



ORIGINAL RESEARCH PAPER

Paediatrics

STUDY ON RELATION BETWEEN HYPERTENSIVE DISORDER IN PREGNANCY AND THROMBOCYTOPENIA IN NEW BORN

KEY WORDS: Hypertensive disorder, Thrombocytopenia, Neonates

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ABSTRACT

BACKGROUND Hypertensive disorders of pregnancy complicate about 8%-10% of all gestations.[1] Hypertensive disorders are responsible for significant maternal and perinatal morbidity and mortality. Intracranial hemorrhage is the commonest cause of death associated with hypertension [2]. The lower the platelet count, the greater are the maternal and fetal morbidity [3]. **OBJECTIVE;** To determine the thrombocytopenia in term neonates born to mothers with hypertensive disorders of pregnancy. study population: Term Neonates were recruited from Postnatal wards who were delivered at tertiary care centre. This is Cross sectional study. sample size of the study is 100 studied from July 2018 December 2019. **RESULT;** It is concluded that mothers with pregnancy induced hypertension are more liable to be delivered by caesarean section, their babies are more liable to have lower body weight for gestational age. low birth weight neonates born to mothers with pregnancy induced hypertension would require scrutiny for thrombocytopenia during early neonatal period.

INTRODUCTION

The major mechanism underlying neonatal thrombocytopenia is impaired platelet production. In 75% of all cases, the low platelet count is either present at birth or develops by 72 hours of life.[4] Only a minority of these patients have immunological disorders of coagulopathy causing thrombocytopenia. Most of the remaining patients are preterm neonates born after pregnancies complicated by placental insufficiency or fetal hypoxia, for example maternal pre-eclampsia and fetal intrauterine growth restriction. Neonates with this early onset thrombocytopenia have impaired megakaryocytopoiesis and platelet production; megakaryocytes and their precursor and progenitor cells are considerably reduced at birth and levels of the megakaryocytopoietic cytokine thrombopoietin are therefore elevated [5]. In pregnancies complicated by gestational hypertension, pre-eclampsia and eclampsia syndrome, thrombocytopenia is generally identified at birth or within the first 2-3 days following delivery, with resolution by 10 days of life in most cases. Severity of thrombocytopenia related to preeclampsia is highly variable, with a small percentage of infants developing severe or clinically significant thrombocytopenia (<50,000/uL)[4],[6]. One potential mechanism is that the resultant fetal hypoxia, has a direct depressant effect on megakaryocyte proliferation. At present, there is a paucity of evidence-based recommendations to guide clinicians on which platelet counts warrant intervention. Given the inherent risks of platelet transfusions, including the induction of a systemic inflammatory response and worsening of lung function immediately following the transfusion, additional studies are needed to guide clinical management[7],[8]

Platelet abnormalities in infants born to hypertensive mothers can lead to serious neonatal complication like bleeding manifestations including intracranial hemorrhage from platelet deficiency due to any cause[9]. Therefore early haematological screening of these infants is recommended. Hence the purpose of this study is to identify the early platelet changes of the infants born to mothers with gestational hypertension, preeclampsia and eclampsia syndrome, so as to anticipate, diagnose and treat them early to decrease the perinatal morbidity and mortality.

AIMS AND OBJECTIVES;

PRIMARY OBJECTIVES; To determine the thrombocytopenia in term neonates born to mothers with hypertensive disorders of pregnancy.

SECONDARY OBJECTIVES; To determine the hematological parameters in neonates born to mothers with hypertensive disorders of pregnancy.

MATERIALS & METHODS; Study is conducted in the department of Paediatrics Term neonates were recruited from Postnatal ward this is cross sectional study conducted from July 2018 to December 2019. Sample Size: is calculated Based on the study conducted by Chaurasiya O et al.[11] Prevalence of thrombocytopenia in term neonates born to mothers with hypertensive disorders of pregnancy was 53.15% [11]

Formula: $n = z^2 * pq / d^2$ Where, n is the required sample size. Z is the standard normal deviate, which is equal to 1.96 at 95% confidence interval. p is the prevalence in the population of the factor under study.

$q = 100 - p$
 $d = \text{Absolute precision taken as } 10\%$
 $p = 53.15\% [10]$
 $q = 46.85\%$

$n = \text{number of samples to be studied } n = z^2 * pq / d^2$
 $= (1.96)^2 * 53.15 * 46.85 / (10)^2$
 $= 9565.88 / 100$
 $= 95.65$
 $= \text{rounded to } 100 \text{ in each group.}$
 Group A (Cases): 100 patients
 Group B (Controls): 100 Patients.

INCLUSION CRITERIA:

Term newborns born to mothers with hypertensive disorders of pregnancy. The diagnosis of gestational hypertension, preeclampsia and eclampsia syndrome was made when the blood pressure was more than or equal to 140/90 mmHg, detected after the 20th week of pregnancy. The cases of gestational hypertension, preeclampsia and eclampsia syndrome were classified into the following three categories:

1. Gestational hypertension — new onset non proteinuric

hypertension (systolic pressure equal or more than 140 mm of Hg and diastolic pressure equal or more than 90 mm of Hg).

