

Neonatal Thrombocytopenia: Its Associated Risk Factors and Outcome in Neonatal Intensive Care Unit in a Tertiary Hospital in Nepal

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ABSTRACT

Background: Thrombocytopenia is a frequently encountered hematological abnormality in Neonatal Intensive Care Unit (NICU). There are various maternal and neonatal risk factors associated and the incidence varies greatly depending upon the population studies. This study was performed on neonates admitted in Bharatpur Hospital NICU. **Materials & Methods:** In this retrospective study, 412 neonates who were admitted in NICU from November 2016 to October 2017 were included in the study. Frequency of thrombocytopenia was determined along with associated maternal and neonatal risk factors. Maternal risk factors like Pregnancy induced hypertension (PIH), Diabetes, Eclampsia, drug use and neonatal risk factors like sepsis, asphyxia, intrauterine growth retardation (IUGR), prematurity were analyzed. Requirement of platelet transfusion and the outcome were also evaluated. **Results:** Of the 412 neonates included, 74 had thrombocytopenia which comprised approximately 18% neonates admitted in NICU. Early onset thrombocytopenia occurring within 72 hrs comprised 91.8% while late onset thrombocytopenia occurring after 72 hrs comprised 8.2% of total thrombocytopenia. 58.1% (43) were mild, 29.7% (22) moderate and 12.2% (9) severe thrombocytopenia. The major neonatal risk factors were sepsis, asphyxia, IUGR and prematurity while gestational diabetes and PIH were maternal risk factors contributing to neonatal thrombocytopenia. Only 4.05% received platelet transfusion. 77.03% of the neonates recovered and were discharged while 12.16% neonates were referred to other centres and 5.40% neonates died. **Conclusion:** Neonatal thrombocytopenia accounted for 18% of neonates which were admitted in the NICU. Significant neonatal risk factors were asphyxia and sepsis and maternal risk factors were PIH and diabetes. Majority did not require platelet transfusion and outcome was also good.

Keywords: neonate; NICU; thrombocytopenia.

INTRODUCTION

Thrombocytopenia, generally defined as a platelet count less than $150 \times 10^9/L$, is the commonly encountered hematologic disorder in neonatal intensive care units (NICUs).¹ It affects 18–35% of all patients admitted to NICUs and affects widely to extremely low birth weight (ELBW) infants with a birth weight less than 1,000 grams.^{2,3} Neonatal thrombocytopenia (NT) can be classified based on the timing of onset of thrombocytopenia (early, within 72 h of birth versus late, after 72 h of life).⁴ Early onset thrombocytopenia is commonly associated with pregnancy complications such as intrauterine growth restriction, maternal diabetes or drug use. Clinically, the most common cause of severe early NT is known as neonatal alloimmune thrombocytopenia purpura (NAITP). However, NAITP accounts for only a small proportion (<5%) of early NT overall.⁵ The most common causes of late NT are sepsis and necrotizing enterocolitis

(>80% of cases). This form of NT which usually develops very rapidly over 1 to 2 days, is often very severe (platelets $<30 \times 10^9/L$) and takes 1 to 2 weeks to recover. Such babies frequently require repeated platelet transfusion.^{6,7} In most cases, neonatal thrombocytopenia is mild to moderate and can be resolved without intervention. Life-threatening bleeding or intracranial hemorrhage (ICH) with a high risk of neurodevelopmental impairment may occur in severe thrombocytopenia (platelets $<50 \times 10^9/L$). Alloimmune thrombocytopenia is associated with a comparatively high bleeding risk. Late onset thrombocytopenia is typically more severe than early onset disease and bleeding is more common (10). Though thrombocytopenia is so prevalent it is often ignored in the surmise that it will resolve spontaneously. Thus, appropriate diagnostic and therapeutic management is necessary to prevent death or

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neurological sequelae in the severely thrombocytopenic neonate.

As we could not find enough studies on the frequency of neonatal thrombocytopenia in Nepalese populations; the current study was undertaken to evaluate the rate and etiology of thrombocytopenia in neonates.

