ORIGINAL ARTICLE

THROMBOCYTOPENIA IN NEONATES: INCIDENCE, PRESENTATION, AND STUDY OF CORRELATED FACTORS AT A LAHORE TEACHING HOSPITAL

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Background: Patients with thrombocytopenia have been observed to experience changes in their coagulation profile and severity of disease. This study aims to see the incidence, presentation, and correlating factors of thrombocytopenia in newborns. **Methods:** From Jan 2023 to Jan 2024, 200 newborns in the Paediatric and Pathology Departments of Chaudhry Muhammad Akram Teaching and Research Hospital participated in a cross-sectional study. Utilizing SPSS-23, overall data was analysed. **Results:** In this study 138 (69%) of the 200 newborns were female, and 62 (31%), were male. Seventy-six (38%) neonates had thrombocytopenia, whereas 124 (62%), neonates had normal platelet counts. Of the 76 newborns, 42 (21%) had mild thrombocytopenia, 25 (12.5%) had moderate thrombocytopenia, and 9 (4.5%) had severe thrombocytopenia. Thirty-five percent early-onset neonatal thrombocytopenia (EOT) had early onset thrombocytopenia, while 46 (23%) had thrombocytopenia in the late onset (LOT) phase. There was a strong correlation discovered between thrombocytopenia and anaemia, jaundice asphyxia, low birth weight, preterm and full-term neonatal birth, and neonatal jaundice. The correlation of bleeding in neonates with thrombocytopenia was significant (p>0.05). **Conclusion:** Moderate to severe thrombocytopenia in newborns often follows mild thrombocytopenia. Thrombocytopenia is highly correlated with bleeding, preterm birth, full-term birth (extensive monitoring during childbirth), anaemia, hypoxia, and sepsis. In sick newborns, severe thrombocytopenia is considered as a prognostic marker.

Keywords: Platelet count, Infection, Sepsis, Asphyxia, Low birth weight, Neonates, Thrombocytopenia

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INTRODUCTION

Thrombocytopenia is a common problem in the neonatal period, especially in preterm and critically unwell infants. 1%–5% of newborns and 20%–50% of critically sick newborns.[1] Biological components play a crucial role in regular haemostasis, helping to stop bleeding from a wounded blood vessel. Most platelets (70–80%) are found in the bloodstream, with the remainder 20–30% gathering in the spleen. Platelet count of 150×10^9 to 400×10^9 is considered normal.[2] Neonates with thrombocytopenia exhibit a low platelet count of less than 150×10^9/L. The majority of neonates have mild ($100–150\times10^9$ /L) to moderate ($50–99\times10^9$/L) thrombocytopenia, with about 20% having severe thrombocytopenia ($<50\times10^9$/L). A platelet has an eight-day lifespan on an average.[3]

Common mechanism for thrombocytopenia includes a decrease in megakaryopoiesis-induced platelet formation, or an increase in platelet destruction or sequestration.[4] Neonates with placental insufficiency have decreased platelet production, which results in thrombocytopenia.[5] Birth asphyxia, premature birth, hyperbilirubinemia, low birth weight (LBW), sepsis, and respiratory distress syndrome are the causative factors.[6] Thrombocytopenia, which often presents as either early-onset thrombocytopenia, which appears before 72 hours of delivery, or late-onset thrombocytopenia which appears beyond 72 hours, affects up to one-third of preterm babies who are admitted to an intensive care unit.[7]

Mothers susceptible to placental insufficiency may also be prone to hypertension. Early onset thrombocytopenia (EOT) is a mild to severe disease that is self-limiting, and usually is the result of a superimposed bacterial infection that causes necrotizing enterocolitis sepsis. Late-onset thrombocytopenia (LOT) is severe, protracted, and necessitates platelet transfusion. Alloimmune thrombocytopenia, prenatal asphyxia, and bacterial sepsis are the three most common causes of thrombocytopenia in full-term infants, and the condition is typically severe.[8] The aim of this study was to explore the prevalence, presentation, and correlating factors of thrombocytopenia in newborns. The objective was to see the incidence with its correlating factors and presentation in neonates.

MATERIAL AND METHODS

This cross-sectional study was carried out between Jan 2023 and Jan 2024 at Chaudhry Muhammad Akram

Teaching and Research Hospital, Lahore. Infants were categorized as having thrombocytopenia at an early stage (72 hours). Gestational age less than 259 days (37 weeks) was considered pre-term, and 259–293 days (37–41 weeks) was considered full-term, and post-term (294 days/42 weeks), according to the World Health Organization (WHO). Body weight below 2,500 grams was considered low birth weight (LBW).

Between 37 and 42 weeks is the definition of a full-term birth.[9] The patients were chosen randomly. The sample size was 200 using a 95% confidence level, a prevalence of 37% for newborn thrombocytopenia, and a margin of error of less than 3%.[10] The parents' informed consent was obtained both verbally and in writing. Three mL of fresh venous blood sample was obtained in an EDTA-containing vacationer. A total platelet count was performed in Pathology Diagnostic Laboratory using Sysmex analyzer XN 330.

A questionnaire that includes demographic information (age, gender, and address) was used to collect the data. The Institutional Review Board of the Chaudhry Muhammad Akram Teaching and Research Hospital in Lahore granted ethical approval. Data were analysed on SPSS-23. Student's *t*-test was applied to see the differences between the groups and $p \leq 0.05$ was considered as statistically significant.

