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Research Article

A STUDY OF NEONATAL THROMBOCYTOPENIA IN MATERNAL PREGNANCY INDUCED HYPERTENSION

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A B S T R A C T

Introduction: Neonates born to mothers with pregnancy induced hypertension (PIH) are at higher risk of developing thrombocytopenia.
Aim: To evaluate the prevalence of thrombocytopenia in neonates born to mothers with pregnancy induced hypertension (PIH) and identify the associations if any, between maternal and neonatal characteristics.
Materials and Methods: This cross-sectional study was conducted from October 2014 to July 2016, in a tertiary care centre in Mangalore, Karnataka. Maternal and neonatal characteristics were recorded in pre-designed proforma.
Results: There were 48.3% male and 51.7% female neonates. Thrombocytopenia was found to be equal among male and female newborns (50 % *vs* 50 %). Severe thrombocytopenia was recorded in one male neonate only. When birth weights were analyzed, 48.3 % were above 2500g and 31.7 % were less than 2500g. Thrombocytopenia was equal (10 %) inboth low birth weight and normal birth weight neonates.Of 60 neonates, 58.3 % were born to primi mothers. Thrombocytopenia was observed in 15 % and 5 % newborns of primi and multiparous women respectively. 17 (28.3 %) mothers were on various medications for PIH. Neonatal thrombocytopenia was similar irrespective of maternal medications. Significant association was found between onset of maternal PIH (weeks in gestation) and neonatal thrombocytopenia with p value of <0.001. All neonates born to mothers with pregnancy induced hypertension on follow ups at 6 week were found to be asymptomatic and growing appropriate for age and gender.
Conclusions: All neonates born to mothers with pregnancy induced hypertension would require close observation for thrombocytopenia during early neonatal period.

INTRODUCTION

Hypertensive disorders of pregnancy complicate about8-10% of all gestations.[1] Neonates born to mothers with pregnancy induced hypertension (PIH) are at increased risk of thrombocytopenia. The major mechanism underlying neonatalthrombocytopenia is impaired platelet production. In 75% of all cases, the low platelet count is either present atbirth or develops by 72 hours of life.[2]

Only a minority of these patients have immunological disorders or coagulopathy causing thrombocytopenia. Most of the remaining patients are preterm neonates born after pregnancies complicated by placental insufficiency and/or fetal hypoxia. Reported incidence varies widely from 9.2% to 36 % and severe thrombocytopenia of about20% has been suggested.[3-6] Thrombocytopenia is said to evolve slowly during the first week of life and precipitous fall requiring definite therapy could also occur.[4]

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One potential mechanism is that theresultant fetal hypoxia, has a direct depressant effect on megakaryocyte proliferation.[5] Platelet abnormalities in infants born to hypertensive mothers can cause serious neonatal complication like sepsis, increased susceptibility to infections and disseminated intravascular coagulation, intracranial hemorrhage which may add to the existing morbidity in them. Therefore early haematological screening of these infants is recommended.

Hence the purpose of this study is to determine the relation between pregnancy induced hypertension and its effect on neonatal platelet counts and to update current data and outcome (mortality and morbidity) of neonates with thrombocytopenia who are born to mothers who had pregnancy induced hypertension in K. S. Hegde hospital.

MATERIALS AND METHODS

A cross sectional study was carried out in NICU of K. S. Hegde Hospital. All neonates born to mothers with pregnancy induced hypertension from October 2014 to July 2016 were

enrolled in the study. Maternal antenatal data including the details of the hypertension and maternal platelet counts was recorded. The birth details and Apgar score was recorded for all babies. The babies were examined in detail and anthropometry recorded. The gestational age (GA) was assessed from maternal dates, sonography and confirmed by clinical examination. Consent was obtained from parents or guardian.Cord blood sample was taken for platelet counts from these babies and also repeated once after 72 hours of birth. Baby's condition was closely monitored during NICU stay for any further complications and progress was documented. The platelet count was repeated before discharge from hospital and also on follow up at 6 weeks if there was thrombocytopenia at discharge.

Statistical Analyses

All data were entered in Excel spreadsheet. Statistical analyses was performed using software packages SPSS 22.0. Clinical data of mothers and newborns were analysed for risk assessment. For non-parametric data, proportions was calculated and for parametric data mean were used. Test of significance was applied and P value < 0.05 was taken as significant.