2. Pre-eclampsia — hypertension with proteinuria (systolic pressure equal or more than 140 mm of Hg and diastolic pressure equal or more than 90 mm of Hg and proteinuria more than 300mg in a 24 hour period or more than or equal to 1+ urine protein by dipstick method)

3. Eclampsia — seizures that cannot be attributed to other causes in a woman with preeclampsia.

EXCLUSION CRITERIA:

1] Babies born before 36 wks of gestation were excluded
 2] Babies born to mothers when pregnancy is complicated by any other risk factors for increase in maternal or fetal morbidity and mortality such as Rhesus incompatibility,Diabetes Mellitus,Any other medical illness such as severe anemia, haemophilia, chronic hypertension, renal disease,heart disease,connective tissue disease nutritional and those who received aspirin and other drugs which were likely to cause change in hematological profile were excluded from the study.

3] Babies born to mothers with hypertension diagnosed before 20 weeks of gestation.
 4] Babies born with congenital malformations.

Sample collection;

Two ml of cord blood anti coagulated with EDTA was collected from these babies and various hematological parameters are studied. These include Hemoglobin, Total and Differential counts, Platelet count and Red cell indices like PCV, MCV, MCH, MCHC are estimated using automated cell counter method using SYSMEX KX-21 Automated hematology analyser B2584 08/2007 Japan. Platelet count was confirmed by peripheral smear examination and REES ECKER method. Peripheral blood smear and nucleated RBC's was examined using the smear stained with Leishman's stain. Stastical analysis: Data entry was done using M.S. Excel and statistically analysed using Statistical package for social sciences (SPSS Version 16) for M.S Windows.

ETHICAL COMITEE CLERANCE OBTAINED FROM INSTITUTE.

**DISCUSSION;
 RESULTS & OBSERVATIONS**

Table 1: Distribution of Cases based on their PIH category

PIH Category	Pre-Eclampsia	Frequency	Percent
	Eclampsia	36	36.0%
	Gestational Hypertension	18	18.0%
	Total	46	46.0%
		100	100.0%

In the present study, Pre-eclampsia is present in 36% patients, eclampsia is present in 18% patients and Gestational Hypertension is present in 46% patients.

In a study by Chaurasiya O et al.[11] 63.96% neonates had mothers with preeclampsia and 36.04% with eclampsia.

MATERNAL AGE;

In this study among mothers of cases, Majority of the maternal age is in between 21 to 25 years (41%) and among mothers of controls, Majority of the maternal age is in between 26 to 30 years (46%). The association between them was found to be statistically not significant.

Table 2: Distribution of cases & controls based on the Gestational Age

Gestational Age	36-38 Weeks	N	Group		Total
			Cases	Controls	
			50	49	99
		%	50.0%	49.0%	49.5%
	39-41 Weeks	N	50	51	101
		%	50.0%	51.0%	50.5%
Total		n	100	100	200
		%	100.0%	100.0%	100.0%
Mean+SD			38.65+0.88	38.65+1.05	38.65+0.97

Chi-Square:0.20, PValue:0.500, Statistically not significant

Among mothers of cases, 50% patients were in the gestational age of 36-38 weeks and 50% patients were in the gestational age of 39-41 weeks. Among mothers of controls, 49% patients were in the gestational age of 36-38 weeks and 51% patients were in the gestational age of 39-41 weeks. The association between them was found to be statistically not significant. In a study by Al-bahadily AJM et al.[13] The mean gestational age of the study group was (36.68±1.81) weeks which is lower than the gestational age of the control group (37.40±1.02) weeks (P<0.001). MODE OF DELIVERY; In this study Among mothers of cases, Majority of the patients underwent LSCS (83%) and among mothers of controls, (65%) patients were underwent LSCS. The association between them was found to be statistically significant. In Kumar PS et al.[14] [14] Among cases, Majority of the patients underwent LSCS (64%) and among controls, Majority of the patients were underwent NVD (60%). The association between them was found to be statistically significant.

Table 3: Distribution of cases & controls based on the Platelet Count

Platelet Count	<1 lakh/mcL	N	Group		Total
			Cases	Controls	
			4	0	4
		%	4.0%	0.0%	2.0%
	1-1.5 lakh/mcL	N	32	6	38
		%	32.0%	6.0%	19.0%
	1.51-2.5 lakh/mcL	N	53	52	105
		%	53.0%	52.0%	52.5%
	2.51-3.5 lakh/mcL	N	11	41	52
		%	11.0%	41.0%	26.0%
	3.51-4.5 lakh/mcL	N	0	1	1
		%	0.0%	1.0%	0.5%
Total		N	100	100	200
		%	100.0%	100.0%	100.0%

Chi-Square 40.107, PValue:0.001*, Statistically significant

Among cases, thrombocytopenia is present in 36% patients and among controls, thrombocytopenia is present in 6% patients. The association between them was found to be statistically significant.

