

## Original Research Article

## Study of neonatal thrombocytopenia in tertiary care NICU

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## Abstract

**Context:** Thrombocytopenia is one of the commonest haematological disorders in the neonatal period, affecting up to a third of those admitted to neonatal intensive care units. It is well recognized that many fetomaternal and neonatal conditions are associated with neonatal thrombocytopenia. The majority of episodes of neonatal thrombocytopenia are relatively mild and self-limiting but sometimes it may cause severe morbidity & mortality due to severe complication like IVH. **Methods & material:** 140 Newborn admitted in tertiary care NICU were selected to find out prevalence, outcome and etiology of neonatal thrombocytopenia. Detail maternal history and neonatal physical examination done and Neonates were followed for outcome, relevant investigation done according to cases. **Result:** Out of 140 neonates 63 neonates had thrombocytopenia (45%). 42.8% neonates were premature out of which 63.3% had thrombocytopenia. Other neonatal risk factor for thrombocytopenia are sepsis 38 (74.5%), SGA/IUGR 28(80%) and NEC 9(100%). Maternal risk factor for thrombocytopenia are Pre eclampsia 64.8%, eclampsia 73.3% and infection during pregnancy (PROM) 68.7%. Out of 140 neonates 135 (96.4 %) neonates were discharged. 5 (3.6%) neonates were died, of which 1 (2.1%) of mild, 1 (8.3%) of moderate and 3(60%) were having severe thrombocytopenia. The mortality in babies with severe thrombocytopenia was high. **Conclusion:** The prevalence of neonatal thrombocytopenia was 45%. The most common etiology associated with thrombocytopenia were maternal pre eclampsia, eclampsia and PROM followed by neonatal prematurity, sepsis, IUGR and NEC. Bleeding complication like intracranial bleed were significantly associated with severe thrombocytopenia. 60% of mortality was found in severe thrombocytopenic group.

**Keywords:** Neonatal Thrombocytopenia, Maternal pre eclampsia, eclampsia, Prematurity, Sepsis, IVH**Abbreviations:** IUGR (Intra Uterine Growth Retardation), SGA (Small for Gestational Age), NEC (Necrotising Enterocolitis), PIH (Pregnancy Induced Hypertension), PROM (Premature rupture of membrane), IVH (Intra ventricular Haemorrhage).

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## Introduction

Thrombocytopenia is one of the commonest haematological disorders in the neonatal period, affecting up to a third of those admitted to neonatal intensive care units. The overall prevalence of thrombocytopenia in neonatal ranges from 1 to 5% and is reported to be much higher in neonates admitted to neonatal intensive care units, ranging from 18 to 35%. It is more common among extremely low birth weight neonates (ELBW <1000 gms birth weight) or preterm babies (GA <36 weeks) or sick neonates in NICUs[1]. In contrast, only 2% of the normal neonates are thrombocytopenic at birth with severe thrombocytopenia (platelet count <50,000/ $\mu$ L) occurring in less than 3/1000 term neonates[2]. Thrombocytopenia is defined as platelet count <1.5 lakh/cmm regardless of gestational age. Degrees of thrombocytopenia can be further subdivided into mild (platelet count 100,000 to 150,000/ $\mu$ L), moderate (platelet count 50,000 to 99,000/ $\mu$ L) and severe (platelet count <50,000/ $\mu$ L)[3]. Multiple disease processes can cause thrombocytopenia in neonates and these can be classified as early onset (<72 hours) and late onset (>72 hours) neonatal thrombocytopenia[4]. The important causes of thrombocytopenia in neonates are sepsis, birth asphyxia, prematurity, intra-uterine growth retardation, hyperbilirubinemia, respiratory

distress syndrome, meconium aspiration syndrome and low birth weight[5]. Disseminated intravascular coagulation & maternal eclampsia also play an important role in the etiology of NT. The majority of episodes of neonatal thrombocytopenia are relatively mild, self-limiting and of short duration but some times it can cause mortality & morbidity due to severe complication like IVH. Hence we aim to study the profile of neonatal thrombocytopenia, so that we can know about common etiology, morbidity pattern and mortality of neonatal thrombocytopenia in tertiary care NICU.

