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Pattern of Thrombocytopenia in Hospitalized Neonates: A cross sectional study

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ABSTRACT
Thrombocytopenia is one of the frequent hematological complications in neonates. Thrombocytopenia within 72 hour may caused by chronic fetal hypoxia, perinatal asphyxia, and perinatal infection andneonatal autoimmune diseases, neonatal alloimmune thrombocytopenia, disseminated intravascular coagulation (DIC) and thrombocytopenia laterthan 72 hour caused by Congenital infection e.g. cytomegalovirus (CMV), rubella, toxoplasma, and Autoimmune diseases orlate onset of sepsis. The changes in platelet count overtime are significant and only therapeutic strategy is platelet transfusion. The study was aim to determine prevalence and pattern of thrombocytopenia overtime among neonates.A cross sectional study was done in Pediatric ward of Rahman Medical Institute from February to July 2018. A total of 385 neonatal samples were collected from 0-28 days of age irrespective of their birth weight and gestational age. The overall frequency of thrombocytopenia in neonates was78 (20.3%). There was a mentionable difference found in platelet count with respect to different categories of neonates with highest frequency of thrombocytopenia found in category 2 (4 to 14 days)having 45 (31.2%) neonates followed by category 1 having 24(11.5%) while category 3 have 9 (26.5%)neonates suffering from thrombocytopenia respectively. We found early onset thrombocytopenia (<72 hours of life)with frequency of 24 (11.6%) and late onset thrombocytopenia (after 72 hours) with frequency of 54 (30.2%) neonates respectively. The frequency of late onset thrombocytopenia is high and require prevention from infection i.e sepsis by adhere to infection control guidelines in pediatric wards.
Key Words: *Thrombocytopenia, Prevalence, Early onset, Late Onset, Neonate.*

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INTRODUCTION

Thrombocytopenia the term usually used for decrease in platelet count from 150 × 109/L [1, 2]. When platelet count decrease from the said limit in neonates it will term as neonatal thrombocytopenia and is found to be most frequently encountered hematologic disorder in neonates [2, 3]. Most of the study reported prevalence of overall 5% of the newborn but varies with respect to population characteristics [4].

There are a lot reasons behind neonatal thrombocytopenia reported to be common ranging from fetomaternal to neonatal conditions. Fetal condition include alloimmune, congenital infection (CMV, rubella, HIV) autoimmune (ITP,SLE, other congenital syndrome i.e Wiskott-Aldrich syndrome).(5) Also Chromosomal abnormalities i.e Aneuploidy (trisomies 18,13,21) play significant role in development of thrombocytopenia [5, 6]. Neonatal thrombocytopenia are divided in to early onset and late onset thrombocytopenia based on timing of onset of thrombocytopenia after birth. Early onset thrombocytopenia's are mostly due to chronic fetal hypoxia, infants born to be associated pregnancy-induced hypertension, intrauterine growth restriction [7, 8], placental insufficiency, perinatal asphyxia, DIC, alloimmune and autoimmune reasons while late onset thrombocytopenia mostly triggered by late-onset sepsis and necrotizing enterocolitis [9, 3, 5].

Most of the time neonatal thrombocytopenia is recovered without any specific intervention when clinical presentation reveals mild to moderate thrombocytopenia, however neurodevelopmental impairment ,

life-threatening bleeding or hemorrhages were adhere to severe thrombocytopenia (platelets<50×109/L) and require specific intervention in form of platelet transfusions [10].
Gupta et al(11) in their study revealed higher incidence of thrombocytopenia with frequency of 41.7% . Another study in brazil [12] reported a lower prevalence of 1.5% in their 9,332 newborn. A higher prevalence of 53% is reported by Nigerian study and revealed the higher frequency of early onset thrombocytopenia. (1)There is scarce of literature in our setting and have less sufficient studies on pattern of neonatal thrombocytopenia hence current study is designed to determine the prevalence and pattern of neonatal thrombocytopenia.

MATERIAL AND METHODS

A cross sectional Study was done in pediatric ward of Rahman Medical institute and a total of 385 neonatal patients with various clinical diagnoses were constituted as study population. After ethical approval and consent from the guardian, demographic information is recorded on predesigned Performa. About 03 ml of venous blood was collected in EDTA vacutainer. For homogenous mixing, bloods were kept on roller mixer and after constant mixing blood was analyzed on sysmex automated hematology analyzer. Blood is initially diluted and moved through a narrow tube for that cells passes one in a time. Cells were passed through a capillary opening known as aperture. The electrode on each side of aperture detects change in direct current resistance when cell passes (with respect to its volume). Therefore platelets were measure on basis of their size (volume) and displayed as histogram. There are certain interference in accurate platelet count using aperture impendence method such as giant platelet, fragmentocytes, platelet aggregation/agglutination which may be ruled out and resampled after taking appropriate corrective measures. For monitoring and evaluating the precision of platelet count Liquichek Hematology control three levels were routinely performed for quality control purpose. Data obtained were analyzed on SPSS version 22 and displayed in the form of tables. Demographic characteristics were recorded and chi square test of association were used in order to reveal association between categorical variable. P value of <0.05 were considered statistically significant.