MATERIALS AND METHODS

This retrospective study was conducted in neonates admitted in NICU of Bharatpur hospital Chitwan Nepal from November 2016 to October 2017. Platelet count of all admitted neonates were recorded and further information were collected from the patient record of the neonate with thrombocytopenia. The diagnosis of thrombocytopenia was based on platelet count in peripheral blood samples. Platelet count was performed on ethylene diaminetetraacetate anticoagulated blood with a standard automatic blood cell counter. Thrombocytopenia was defined as platelet counts of less than 150×10^9 per Liter (moderate and severe thrombocytopenia were defined as less than 100×10^9 and fewer than 50×10^9 per liter respectively).

Early onset thrombocytopenia was defined if thrombocytopenia occurred from birth to 72 hours of life and late onset thrombocytopenia > 72 hours of life. The maternal and neonatal risk factors, requirement for platelet transfusion and outcome after completion of treatment were also noted. The data was entered in SPSS 16.0 statistical software. The results were expressed as proportions.

RESULTS

This study was conducted with the aim to find the frequency of neonatal thrombocytopenia and its neonatal and maternal risk factors along with the need of platelet transfusion and outcome in a tertiary care hospital setting. Total of 412 neonates were admitted in NICU of Bharatpur Hospital Chitwan; of which 74 (18%) developed neonatal thrombocytopenia. Forty one (55.4%) neonates were male and 33 (44.6%) were females. Male female ratio was 1.24:1 (Table-1). Out of 74 neonates enrolled in the study 51 neonates were term gestation, 14 were preterm, seven were postdated and 2 were post term.

	Number	Percentage
Male	41	55.4
Female	33	44.6
Total	74	100.0

Mild thrombocytopenia was seen in 33 term neonates while 15 had moderate and 3 had severe thrombocytopenia. Among preterm neonates 7 had mild, 3 had moderate and 4 had severe thrombocytopenia. Most of the neonates were born in Bharatpur Hospital comprising 67 (90.54%) as inborn neonates and only 7(9.46%) were delivered in other centres and in home. Most of them were normal vaginal delivery comprising 41(55.41%) and 31(41.89%) were delivered via cesarean section and only 2(2.70%) were vacuum delivery. Mild thrombocytopenia was seen in 43 (58.1%) neonates while 22 (29.7%) were moderate thrombocytopenia and 9 (12.2%) neonates had severe thrombocytopenia (Table 2). Among these Early onset thrombocytopenia i.e. occurring within 72 hrs comprised 68 (91.8%) while late onset thrombocytopenia occurring after 72 hrs comprised 6(8.2%) of total thrombocytopenia.

In our study there were not many maternal risk

	Number	Percentage
Mild	43	58.1
Moderate	22	29.7
Severe	9	12.2
Total	74	100.0

factors observed. Sixty six (89.2%) neonates didn't have any maternal risk factors contributing to neonatal thrombocytopenia while seven (9.5%) had pregnancy induced hypertension and only one (1.2%) had history of maternal diabetes (Table 3). Twenty (27%) neonates had early onset neonatal

	Number	Percentage
None	66	89.2
PIH	7	9.5
Diabetes	1	1.3
Total	74	100.0

sepsis while only two (2.7%) had late onset neonatal sepsis. 26 (35.1%) had asphyxia and seven (9.5%) were IUGR babies. Six (8.1%) IUGR babies developed sepsis while five (6.8%) IUGR babies had asphyxia and 8 (10.8%) had both asphyxia and sepsis as risk factors. The major contributors were sepsis and asphyxia (Table 4).

