ISSN: 0975-1556

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2021; 13(6); 70-75

Original Research Article

To Assessment of Neonatal Thrombocytopenia and Identification of Neonatal Thrombocytopenia Risk Factors and Clinical Study

Dinesh Kumar Rajak[1], Alka Singh[2]

[1]Assistant Professor, Department of Pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India

[2]Professor, Department of Pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India

Received: 03-07-2021 / Revised: 20-08-2021 / Accepted: 17-09-2021
Corresponding author: Dr. Alka Singh
Conflict of interest: Nil

Abstract

Aim: The aim of the study to evaluate the incidence of thrombocytopenia in neonates. To identify associated risk factors with the neonatal thrombocytopenia and clinical impact of thrombocytopenia. **Material and methods:** The Prospective study, which was carried in the Department of Pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India, for the period of 1 year. Total 100 patients who had Platelet count of less than 1,50,000/cu mm was taken for determining thrombocytopenia and Babies having significant birth asphyxia were included in this study. **Results:** The incidence of neonatal thrombocytopenia in this study was 30.77%. Male preponderance was seen with 65% male babies admitted in NICU while female babies were about 35 %. About 45 cases (45%), showed Moderate Thrombocytopenia in neonates. 35 cases (35%) showed severe Thrombocytopenia in neonates. About 20 cases (20%) showed mild Thrombocytopenia in neonates. Early onset thrombocytopenia (<3days of age) was seen in 64% and late onset thrombocytopenia (3-28 days) in 36%. 69% of babies born during less than 36 weeks of gestation showed lower platelet count. Out of 69 cases born < 36 weeks, 18 cases with weight is < 1 kg and 51 cases with 1.5 -2.4 kg weight. Out of 31 cases born during gestational period 36- 38 weeks, 26 cases showed 2.5 kg and 5 cases 1.5 kg. 69% were preterm babies. Among 100 thrombocytopenic neonates, sepsis was observed in 64%. 32% of neonates had history of pregnancy induced hypertension in mothers. **Conclusion:** The neonatal thrombocytopenia incidence was 30.77%. There were more premature neonates of thrombocytopenia induced by sepsis.

Keywords: Neonatal Thrombocytopenia, Sepsis, Premature Neonates.

Introduction

Thrombocytopenia is the commonest haematological abnormality encountered in neonatal intensive care unit (NICU), the incidence of which varies greatly, depending upon the studied population[1,2].Healthy fetuses and neonates at gestational ages ≥22 weeks have platelet counts within the normal range for adults (150– 450×109 /L)[2,3]. Neonatal thrombocytopenia is defined as a platelet count less than 150×109 /L regardless of gestational age[2,3,4]. However, platelet counts in the range of

100–150×109 /L is somewhat more common among healthy neonates. Thrombocytopenia exists in 1–5% of newborns at birth and severe thrombocytopenia occurs in 0.1–0.5%[5]. Thrombocytopenia is present in 22 to 35% of all newborns admitted to NICU and in up to 50% of those admitted to NICUs who need intensive care[2,4,5]. The majority of neonates will have mild or moderate thrombocytopenia and about 20% of neonates have severe thrombocytopenia (72 hour)[2]. The important causes of thrombocytopenia in neonates are infections, birth asphyxia, preterm, intrauterine growth retardation, hyperbilirubinemia, respiratory distress syndrome, meconium aspiration syndrome and low birth weight. Apart from platelet counts, bleeding manifestations depend on underlying ailments[1,6,7]. Early onset neonatal thrombocytopenia occurs commonly in NICU population regardless of gestational age with a benign course and a predictable outcome[5,8]. Late onset thrombocytopenia is typically more severe than early onset disease[9]. Detection of thrombocytopenia is a useful initial assessment for sick neonates and it is considered as one of the complication of the disease process, but in some cases thrombocytopenia is detected accidentally[10]. Though thrombocytopenia is so prevalent it is often ignored in the assumption that it will resolve spontaneously. However, if it is not detected and managed properly can result in devastating complications. The aim of the study to evaluate the incidence of thrombocytopenia in neonates. To identify associated risk factors with the neonatal thrombocytopenia and clinical impact of thrombocytopenia.

Material and methods

The Prospective study, which was carried in the Department of pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India, for the period of 1 year, after taking the approval of the protocol review committee and institutional ethics committee. A total of 100 high risk neonates who were admitted in NICU during this period were included in the study.