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Out of the 36 babies having thrombocytopenia, 4 (4%) babies had a platelet count less than 1 lakh while the 32(32%) other babies with thrombocytopenia had counts between 1-1.5 lakhs. Sivakumar S et al.[15] who reported a platelet count of less than 1 lakh in 5 (10%) out of 11 babies with thrombocytopenia, while 6 (12%) of the babies had counts between 1 — 1.5 laths and only one baby had counts below 50,000.

In a study by Chaurasiya O et al.[11] prevalence of neonatal thrombocytopenia was 53%. In Shilpa MD et

al.[12]prevalence of neonatal thrombocytopenia was 65.5%. Among cases, birth weight is <2.50kgs in 21% patients and among controls, birth weight is <2.50kgs in 14% patients. The association between them was found to be statistically not significant. In a study by Chaurasiya O et al.[11] birth weight is <2.50kgs in 35.1% patients.

Table 4: Descriptive Statistics of hematological parameters

	Group	N	Mean	Std. Deviation	T Test	P Value
Haemoglobin (g/dl)	Cases	100	17.32	2.57	1.24	0.21
	Controls	100	16.88	2.39		
TLC (/mm3)	Cases	100	18412.00	7166.76	0.46	0.64
	Controls	100	17992.00	5577.61		
Neutrophil Count	Cases	100	62.86	11.16	-2.48	0.001*
	Controls	100	66.31	8.25		
Lymphocyte Count	Cases	100	31.60	10.69	1.20	0.23
	Controls	100	29.99	8.09		
Platelet Count (lakh/ml)	Cases	100	1.87	0.54	-6.63	0.001*
	Controls	100	2.37	0.51		
MCV (fl)	Cases	100	108.35	11.85	2.35	0.02*
	Controls	100	104.45	11.54		
MCH (pg)	Cases	100	34.19	2.65	-0.39	0.69
	Controls	100	34.36	3.40		
MCHC (g/dl)	Cases	100	32.41	2.82	0.86	0.38
	Controls	100	32.07	2.64		
Red cell count	Cases	100	5.28	0.88	5.07	0.001*
	Controls	100	4.65	0.88		
Reticulocyte Count	Cases	100	3.17	6.17	1.33	0.18
	Controls	100	2.33	1.09		

When comparing hematological parameters between cases and controls, statistical significance was found among Neutrophil Count, Platelet Count, MCV & Red cell count.

Hematological Parameters; When comparing hematological parameters between cases and controls, statistical significance was found among Neutrophil Count, Platelet Count, MCV & Red cell count. In the present study, mean hemoglobin of 17.32g/dl for the cases against a mean of 16.88g/dl for the controls, which was statistically not significant with a P value of > 0.001. There was no significant difference seen in the hemoglobin concentration, mean corpuscular hemoglobin or mean corpuscular hemoglobin concentration between the cases and controls in our study and this observation was comparable to that of Sivakumar S et al.[15]

CONCLUSION;

1 Pre-eclampsia is present in 36% patients, eclampsia is present in 18% patients and Gestational Hypertension is present in 46% patients. Among mothers of cases, Majority of the maternal age is in between 21 to 25 years (41%) and among mothers of controls, Majority of the maternal age is in between 26 to 30 years (46%). The association between them was found to be statistically not significant. Among mothers of cases, Majority of the patients were booked cases (83%) and among mothers of controls, Majority of the patients were booked cases (85%). The association between them was found to be statistically not significant. Among mothers of cases, 50% patients were in the gestational age of 36-38 weeks and 50% patients were in the gestational age of 39-41 weeks. Among mothers of controls, 49% patients were in the gestational age of 36-38 weeks and 51% patients were in the gestational age of 39-41 weeks. The association between them

was found to be statistically not significant. Among mothers of cases, Majority of the patients underwent LSCS (83%) and among mothers of controls, (65%) of the patients were underwent LSCS. The association between them was found to be statistically significant. Among cases, IUGR is present in 11% patients and among controls, IUGR is present in 2% patients. The association between them was found to be statistically significant. Among cases, birth weight is <2.50kgs in 21% patients and among controls, birth weight is <2.50kgs in 14% patients. The association between them was found to be statistically not significant. Among cases, male babies are 49% and female babies are 51%. Among controls, male babies are 62% and female babies are 38%. The association between them was found to be statistically significant. Among cases, thrombocytopenia is present in 36% patients and among controls, thrombocytopenia is present in 6% patients. The association between them was found to be statistically significant. When comparing systolic BP and diastolic BP between cases and controls, statistical significance was found. When comparing hematological parameters between cases and controls, statistical significance was found among Neutrophil Count, Platelet Count, MCV & Red cell count.

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