In mild thrombocytopenic neonates sepsis accounted 21(27.9%) while asphyxia accounted 27 (37.2%). Similar were the risk factors in moderate thrombocytopenia while 25(33.3%) neonates among severe thrombocytopenia had sepsis. Most of them did not require platelet transfusion. Seventy

Table 4. Neonatal Risk Factors		
	Number	Percentage
Early Onset Neonatal Sepsis (EONNS)	20	27
Late Onset Neonatal Sepsis (LONNS)	2	2.7
IntraUterine Growth Retardation (IUGR)	7	9.5
Asphyxia	6	35.1
Asphyxia & IUGR	5	6.8
Sepsis & IUGR	6	8.1
Sepsis & Asphyxia	8	10.8
Total	74	100.0

one (95.95%) neonates did not receive platelet transfusion while only three (4.05%) received platelet transfusion. Only three neonates in severe thrombocytopenia received platelet transfusion. Fifty seven (77.03%) of the neonates recovered and were discharged while nine (12.16%) neonates were referred to other centres and four (5.4%) neonates died and four (5.4%) did not complete the treatment and they left against medical advice. Two neonates with mild thrombocytopenia and two neonates with severe thrombocytopenia died. Thirty six (83.7 %) neonates with mild thrombocytopenia recovered and were discharged while 16(72.7%) among moderate thrombocytopenia and five (55.6%) among severe thrombocytopenia were improved and discharged.

DISCUSSION

Neonatal thrombocytopenia is a commonly encountered problem in all NICUs. The incidence varies significantly, depending on the population studied. In the present study, frequency of neonatal thrombocytopenia was 74 (18%) in our NICU which is comparable to a study conducted by Eslami et al. where the incidence of neonatal thrombocytopenia was 28.5%⁹ and yet another study by Henry et al. on 807 neonates admitted in NICU of MC Master University in Canada, showed 22% of neonates were thrombocytopenic.¹⁰ On the other hand, in a study that performed by Naguri et al on 258 neonates in NICU, 70% was thrombocytopenic. In another study, in Nigeria by Jeremiah et al. on 132 neonates that admitted in NICU, 53% were thrombocytopenic.¹¹ But in another study in Indonesia the incidence of thrombocytopenia was lower. In this study that was conducted by Kusamsari et al. 12% of neonates in NICU were thrombocytopenic.¹²

In our study, 91.8 % of neonates were early onset thrombocytopenia, and 8.2 % were late onset

thrombocytopenia where as in a similar study of Jeremiah et al. 84.4% were early onset thrombocytopenia and 15.6% late onset thrombocytopenia.¹¹ In contrast with finding of Henry, our study showed that 58.1 % of neonates had mild thrombocytopenia, and 29.7 % had moderate and 12.2 % of them had severe thrombocytopenia. In their study, 42% of neonates had mild thrombocytopenia, 38% and 20% of them had moderate and severe thrombocytopenia, respectively. Compared to their findings, the number of patients with severe thrombocytopenia was lower in our study.¹⁰ Similar to other studies we did not find any significant differences in the incidence of thrombocytopenia in both genders.^{9,13,14,15}

Among the maternal risk factors contributing for neonatal thrombocytopenia our study showed that 89.2% had no any maternal risk factors contributing to neonatal thrombocytopenia while 9.5% had pregnancy induced hypertension and only 1.2% had history of maternal diabetes. Whereas in a similar study by Eslami et al. 46.4% had pregnancy induced hypertension and 32.1% gestational DM as maternal risk factors.⁹

Among the neonatal risk factors our study showed 27% neonates had early onset neonatal sepsis while only 2.7% had late onset neonatal sepsis. 35.1% had asphyxia and 9.5% were IUGR babies. In a similar study by Eslami et al. 31.9% had neonatal sepsis, 20.8% were IUGR and 13.9% had asphyxia as neonatal risk factors.⁹

In contrast to our study where only 4.05% neonates required platelet transfusion in a study done by Imene et al in Tunis showed 74% neonates requiring platelet transfusions. In their study mortality was high accounting 21% whereas our study showed only 5.04% neonatal deaths. The high frequency of neonatal deaths was contributed due to other associated factors like very low birth weight, prematurity and nosocomial sepsis along with severe thrombocytopenia.¹⁶

CONCLUSION

Neonatal thrombocytopenia is an important clinical problem in NICU. It is important to look for and appropriately manage thrombocytopenia even in apparently low risk neonates as it can lead to the preventable deaths in hospitalized neonates. We also found definite maternal and neonatal factors associated with neonatal thrombocytopenia in our setting.

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