RESULTS

The study included 60 neonates born to mothers withPIH. Total 12 (20%) babies had thrombocytopenia at birth (Table2 and Fig.1). There were 48.3% male and 51.7% female neonates. Thrombocytopenia was equal in male and female newborns (50 % *vs* 50 %). Severe thrombocytopenia was recorded in one male neonate only. When birth weight was analyzed, 48.3 % were above 2500g and 31.7 % were less than 2500g. Thrombocytopenia was equal (10 %) inboth low birth weight and normal birth weight neonates. Of 60 neonates, 58.3 % were born to primi mothers. Thrombocytopenia was observed in 15 % and 5 % newborns of primi and multiparous women respectively. Seventeen (28.3 %) mothers were on various medications for PIH. The finding of neonatal thrombocytopenia was similar, irrespective of status/identity of maternal medications taken for hypertension.(Table:1)

Table 1 Association between maternal antihypertensive medications and neonatal thrombocytopenia

Medication (n=60)	NORMAL Platelet	Thrombocytopenia	Total	P value
With (n=17)	11 (18.3 %)	6 (10 %)	17 (28.3%)	0.063
Without (n=43)	37 (61.7%)	6 (10%)	43 (71.7%)	

Table 2 Distribution of platelet count in thrombocytopenic neonates

Sl No.	Platelet at Birth	Platelet at 72 Hours	Platelet before Discharge
1	79000	170000	
2	130000	178000	
3	60000	58000	190000
4	76000	165000	
5	79000	174000	
6	96000	178000	
7	148000	150000	210000
8	71000	190000	
9	33000	210000	
10	140000	222000	
11	100000	132000	176000
12	148000	293000	

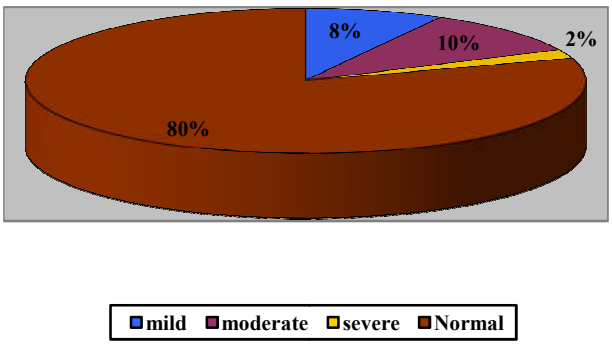

Figure 1 Distribution of severity of neonatal thrombocytopenia

Univariate analysis using chi square test with Fischer exact was done to find out association between maternal characteristics and neonatal thrombocytopenia which has shown no significant correlation.Significant association was found between onset of maternal PIH (weeks in gestation) and neonatal thrombocytopenia with p value of <0.001(Table 3).

Table 3 Association between onset of maternal PIH and neonatal thrombocytopenia

Onset of Pih (n=60)	Normal Platelet	Thrombocytopenia	Total	P value
<28 Week (n=10)	2 (3.3 %)	8 (13.3%)	10 (16.6%)	<0.001
>28 Week (n=50)	46 (76.7 %)	4 (6.7)	50 (83.4%)	

There was no significant association found between gender, parity, birth weight vs gestation, birth weight, maternal antihypertensive medications and neonatal thrombocytopenia (Table 4). All neonates born to mothers with pregnancy induced hypertension on follow ups at 6 week were found to be asymptomatic and growing appropriate for age and gender.

Table 4 Univariate analysis showing relation of thrombocytopenia between various neonatal and maternal characteristics

Thrombocytopenia VS	Odds Ratio	P Value
Gender	0.92	0.897
Gestation	0.51	0.386
Parity	0.39	0.190
Onset of pih	1.1	<0.001
Birth weight	0.65	0.513
Birth weight and gestation	0.9	0.778
Maternal medication	0.29	0.063

