

## ASSOCIATION OF MATERNAL AND NEONATAL RISK FACTORS WITH NEONATAL THROMBOCYTOPENIA IN A TERTIARY CARE HOSPITAL: AN OBSERVATIONAL STUDY

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### Abstract

**Background:** Neonatal thrombocytopenia is a major cause of morbidity and mortality in NICU's particularly in the sick, preterm, low birth weight neonates. The major cause of thrombocytopenia in neonates are sepsis, birth asphyxia, prematurity, intra-uterine growth retardation and low birth weight. There are various studies which suggests that neonates born to diabetic mothers, mothers with anemia and mothers with pregnancy induced hypertension (PIH) are at increased risk of thrombocytopenia. In our study we found association of neonatal thrombocytopenia with various maternal and neonatal factors. To estimate the incidence & severity of neonatal thrombocytopenia & also to determine the neonatal and maternal risk factors associated with it in the neonates admitted in NICU in a tertiary care hospital. **Materials and Methods:** Prospective, Observational study conducted in NICU of Katihar Medical College, Katihar, Bihar. A total of 100 inborn neonates were taken in this study. **Result:** 100 neonates, admitted in NICU fulfilling inclusion criteria were studied. Incidence of thrombocytopenia was 53%. In our study 62% neonates were preterm. According to birth weight 72% VLBW & 59 % were LBW neonates developed thrombocytopenia. Mild, Moderate & Severe thrombocytopenia were found to be 43%, 17% & 39% respectively. De-pending on time duration, 87% developed early onset thrombocytopenia and 13% developed late onset thrombocytopenia. Prematurity & sepsis were the most common cause, followed by perinatal asphyxia. Most common associated maternal risk factor was found to be Maternal Anemia (Hb < 11.0 gm%), followed by Maternal thrombocytopenia and Pregnancy Induced Hypertension. **Conclusion:** Prematurity, sepsis and perinatal asphyxia are common causes of neonatal thrombocytopenia and its associated mortality. Maternal Anemia, thrombocytopenia & PIH were found to be an independent risk factor for development of neonatal thrombocytopenia in NICU admitted neonates.

## INTRODUCTION

Thrombocytopenia (platelet count < 1,50,000/mm<sup>3</sup>) is one of the most common hematological problems in the neonatal intensive care units (NICUs).<sup>[1]</sup> The overall prevalence of thrombocytopenia in neonates ranges from 1 to 5% though it has been reported upto 22 to 35% in sick neonates.<sup>[1]</sup> It is more common among premature or extremely low birth weight (ELBW) neonates or sick neonates admitted in NICUs.

In contrast, only about 1-5% of the normal neonates are thrombocytopenic at birth with severe thrombocytopenia (platelet count < 50,000/mm<sup>3</sup>) occurring in less than 3/1000 term infants.<sup>[2]</sup>

Thrombocytopenia is also one of the early but non-specific indicator of neonatal sepsis.<sup>[3]</sup>

Bleeding is a major complication of thrombocytopenia but is generally limited to infants with count <30000/mm<sup>3</sup>.<sup>[4,5]</sup>

In neonates, the common causes of thrombocytopenia are- sepsis, birth asphyxia, prematurity, intra-uterine growth retardation, meconium aspiration syndrome, necrotizing

enterocolitis, respiratory distress syndrome, low birth weight, hyperbilirubinemia and PIH in mother. Thrombocytopenia in neonates is defined as a platelet count of  $<150,000/\text{mm}^3$  and is classified as mild, moderate and severe on the basis of severity where the platelet counts are  $100000-150000/\text{mm}^3$ ,  $50000-99000/\text{mm}^3$  &  $<50000/\text{mm}^3$ . [6-10]

Thrombocytopenia on the basis of onset of its appearance in neonate is classified as early onset where it develops within 72 hours of birth and late onset thrombocytopenia where it develops after 72 hours. [11,12]

### Objectives

1. To estimate the incidence & severity of neonatal thrombocytopenia in the neonates admitted in NICU in a tertiary care hospital.
2. To determine the association of neonatal and maternal risk factors with neonatal thrombocytopenia.

## MATERIALS AND METHODS

**Study Design:** Prospective Observational study.

**Study Setting:** Neonatal Intensive Care Unit (NICU), Department of Pediatrics, Katihar Medical College.

**Study Population:** 100 inborn neonates who were admitted in NICU of Katihar Medical College during study period.

**Duration of study:** October 2021 to September 2022.

Blood sample was collected in EDTA vial and platelet count was done with standard automatic blood cell counter.

**Statistical Analysis:** Microsoft Excel was used for data entry, table formation and percentage calculation. Data collected, summarized, and analyzed using SPSS 20.0 software.