## Material and methods

This is prospective observational, hospital based study carried out in department of Paediatrics in Indira Gandhi Govt medical College & hospital, Nagpur during period of January 2018 to June 2019 after acceptance from institutional ethical committee. In this study, a sample of 140 of all the newborns admitted in NICU during this time period except for the ones admitted for observation were selected. Prior written Informed Consent was obtained from the parents or available relatives of each neonate. All maternal aspects like maternal age, parity, prenatal events like leaking/bleeding > 18 hrs, maternal illness like PIH, eclampsia, hospital admission, maternal drug intake like aspirin, antiplatelet drugs, bad obstetric history, Rh-isoimmunization, mode of delivery suggesting thrombocytopenia was noted down. In all enrolled newborns detailed history regarding presenting symptoms and physical examination of each neonate was done, necessary investigation were done accordingly and followed up for outcome. Gestational age was calculated by New Ballard score.

**Investigations:** CBC (Hb, TLC, DLC, Platelet count, absolute neutrophil count) C- reactive proteins (CRP). Micro-Erythrocyte

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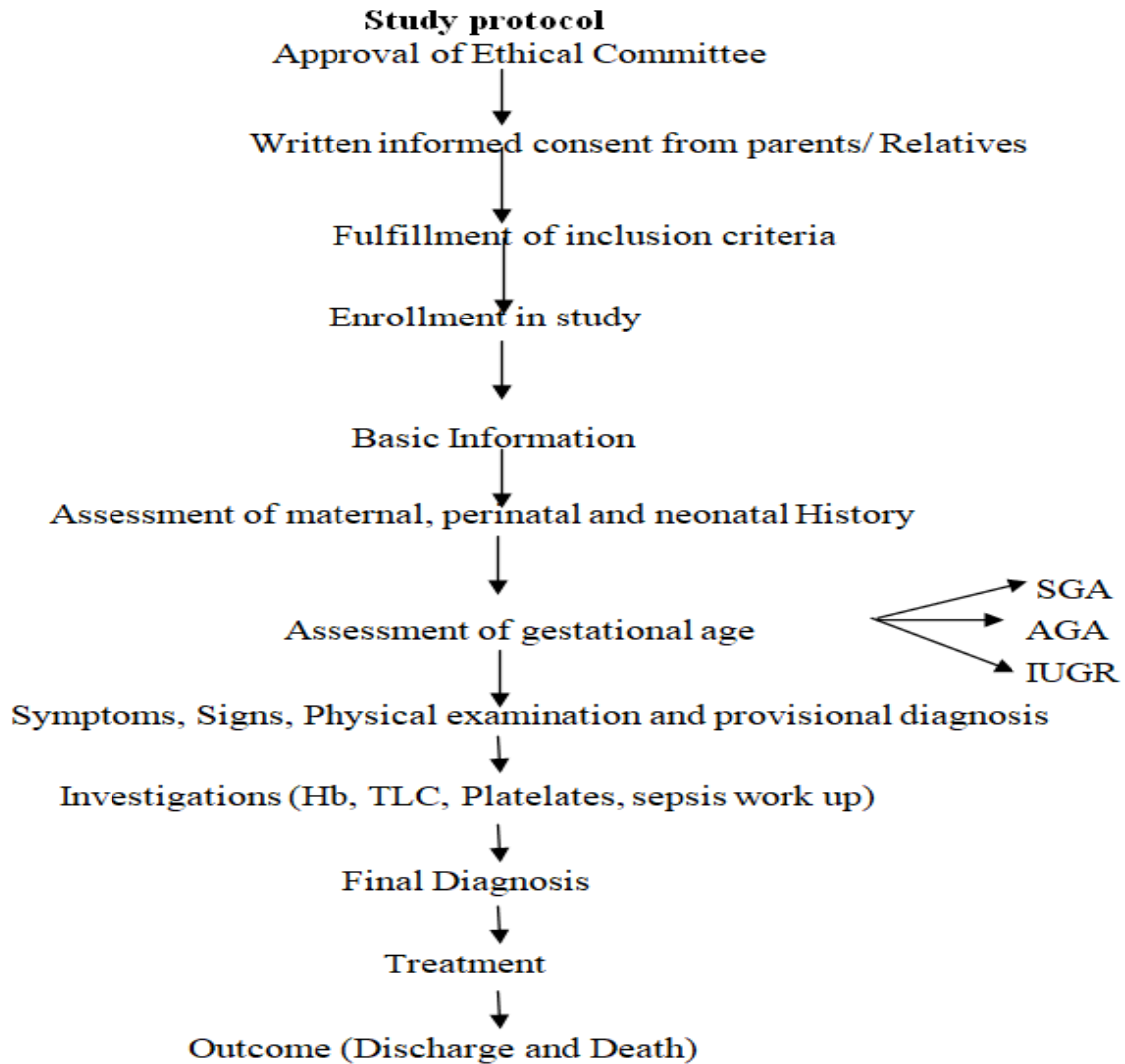
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sedimentation rate (m-ESR), Blood culture and sensitivity, X-ray chest, USG abdomen, LP, Urine routine done if needed.