DISCUSSION

As per previous studies done by Pritchard *et al*, in neonates born to mothers with PIH, the incidence of thrombocytopenia was reported to be 36%.[5,6] In another study, the incidence of neonatal thrombocytopenia in infants born to mothers with pregnancy induced hypertension has been purported to be in the range of 1 per 100 live births, and it is more commonly seen in preterm and low-birth-weight infants.[7]In our study, we observed that the incidence of neonatal thrombocytopenia was found to be at least 20 %.In our study we reported that higher percentage of preterm babies had neonatal thrombocytopenia (30%) born to mothers with PIH as compared to the term babies (18%) complicated with thrombocytopenia Duley *et al* however attempted to find out the correlation between maternal PIH and incidence of thrombocytopenia in premature neonates and reported the presence of significant association

between both. [8] Similar observations were found in a study conducted by Raizada *et al* who postulated that preterm infants born to hypertensive mothers are at high risk for neonatal thrombocytopenia. However, it was also stated that severe thrombocytopenia with bleeding manifestations were highly unlikely to occur.[9] Patricia *et al* too remarked that infants with birth weight less than 1200g and born before 32 weeks gestation and who were born to mothers with gestational hypertension were prone for thrombocytopenia.[10]

Roberts and Murray have proven that small for gestational age (SGA) infants born to mothers with PIH are at 2.52 times increased risk for thrombocytopenia.[11] However in the present study, the risk of thrombocytopenia was found to be same in small (SGA) or appropriate (AGA) for gestational age infants.

Bhat *et al*, in their study involving 97 neonates born to mothers with pregnancy induced hypertension concluded that 35 (36.1 %) had thrombocytopenia and 62(63.9 %) did not. Out of all thrombocytopenic neonates, moderate thrombocytopenia was reported to be in 15 (15.5%) and severe thrombocytopenia was reported in 20 neonates (20.6 %).[12] However, in the present study out of a total of 60 neonates, there were 12 reported thrombocytopenic neonates (20%). Out of these 12 thrombocytopenic neonates 5, (42%) had mild, 6 (50%) had moderate thrombocytopenia and only one neonate (8%) was found to be having severe thrombocytopenia. Gender predilection in neonatal thrombocytopenia, in cases of newborns born to mothers with PIH is questionable. Bhat *et al* did observe a higher percentage of overall and severe thrombocytopenia in male newborns.[12] However, in the present study incidence of thrombocytopenia was found to be equal in both males and females.

A study done by Bhat *et al* reported that in neonates born to mothers with PIH, birth weight was negatively associated with severe thrombocytopenia. In their study, Low Birth Weight infants were found to be at 4.5 times increased risk for severe thrombocytopenia compared to normal weight infants.[12] In their exhaustive study, an attempt was done to discern the relation between gestation, birth weight, PIH and neonatal thrombocytopenia. It was realized that prematurity and low birth weight could be possibly stated as being major risk factors associated with neonatal thrombocytopenia and maternal hypertension.[12] They also attempted to ascertain the relation between neonatal thrombocytopenia and intake of maternal antihypertensive medication which have shown no significance between above mentioned variables.[12]In the present study too, no significant association was realized between maternal medications and neonatal thrombocytopenia. They also made an attempt to understand the relation between the neonatal thrombocytopenia and onset of PIH. However, they were not able to conclude any such association.[12] However, in the present study Univariate analysis using chi square test with Fischer exact showed a significant association between onset of maternal PIH (weeks in gestation) and neonatal thrombocytopenia with p value of <0.001, this being the only positive correlation discerned.

CONCLUSION

Our study included 60 neonates born to mothers with PIH. Out of these, 12 (20 %) had thrombocytopenia and 48 (80 %) did not. Furthermore, 7(12%) had moderate and 1 (2 %) had severe thrombocytopenia. It was discerned that period of onset of hypertension in the mother has a significant association with thrombocytopenia. In our study, 10 mothers (16.6%) had onset of PIH before the period of 28 weeks. Of these, 8 (13.3%) had thrombocytopenia. Also, of the total 50 (83.4%) mothers who had onset of PIH after the period of 28 weeks, 4 (6.7%) had thrombocytopenia. Univariate analysis using chi square test with Fischer exact showed a significant association between onset of maternal PIH (weeks in gestation) and neonatal thrombocytopenia with p value of <0.001. Hence all neonates born to mothers with PIH would require screening for thrombocytopenia especially in first week of life.

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