### Inclusion Criteria

All the inborn neonates admitted to the NICU of Katihar Medical College during this study period.

### Exclusion Criteria

- Neonates who expired within 24 hours of admission.
- Suspected cases of IEM
- Gross Congenital anomalies

## RESULTS

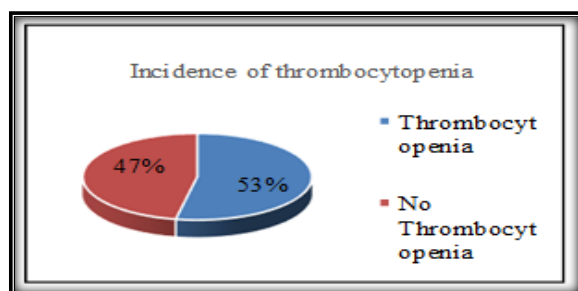


Figure 1: showing incidence of thrombocytopenia.

Out of 53 neonates who developed thrombocytopenia, 52.8% were males (n= 28), 47.2% were female (n=25)

Total 100 inborn neonates were included in the study out of which 53 developed thrombocytopenia [Figure 1].

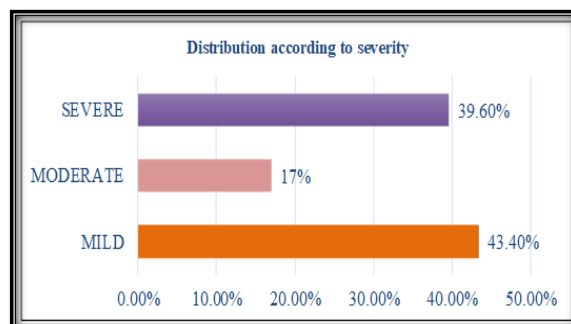


Figure 2: shows distribution according to severity of thrombocytopenia

As per the severity of thrombocytopenia, about 40% of neonates developed severe thrombocytopenia. [Figure 2].

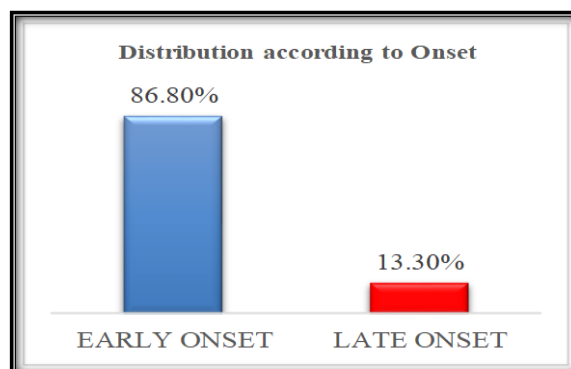


Figure 3: showing distribution according to onset of thrombocytopenia

Majority of the case (86.8%) were early onset thrombocytopenia. [Figure 3]

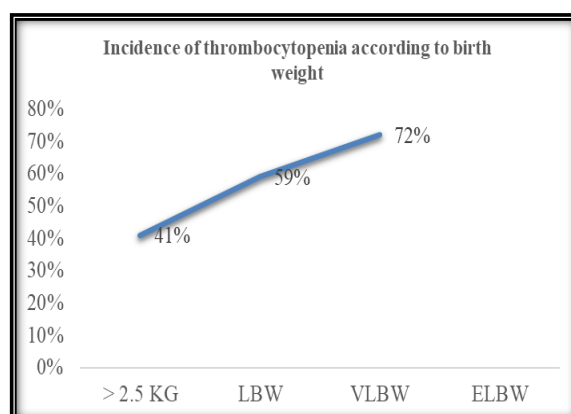


Figure 4: showing distribution of thrombocytopenia according to birth weight.

The study shows that there is an inverse relationship between incidence of thrombocytopenia and birth weight. [Figure 4]

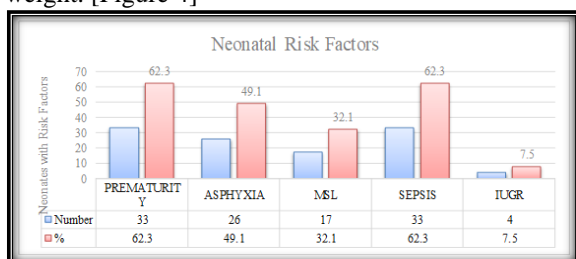


Figure 5: showing associated neonatal risk factors

However, among the babies who develop thrombocytopenia, mostly were premature and septic babies followed by asphyxiated and MSL babies than IUGR babies. [Figure 5]