**Definitions of important terms:**

- 1) PRETERM: Babies born before 37 weeks of gestation.
- 2) SGA / IUGR: Neonate with birth weight or crown heel length for gestational age less than 10th percentile for GA or <2SD below mean for infant's GA.
- 3) NEC: defined according to Bell's staging criteria with Walsh and Kleigman classification.
- 4) Sepsis : Any two or more of lab parameters of sepsis workup positive (ANC,TLC,MICRO-ESR,CRP,IT RATIO)

- 5) Neonatal thrombocytopenia-Neonate with platelet count of less than 1.5 lakh/cmm(mild thrombocytopenia is platelet count 1 lakh/cmm to 1.5 lakh/cmm, moderate thrombocytopenia is platelet count 50000 to 99000/cmm and severe thrombocytopenia is platelet count <50000/cmm)
- 6) Maternal PIH : Hypertension without proteinuria after 20 wks of gestation
- 7) Eclampsia: Woman with pre-eclamsia complicated with convulsions and / or coma.
- 8) Premature Rupture Of Membrane (PROM):- PROM is defined as rupture of membranes before the onset of labor.



**Results**

This is observational prospective study carried out in 140 neonates. Following were the results Out of 140 neonates 63 neonates had thrombocytopenia, hence prevalence of thrombocytopenia was 45 %.Out of 140 neonates 42.8% neonates were premature of which 63.3% had thrombocytopenia. It was statistically significant. (p value 0.0001)

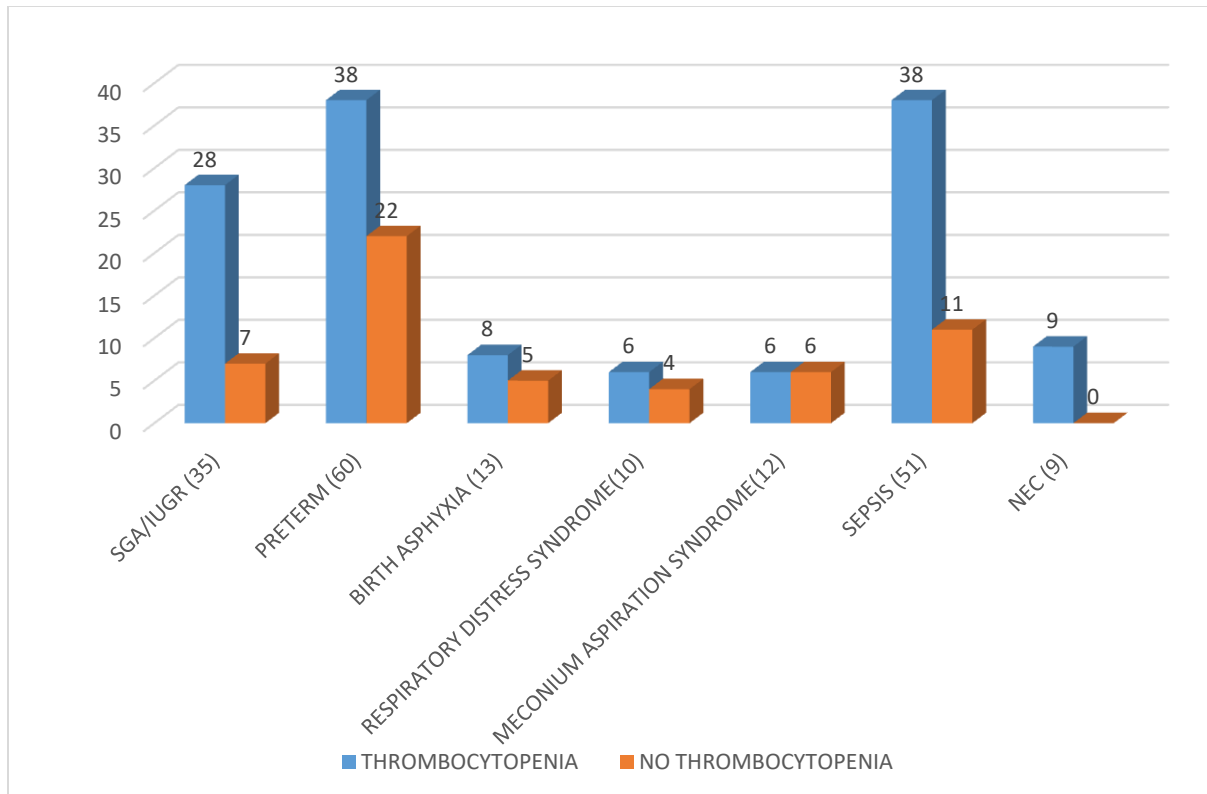
**Table 1 : Association between maternal risk factors and thrombocytopenia**

