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Research Paper

Maternal and Neonatal Factors Causing Thrombocytopenia in Neonates Admitted To Nicu During 2013-2014

Medical Science

KEYWORDS :

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ABSTRACT

Background : Thrombocytopenia is the most common hematological abnormality which is encountered in the neonatal intensive care unit (NICU). The incidence in neonates varies greatly, depending upon the population studies. According to the frequency of thrombocytopenia and its complications, this study was performed on neonates admitted to A.J Institute of Medical Sciences-NICU from August 2013-August 2014.

Materials and Methods : In a retrospective study, 250 neonates who were admitted to NICU were enrolled in the study. They were categorized to three groups regarding platelet count: mild, moderate and severe thrombocytopenia. Incidence of thrombocytopenia was determined and contribution of variables such as sex, gestational age, intrauterine growth retardation, asphyxia, sepsis, necrotizing enterocolitis, blood group, placental insufficiency in Gestational Diabetes Mellitus (GDM) and hypertension (HTN) were analyzed.

Results : Neonatal thrombocytopenia was found in 91(36.4%) of 250 subjects, consisted of 77.3% early onset and 22.7% late onset, which most of them had mild and moderate thrombocytopenia. Thrombocytopenia was associated with sepsis, intrauterine growth retardation sepsis, asphyxia, Gestational Diabetes Mellitus, maternal hypertension and prematurity. There was no relation between occurrence of thrombocytopenia and gender.

Conclusion : The incidence of neonatal thrombocytopenia was 36.4 %. Significant maternal risk factors that lead to thrombocytopenia were Hypertension and preeclampsia, while risk factors of neonates were asphyxia, sepsis and Intra Uterine Growth Retardation.

Introduction

Neonatal thrombocytopenia (platelets <150 ×109/litter) is one of the most common hematological abnormalities in neonates occurring in 1 to2% of healthy term neonates. The preterm or sick neonates tend to develop thrombocytopenia. Among these neonates, the incidence of thrombocytopenia is 18 to 35% (1, 2). Of neonates admitted to neonatal intensive care units (NICUs), the platelet count drops below 150 ×109/L in one in four babies and to below 50 × 109/L in one in twenty (3). A large population studies showed that more than 98% of term neonates born to mothers with normal platelet counts have platelets above 150 × 109/L at birth (4, 5). There is a newer classification of Neonatal thrombocytopenia (NT) based on the timing of onset of thrombocytopenia (early, within 72 h of birth versus late, after 72 h of life). These are more useful for neonatal clinicians and will help to facilitate systematic studies to improve the management of NT. Early onset thrombocytopenia is commonly associated with pregnancy complications such as intrauterine growth restriction, HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), 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. NT occurs in a large proportion of preterm infants, although the thrombocytopenia is self-limiting. It usually disappeares within 10 days (6,7). The most common causes of late NT are sepsis and necrotizing enterocolitis (>80% of cases) (8,9). This form of NT which usually develops very rapidly over 1 to 2 days, is often very severe (platelets <30 × 109/L) and takes 1 to 2 weeks to recover. Such babies frequently require repeated platelet transfusion (8). 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 ×109/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). Thus, appropriate diagnostic and therapeutic management is necessary to prevent death or neurological sequelae in the severely thrombocytopenic neonate. Hence, current study was undertaken to evaluate the prevalence and causes of thrombocytopenia in neonates.

Materials and Methods

A retrospective study was conducted on 250 neonates who admitted to NICU A.J Institute of Medical Sciences,Mangalore. Blood samples were obtained for platelet (PLT) counts and preparation of blood smear slides. Informed consent forms were obtained from mothers of neonates with thrombocytopenia. These forms included maternal and neonatal information.Maternal information were about diabetes, hypertension, eclampsia and Preeclampsia, autoimmune disease, drug history during pregnancy and RH blood groups. Neonatal information were about gestation age, IUGR (intera uteruine growth retardation), asphyxia, sepsis, RH blood groups, chief complain and final diagnosis during admission. PLT counting was performed on ethylene diamine tetra acetate- anticoagulated blood with a standard automatic blood cell counter.

Thrombocytopenia was defined as PLT counts of lower than 150 × 109 per L, whereas moderate and severe thrombocytopenia was defined as less than 100 × 109 and fewer than 50 × 109 per L .Early thrombocytopenia was defined from birth to 72hr and late after 73hr of birth.