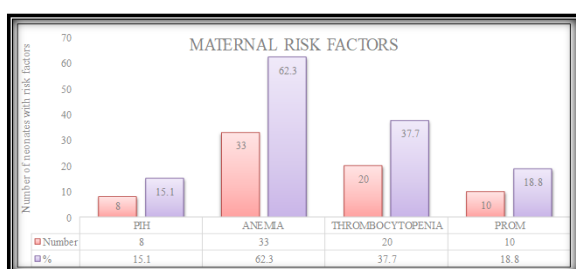


Figure 6: showing associated overall maternal risk factors

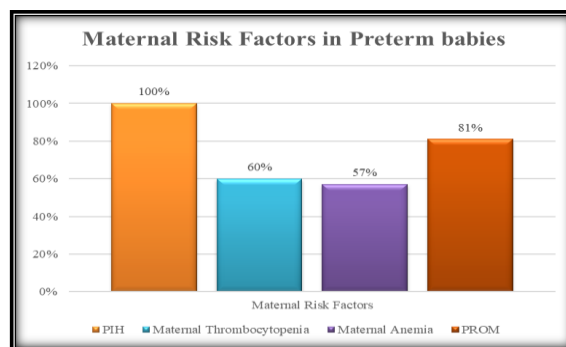


Figure 7: showing associated maternal risk factors in preterm babies

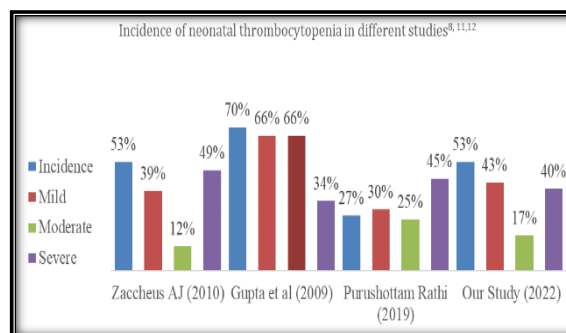


Figure 8: showing comparison of incidence of thrombocytopenia in different studies.

Table 1: Showing incidence thrombocytopenia in term and pre term neonates.

	TERM (n=49)	PRETERM (n=51)
THROMBOCYTOPENIA	20	33
NO THROMBOCYTOPENIA	29	18
PERCENTAGE	40.8%	64.7%

Study population comprised of 51% preterm and 49% term neonates. Among the preterm neonates 64.7% developed thrombocytopenia which was more than 1.5 times the incidence as found among term neonates (40.8%) [Table 1].

Table 2: showing distribution of thrombocytopenia according to birth weight.

Birth weight	Thrombocytopenia
>2500 GRAMS (n=41)	17 (41%)
1500 - 2500 GRAMS (n=47)	28 (59%)
1000 - 1500 GRAMS (n=11)	8 (72%)
< 1000 GRAMS (n=1)	0

Highest proportion of thrombocytopenia was found among VLBW (72%) babies followed by LBW babies (59%) [Table 2].

Maternal risk factors associated with neonatal thrombocytopenia in our study were PIH, Maternal Anemia (Hb < 11.0 gm%), Maternal thrombocytopenia and PROM. Overall maternal anemia (62.3%) was found to be most common associated maternal risk factor followed by maternal thrombocytopenia (37.7%) and PROM (18.8%), which was almost similar in case of term babies but among preterm neonates PIH (100%) and PROM (81%) were the most common maternal risk factors. [Figure 6,7]

## DISCUSSION

In present study, incidence was 53%. Mild, moderate and severe thrombocytopenia was found to be 43%, 17% & 40% respectively.

In various studies incidence of thrombocytopenia ranged from 27% to 70% but in our study, it is 53% which is in accordance with the result found in a study by Zaccheus et al done in 2010. [Figure 8]

In our study severe thrombocytopenia is found to be 40% which is in accordance to the finding in study by Gupta et al in 2009 and Rathi P in 2019 where

severe thrombocytopenia was found in 34% neonates and 45% neonates respectively. [Figure 8] Talking about neonatal conditions, prematurity (62.3 %) & sepsis (62.3%) were the most common causes noted for neonatal thrombocytopenia, followed by perinatal asphyxia (49.1 %) and MSL (32.1 %) in the study.

In our study PIH as a cause of neonatal thrombocytopenia is found to be statistically significant (p-value 0.017) and found to be 15.1 % which less (36.1%) as compared to study done in Manipal in 2008 by Y R Bhat.<sup>[10]</sup>

## CONCLUSION

Prematurity, sepsis and perinatal asphyxia are common risk factors in our study.

Maternal PIH has significant association (p-value = 0.017).

Other maternal risk factors, e.g., maternal thrombocytopenia, maternal anemia were found to be insignificant.

Early identification of risk factors may help to reduce incidence of neonatal thrombocytopenia.

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