in MS Excel, correlation tests like chi square/ Fischer exact were applied to the relevant tabulated data and the same was analyzed in SPSS 17.0.

RESULTS

Tests of significance

Calculated $\chi^2 = 35.651$.

P value for the above at degree of freedom 1 is <0.001, implying its high significance between PIH and Thrombocytopenia.

It is observed from the above table that out of:

- Out of 8 cases of gestational hypertension, no cases showed thrombocytopenia.
- Out of 26 cases of MILD pre-eclampsia, 4 showed mild degree, 1 showed moderate degree of thrombocytopenia, with rest 21 showing normal platelet counts.
- Out of 29 cases of severe PE, 11 showed mild degree, 3 moderate degree, 1 showed severe degree

of thrombocytopenia, with rest showing normal values.

- Out of 25 cases of imminent eclampsia, 9 showed mild, 14 showed moderate and 1 showed severe

degree of thrombocytopenia with 1 showing normal counts.

- Out of 12 cases of antepartum eclampsia, 2 showed mild, 6 moderate degree, 4 showed severe degree of thrombocytopenia.

Table 1: Association of thrombocytopenia with PIH.

Thrombocytopenia	PIH***					Total
	Antepartum eclampsia	GH*	Imminent eclampsia	Mild PE**	Severe PE	
Normal (1.5-5 lakh/ mm3)	0	8	1	21	14	44
Mild (1-1.5 lakh/mm3)	2	0	9	4	11	26
Moderate(0.5-1 lakh/ mm3)	6	0	14	1	3	24
Severe(<50000/mm3)	4	0	1	0	1	6
Total	12	8	25	26	29	100

*Gestational hypertension; **pre-eclampsia; ***pregnancy incuded hypertension.

Table 2: PIH vs fetal outcome.

PIH	Fetal outcome					Total
	Died	Good	IUD	IUGR	Severe birth asphyxia	
Antepartum eclampsia	2	4	3	1	2	12
GH	0	8	0	0	0	8
Imminent eclampsia	2	12	6	5	0	25
Mild Pre eclampsia	0	23	1	2	0	26
Severe Pre eclampsia	0	25	2	2	0	29
Total	4	72	12	10	2	100

It was observed from the above table that 72% of the babies were born without any complications, followed by 12% of the fetuses which had IUD. 10% of the neonate

were IUGR, with another 4% died after birth and 2% with severe birth asphyxia but alive.

Table 3: PIH vs fetal outcome.

PIH	Fetal outcome				Total
	Death	DIC	GOOD	HELLP	
Antepartum eclampsia	0	2	8	2	12
GH	0	0	8	0	8
Imminent eclampsia	1	2	21	1	25
Mild Pre eclampsia	0	0	26	0	26
Severe Pre eclampsia	0	1	28	0	29
Total	1	5	91	3	100

It was observed that 91% of the mothers had no complications. 5 % manifested as DIC with 3 % showing HELLP syndrome and one reporting to had cardiac arrest and died.

DISCUSSION

Pre-eclampsia is one of the major maternal and perinatal mortality and morbidity worldwide, particularly in developing countries.¹² Preeclampsia affects approximately 6% of all the pregnancies, more often in

primigravidas in the age group of 20-30 years. Preeclampsia accounts 17.6% of maternal deaths in United States.¹²

Approximately 50% of patients with preeclampsia will develop thrombocytopenia. Severity will be usually proportionate to that of the underlying pathology. But in few cases, onset of thrombocytopenia precedes other manifestations of pre-eclampsia.¹³ Though the pathogenesis of thrombocytopenia in patients with preeclampsia is not well understood, recent studies suggest that megakaryocytopoiesis impairment as a pathogenic factor.¹⁴⁻¹⁶

In our present study a total of 100 PIH cases who were evaluated majority cases were in the age group of 20-22 years with the mean of 22.74 next being 22-25 years as compared to Vamsheedhar et al, Shivkumar et al and Prakash J et al studies with mean age of 24.57, 24.3 and 24.75 respectively.^{1,17,19} Intrauterine deaths, intrauterine growth restriction, prematurity and perinatal asphyxia are common complications in the baby born to mother of pregnancy induced hypertension.¹⁸

In the present study 65% of PIH were primigravidas and 57% belonged to 37-40 weeks gestational age, 66% cases were severe preeclampsia (severe pre eclampsia + imminent eclampsia + antepartum eclampsia) and 50% cases showing thrombocytopenia (26 mild +24 severe degree).

CONCLUSIONS

Analysing the above observations we can arrive at a conclusion that thrombocytopenia worsens as PIH progresses from gestational hypertension to eclampsia, so it is advised to monitor platelet count, which is simple, economical and rapid investigation to monitor the progress of PIH. Estimation of platelet count thus, can be used as an early, simple, and rapid procedure in the assessment of severity of pre eclampsia and prevent progression to HELLP syndrome and DIC.

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