Material Risk Factor	Number	Thrombocytopenia	No Thrombocytopenia	P value
Elderly Primigravida	23	10	13	0.87
Chronic Illness during Prgnancy	20	9	11	1
Infection during Pregnancy (PROM)	16	11	5	0.042
PIH	54	35	19	0.0001
Eclampsia	15	11	4	0.019
GDM	8	3	5	0.47
APH	12	6	6	0.71
Auto Immune Disease	2	1	1	0.69

Among all maternal risk factors, Pre eclampsia 64.8% ( p value = 0.0001 ) , eclampsia were common risk factor for thrombocytopenia 73.3%. ( p value = 0.019 ) followed by history of infections during pregnancy (PROM) 68.7 % ( p value = 0.015 ). It was statistically significant.

**Table 2: Association Between Neonatal Risk Factors And Thrombocytopenia.**

Neonatal Risk Factor	Thrombocytopenia	No Thrombocytopenia	P value
SGA/IUGR (35)	28(80%)	7(72%)	0.00
Preterm (60)	38(63.33%)	22(36.44%)	0.0001
Birth Asphxia (13)	8(61.53%)	5(39.47%)	0.2
Respiratory Distress Syndrome(10)	6(60%)	4(40%)	0.32
Meconium Aspiration Syndrome(12)	6(50%)	6(50%)	0.71
Sepsis(51)	38(74.5%)	11(25.5%)	0.00
NEC (9)	9(100%)	0	0.001



**Fig 1:Neonatal factors**

Amongst neonatal risk factor IUGR ( p value 0.00), prematurity ( p value 0.0001), sepsis ( p value 0.00) and NEC ( p value 0.001) were statistically significant for thrombocytopenia.

**Table 3: Neonatal Thrombocytopenia According To Severity**

Neonatal thrombocytopenia	Number(140)	Percentage
Normal	77	55%
Mild	46	32.85%
Moderate	12	8.57%
Severe	5	3.57%

Out of 140 neonates, Mild thrombocytopenia was observed in 46(32.85%) neonates, moderate thrombocytopenia in 12(8.57%) and severe thrombocytopenia in 5(3.57%)

**Table 4: Neonatal thrombocytopenia and it's complications & outcome according to severity.**

Neonatal thrombocytopenia	GI bleed	Intraventricular haemorrhage	Discharge	Death
Normal(77)	2	0	77	0
Mild(46)	1	0	45	1
Moderate(12)	2	0	11	1
Severe(5)	5	3	2	3
Total(140)	10	3	135	5

Amongst cases of severe thrombocytopenia, 60 % had intra-ventricular haemorrhage and 100 % neonates has GI bleeding. It was statistically significant (p value- < 0.00). Out of 140 neonates 135 (96.4 %) neonates were discharged. 5 (3.6%) neonates were died, of which 1 (2.1%) of mild, 1 (8.3%) of moderate and 3(60%) were having severe thrombocytopenia. The mortality in babies with severe thrombocytopenia was high (p value =0.03) which was statistically significant.