Statistical Analysis

The data was summarized and analyzed using SPSS 14.0 statistical software. Student's t-test and chisquare test were used to analyze. The results were expressed as means and standard deviations. A Pvalue of less than 0.05 was taken as significant.

Results

We recorded that, during the 1-year period, 250 neonates were admitted at the NICU of A.J Institute of Medical Sciences. Ninety one (36.4%) of cases were thrombocytopenia. Ninety one blood samples were suitable for the study, representing 51(56%) of neonates were female and 41(45%) male. Forty eight cases (52.7%) of patient had mild and 40 cases (43.9%) moderate and 3 (3.29%) of the neonates were severe thrombocytopenia. 70 (77.3%) patients were with early onset and 21(22.7%) cases were with late

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onset of thrombocytopenia. Thirty eight (54.2%) of with early onset thrombocytopenia were mild and 32(45.7%) were moderate. None of them was severe thrombocytopenia.

In the late thrombocytopenia group, 42(49.4%) were mild and 14(66.7%) moderate, and 3(14.3%) were severe thrombocytopenia. (P-value=0.112) The most common maternal factor was maternal hypertension (46.4%) and the most common neonatal factor was sepsis. Thrombocytopenia was present in 56(61.5%) of preterm and 35(38.4%) of term neonates.

MATERNAL RISK FACTOR	FREQUENCY	
	N	%
HYPERTENSION	13	46.4
GESTATIONAL DIABETES MELLITUS	9	32.1
GDM+HYPERTENSION	3	3.6
ECLAMPSIA	2	7.1
ITP	1	3.6

NEONATAL RISK FACTOR	FREQUENCY	
	N	%
SEPSIS	23	31.9
IUGR	15	20.8
ASPHYXIA	10	13.9
ASPHYXIA+IUGR	5	6.9
SEPSIS+IUGR	2	2.8
ASPHYXIA+SEPSIS	1	1.4
NEC	2	2.8
ABO	3	4.2
OTHER	11	15.3

Discussion

Thrombocytopenia affects 22 to 35% of infants admitted to the neonatal intensive care unit. Multiple diseases can cause neonatal thrombocytopenia and these can be classified as that inducing early thrombocytopenia (≤72 h of life) and those inducing late-onset thrombocytopenia (N≥72 h) (11).The incidence of thrombocytopenia in neonates varies significantly, depending on the population studied. In this review, we found 91 (36.4%) neonates in NICU that were thrombocytopenic. In a similar study which was conducted by Henry E and coworkers on 807

neonate admitted in NICU of MC Master University, 22% of neonates were thrombocytopenic(12).

On the other hand, in a study that performed by Naguri MH and coworkers on 258 neonates in NICU, 70% was thrombocytopenic. In an other study, in Nigeria by Jeremiah Z and coworkers on 132 neonates that admitted in NICU, 53% were thrombocytopenic (14). But in another study in Indonesia the incidence of thrombocytopenia was lower. In this study that was conducted by Kusamsari N and coworkers 12% of neonates in NICU were thrombocytopenic (15). In our study, 77.3% of neonates were early onset, and 22.7% were late onset. This is similar to study of Jeremiah Z et al. In their results 84.4% were early onset and 15.6% late onset (14). In contrast with finding of Henry E, our investigation showed that 52.7% of neonates had mild thrombocytopenia, and 43.9% had moderate and , 3.2% of them had severe thrombocytopenia. In their study, 42% of neonates had mild thrombocytopenia, 38% and 20% of them had moderate and sever thrombocytopenia, respectively. Compared to their findings, the number of patients with severe thrombocytopenia was lower in our study (12). Similar to other studies we did not find any significant differences in the incidence of thrombocytopenia in both genders (16,17,18,19).

This study showed, the most common maternal factors were hypertension and diabetes, that caused early onset thrombocytopenia while neonatal factors were asphyxia, sepsis and IUGR .Although NEC had low frequency, it could cause severe thrombocytopenia. This is similar to finding of Robert I et al. They reported hypoxia, diabetes, hypertension and IUGR which caused early onset thrombocytopenia, and ABO incompatibility and NEC as late onset thrombocytopenia (18).

Conclusion

Neonatal thrombocytopenia is a common clinical problem in NICU. We ensure accurate diagnosis and to determine the most maternal and neonatal factors can reduce neonatal mortality and morbidity.

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