RESULTS

Three hundred and eighty five neonates include 250 males and 135 females admitted to pediatric ward of Rahman medical institute were enrolled and evaluate for their platelet count. Overall prevalence of neonatal thrombocytopenia is 78(20.3%) having frequency of 56for males and 22 for female neonate respectively.Male neonates are more suffering from thrombocytopenia in comparison to female neonate as shown in table no 1.There was higher prevalence of late onset thrombocytopenia (>72hrs) with a frequency of 30.1% (54 out of 179) and remaining 79.9% have normal platelet count as shown in table 2.

Table: 1 Gender wise distribution of thrombocytopenia

Gender	Platelet count below 150 × 109/L	Platelet count above 150 × 109/L	Total
Male	56	194	250
Female	22	113	135
Total	78	307	385

Table 2: Pattern of Neonatal thrombocytopenia with Age

Pattern of Neonatal thrombocytopenia	Frequency	Percentage
Early onset (<72 hour)	24 (out of 206)	11.6%
Late onset (>72 hour)	54 (out of 179)	30.2%

Table 3 shows neonatal thrombocytopenia with different categories of age group having higher frequency of 31.2% (45 out of 144) found to be in group 2 (4 to 14 days) followed by group 1 (up to 3 days) having frequency of 24 (11.5%) while group 3 have 9 (26.5%) neonates suffering from thrombocytopenia respectively. There is significant statistical association found between age groups and thrombocytopenia. (Chi-square statistic is 124.1436. The p-value is < 0.00001)

Table:3 Association of Age groups and thrombocytopenia

	Group 1	Group 2	Group 3	Row total
Thrombocytopenia	24 (70.97) [31.09]	99 (49.37) [49.89]	9 (11.66) [0.61]	132
Normal	183 (136.03) [16.22]	45 (94.63) [26.03]	25 (22.34) [0.32	253
Column Total	207	144	34	385(Grand Total)
Chi-square statistic is 124.1436. The p-value is < 0.00001				

DISCUSSION

Thrombocytopenia is most commonly encountered hematological problem admitted to Intestisve care unit and pediatric wards [1]. The pattern and etiology is revealed and predicted by natural history and onset of thrombocytopenia.(2) Different studies on fetal blood reported the mean platelet count of 150 × 109/L after first trimester and after second trimester raised to 175× 250 109/ and about 98% of the term neonates have platelet count above 150 · 109/Lat birth hence studies reported thrombocytopenia at platelet count below 150 × 109/L [2, 3, 14].

In present study prevalence of neonatal thrombocytopenia were 20.3% which is high as compared to other studies. Brizica *et al* reported 11.4% prevalence of neonatal thrombocytopenia [15]. One factor contribute to their low prevalence is high sample size in comparison to our study. Similar finding were reported by Kusumasari *et al* in their study about "Incidence and risk factors of neonatal thrombocytopenia". They reported the prevalence of 12.1% which is low with relation to our finding and similar to study of Brizica *et al.* [15,16] Another study [17] have finding concordant to our study and reported prevalence of 22% to 35%. Khaleesi *et al* (18)shows frequency of 17.9% while Gupta *et al* shows higher frequency of 33.4% in their study which is high in comparison with our findings [11]. Mother poor health and increase rate of postnatal infection contribute to their higher prevalence.

On the other hand a very low prevalence was reported by study conducted by Dreyfus *et al* [4] and Sainio *et al*. [18]. Their study reveals the frequency of 0.9% and 2% respectively. Their infection control and rigor ward culture influence the lower prevalence of neonatal thrombocytopenia.

Thrombocytopenia frequently encountered in neonatal wards and neonatal intensive care unit are of two type of presentation known as early (within 72hrs of birth) and late onset (after 72hrs of birth) thrombocytopenia. In our study the frequency of early onset thrombocytopenia were 11.6% while late onset thrombocytopenia were found to be 30.2% respectively. A study done by Mehrjerdi *et al* in Tehran, Iran reported higher prevalence of early onset thrombocytopenia (67.7%) in relation to late onset thrombocytopenia (32.3%). Their findings are in agreement with our finding with respect to late onset thrombocytopenia. Maternal conditions are responsible for higher prevalence of their early onset thrombocytopenia.

CONCLUSION

Neonatal thrombocytopenia remains the common and important clinical concern. There was increase in prevalence of thrombocytopenia with high frequency of late onset thrombocytopenia that requires prevention from infection i.e sepsis by adheres to infection control guidelines in pediatric wards. An early and periodic neonatal hematological screening is necessary for better management.

CONFLICT OF INTERST:

There is no conflict of interest with concern to publication of this study among authors.

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