### Discussion

This study is done on 140 neonates in a tertiary care NICU. The prevalence of neonatal thrombocytopenia was 45.0 %. Sonam nadyal et al. 2016 the prevalence of neonatal thrombocytopenia was 63.8%. Study by Jeremiah et al 2010[6] in which the prevalence of neonatal thrombocytopenia was found to be 53.0%. Out of 140 neonates 60(42.8%) neonates were premature of which 38(63.3%) had thrombocytopenia. Anubha sharma et al. 2015[7] showed that 58.2% preterm babies developed thrombocytopenia. In present study among all maternal risk factors, PIH was seen to be more commonly associated with thrombocytopenia. All babies who had maternal risk factor as pre eclampsia(64.8%), eclampsia (73.3%) and PROM (68.7%) had thrombocytopenia which was statistically significant. Tirupathi K et al 2017[8] shows that PROM and PIH in mother is a cause of early onset neonatal sepsis eventually leading to neonatal thrombocytopenia. In our study most common causes of thrombocytopenia in neonates was of prematurity (63.3%) and sepsis (74.5%) followed by IUGR (80%), NEC (100%). Eslami Z et al. 2013[9] recorded neonatal sepsis and intra uterine growth retardation as important causes of thrombocytopenia. Sonam Nandyal 2016 showed leading causes of neonatal thrombocytopenia include prematurity, sepsis, respiratory distress syndrome, birth asphyxia, meconium aspiration syndrome, hyperbilirubinemia and intra-uterine growth retardation.

In this study mild thrombocytopenia was observed in 32.85 % neonates, moderate thrombocytopenia in 8.57 % & severe thrombocytopenia in 3.57 %. Sumarth Lal Meena et al 2019[10] observed the severity of neonatal thrombocytopenia was mild in (46%), moderate in (35%) and severe in (19%).

Khalessi et al. 2013[11] found 43.5% had mild thrombocytopenia, 25.8% had moderate thrombocytopenia, and 24.1% had severe thrombocytopenia. Jeremiah et al. 2010 observed that amongst thrombocytopenic neonates 39.4% were mild, 12.1% moderate and 1.5% severe. In present study among neonates of

severe thrombocytopenia, 60 % had intraventricular haemorrhage. Von Lindern JS et al. 2011[12] found that 12% of babies with neonatal thrombocytopenia developed IVH. Beiner et al. 2003 [13] showed strong correlation between neonatal thrombocytopenia and IVH. Amongst babies presenting with bleeding manifestations i.e. GI bleed (7), mucosal bleed (5), malena (4), and petechiae (5) had severe thrombocytopenia i.e. 100 %. Similar results were found in other studies. Khalessi et al. 2013 showed 6.5% had gastrointestinal bleeding. Patil et al. 2014[14] showed that mucosal bleeding was significantly associated with thrombocytopenia. In this study out of 140 neonates the mortality was 5 (3.6%) of which 3 babies were having severe thrombocytopenia. Patil et al. 2014 reported that mortality rate was very high 37%, among the severely thrombocytopenic neonates. Bonifacio L et al 2007[15] observed that the mortality rate was 16.7%, 32.4% and 45.8% in neonates with mild, moderate and severe thrombocytopenia, respectively. In our study, 96.4 % of all study population showed improvement. 3.6 % cases of whole study population couldn't survive. All non thrombocytopenic cases improved. 2.1% of mild, 8.3% of moderate and 60 % of severe thrombocytopenic babies died. Patil et al. 2014 showed that mortality rate was very high, 37%, among the severely thrombocytopenic neonates while it was only 3.72% and 3.92% respectively in the mild to moderate and no thrombocytopenia groups.

### Conclusion

Neonatal thrombocytopenia is one among most common hematological abnormality encountered in NICU. The prevalence of neonatal thrombocytopenia was 45%. The most common etiology associated with thrombocytopenia were sepsis and prematurity followed by IUGR and NEC. Amongst the maternal factor pre eclampsia, eclampsia and PROM were significantly associated with neonatal thrombocytopenia. Clinical signs and symptoms associated with neonatal thrombocytopenia especially severe thrombocytopenia were gastrointestinal, mucocutaneous bleeding, petechiae, malena and IVH. 60% of mortality was found in severe thrombocytopenic group. Thus, severe thrombocytopenia was found to be a predictor of poor outcome in sick neonates of NICU.

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