RESULTS

There were 200 neonates, 62 (31%) were male and 138 (69%) were female. Table-1 shows that 30 neonates (15%) and 46 neonates (23%) were diagnosed before and after 72 hours of age, respectively. As shown in (Table-2), 124 neonates (62%) had normal platelet counts, 42 (21%) had mild thrombocytopenia, 25 (12.5%) had moderate thrombocytopenia, and 9 (4.5%) had severe thrombocytopenia.

Our study revealed that, in terms of late-onset thrombocytopenia, 26 neonates had mild, 14 had moderate, and 6 had severe thrombocytopeniac onsets, whereas, in terms of early onset thrombocytopenia, 16 had mild, 11 had moderate, and 3 had severe thrombocytopenia.

The relationship between thrombocytopenia and various illness patterns was statistically analyzed in pre-term and full-term birth neonates. The *p* for LBW (low body weight), bleeding, neonatal sepsis, jaundice, and asphyxia were 0.12, 0.03, 0.000, 0.48, and 0.01, respectively. The *p* for bleeding, neonatal sepsis, and asphyxia were significant in neonates with thrombocytopenia (Table-1, 2, 3).

Table-1: Thrombocytopenia in neonates categorized by early and late onset (Hours) (n=200)

Onset of thrombocytopenia	Frequency	Percentage
Early onset (<72 Hours)	30	15.0
Late-onset (>72 Hours)	46	23.0

Table-2: Classification of newborn thrombocytopenia

Platelets count (10^9 /L)	Frequency	Percentage
Mild Thrombocytopenia (100×10^9/L-150×10^9/L)	42	21.0
Moderate Thrombocytopenia (50×10^9/L-99×10^9/L)	25	12.5
Severe Thrombocytopenia (<50×10^9/L)	9	4.5

Table-3: Thrombocytopenia characteristics in connection to various illness patterns (n=200)

Diagnosis		Thrombocytopenia			*p*
		Mild	Moderate	Severe	
Neonatal Birth	Preterm	29	19	5	0.04*
	Full term	13	6	4	
LBW	Yes	32	22	7	0.12
	No	10	3	2	
Bleeding	Yes	38	23	8	0.03*
	No	10	3	2	
Neonatal sepsis	Yes	16	11	3	0.000*
	No	26	14	6	
Neonatal jaundice	Yes	25	19	5	0.48
	No	17	6	4	
Asphyxia	Yes	24	18	5	0.01*
	No	18	7	4	

*Significant

DISCUSSION

The incidence of thrombocytopenia varies in neonates of different communities. In our investigation, thrombocytopenia was more common in female (69%) than in male (31%) neonates. In another study conducted in India[11], thrombocytopenia was found in 52% male and 48% female babies. It supports the fact that the incidence of thrombocytopenia varies in different communities. The incidence of thrombocytopenia was 26.4% in a recent study[12] conducted in Egypt at Assiut University Hospital. At McMaster University in Canada, another investigation[13] on 807 newborns found that 22% of them had thrombocytopenia, 13% of neonates in a study by Kusamsari *et al*[14] had thrombocytopenia[14].

In Kubo M[15] study 64 (82%) patients had early onset thrombocytopenia and 15 (17%) patients had late onset thrombocytopenia among neonates. Our study found that 30 (15%) patients had early-onset neonatal thrombocytopenia (EOT) and 46 patients (23%) had late-onset neonatal thrombocytopenia. In the Kubo M *et al*[15] study more patients had early-onset thrombocytopenia, while in our study there were more patients with late-onset thrombocytopenia, the reason may be that the early onset thrombocytopenia is due to parental factors, while the late onset thrombocytopenia is due to postnatal acquired infectious agents. One-hundred and twelve neonates (55%) with late-onset thrombocytopenia and 89 (45%) with early-onset thrombocytopenia were shown to have this condition in another study[16]. A Nigerian study[17] found thrombocytopenia in 85.85% of the neonates within 72 hours. In both of these studies, late-onset thrombocytopenia was more common, which may be due to the infections after birth.

We found 32 low birth-weight newborns with mild thrombocytopenia, 22 with moderate and 7 with severe thrombocytopenia. The outcomes matched those of a study by Hussain G *et al*[18] in which 58.9% of thrombocytopenia newborns were low birth weight. Research by Nandish HR *et al*[19] also revealed that low birth weight newborns were more likely to have neonatal thrombocytopenia.

Our research revealed a correlation between mild, moderate, and severe thrombocytopenia and the delivery patterns of preterm and full-term neonates. Specifically, 29 preterm neonates had mild, 19 had moderate, and 5 had severe thrombocytopenia, whereas 13 full-term neonates had mild, 6 had moderate, and 4 severe thrombocytopenia. In an Indian study[11] in 24% term babies and 76% pre-term babies had thrombocytopenia.

The early onset of thrombocytopenia was studied at the Dass Institute of Medical Sciences and Research in Amritsar[20], most of these infants had maternal factors behind their disease.

CONCLUSION

Both pre-term and late-term newborns could develop thrombocytopenia due to various factors related to placental insufficiency and post-birth infections. Late-onset thrombocytopenia was a common finding with higher incidence rate in babies with low birth weight. A significant relationship between low platelet counts and bleeding in preterm babies was seen. Same was observed in full-term infant with anaemia, hypoxia, asphyxia, neonatal sepsis, and jaundice. In sick newborns, severe thrombocytopenia is considered as prognostic marker.

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IH: Data collection and Statistical Analysis
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AA: Critical review of Manuscript
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