Methodology

Demographic Data of neonates were included i e, age, sex, gestational age, and birth weight. Information regarding the clinical history of neonate, e.g., sepsis, renal failure, ventilator assistance, birth asphyxia (delayed cry), gastrointestinal problems, and medications were noted. The maternal data included age, parity, pregnancy related complications, antenatal findings in ultrasound, perinatal events and any other associated illness were included. The data related to transfusion consisted of frequency and volume of transfused platelets or other components. Platelet counts were done on the first, third and fifth day of admission and thereafter every 72 hours till counts were normal. Blood Samples were collected by a trained technician. Blood Samples were sent to haematology lab. Low counts were collaborated with a peripheral blood smear. The various grades of thrombocytopenia are: mild (100,000-150,000 per cu mm), moderate (50,000- 100,000 per cu mm) and severe (<50,000 per cu mm). Some authors categorize platelet counts less than 30,000 per cu mm as severe thrombocytopenia[11].

Inclusion Criteria

- Platelet count of less than 1,50,000/cu mm was taken for determining thrombocytopenia.
- Babies having significant birth asphyxia (requiring resuscitation for > 30 seconds)
- low birth weight babies (birth weight < 2.5 kg)

Exclusion Criteria

- Babies having thrombocytopenia and died
- Babies admitted in NICU with normal platelet count

Results

About 100 cases of thrombocytopenia were included in the study. The incidence of neonatal thrombocytopenia in this study was 30.77%. Male preponderance was seen with 65% male babies admitted in NICU while female babies were about 35 % (table 1)

Table 1: Sex–wise distribution of cases

Sex	**No. of cases**	**%**
Males	65	65
Females	35	35
Total	**100**	**100**

About 45 cases (45%), showed Moderate Thrombocytopenia in neonates. 35 cases (35%) showed severe Thrombocytopenia in neonates. About 20 cases (20%) showed mild Thrombocytopenia in neonates. table 2.

Table 2: Type of Thrombocytopenia

Platelet count	**No. of cases**	%
Mild Thrombocytopenia (100,000-150,000 per cu mm)	20	20
Moderate Thrombocytopenia (50,000-100,000 per cu mm)	45	45
Severe Thrombocytopenia (<50,000 per cumm)	35	35
Total	**100**	**100**

Early onset thrombocytopenia (< 3days of age) was seen in 64% (64/100) and late onset thrombocytopenia (3-28 days) in 36% (36/100). 69% (69/100) of babies born during less than 36 weeks of gestation showed lower platelet count. Out of 69 cases born < 36 weeks, 18 cases with weight is < 1 kg and 51 cases with 1.5 -2.4 kg weight. Out of 31 cases born during gestational period 36- 38 weeks, 26 cases showed 2.5 kg and 5 cases 1.5 kg. (Table 3 & Table 4).

Table 3: Platelet count in relation to birth weight of neonates.

Weight in kg	**No. of cases**	**%**
<1kg	18	18
1- 2.4 kg	56	56
>2.5 kg	26	26
Total	**100**	**100**

56% of the neonates weighed between 1- 2.4 kg.

Table 4: Platelet count in relation to gestational age

Gestational age	**No. of cases**	**%**
Preterm (< 36 weeks)	69	69
Normal gestational age (36-38 weeks)	31	31
Total	**100**	**100**

69% were preterm babies. Among 100 thrombocytopenic neonates, sepsis was observed in 64% (Table 5). About 36 cases with neonatal thrombocytopenia showed pregnancy induced hypertension in their antenatal history.

.

Table 4: Risk factors associated with neonatal thrombocytopenia

Risk factors	No. of cases	%
Neonatal sepsis	64	64
Birth asphyxia	18	16.7
Neonatal respiratory distress syndrome	18	16.6
Total	**100**	**100**

A common haematological abnormality encountered in NICU is neonatal thrombocytopenia. There are many predisposing factors for thrombocytopenia and they interact in a complex manner to cause thrombocytopenia. This study included 100 neonates admitted in NICU. Gupta, et al studied a total of 870 neonates who were admitted in Neonatal Intensive Care Unit (NICU). Out of 870 cases 146 cases showed decreased platelet count[12]. This study showed male preponderance with 65 (65%) males and 35 (35%) females. Anubha Sharma et al study population comprised 84 males and 16 females[13]. Bhat YR et al showed that 57.7% of thrombocytopenia was associated with the male gender[14]. In this study 69% of preterm babies developed thrombocytopenia while Beiner ME et al showed that 31% of preterm babies developed thrombocytopenia[15]. Anubha Sharma et al reported 58.2% preterm babies developed thrombocytopenia[16].

Thrombocytopenia in neonates is associated with a wide variety of factors, including prematurity and low birth weight, small for gestational age, sepsis, hypotension, necrotizing enterocolitis, asphyxia, thrombi and exchange transfusions[16-19].

According to Western medical literature, prematurity, IUGR and birth asphyxia were the common causes for neonatal thrombocytopenia whereas in our study septicaemia was the common cause[20,21]. In this study thrombocytopenia was observed in 56% in low birth weight babies of weight being 1.5-2.4 kg and 18% of the extremely low birth weight (ELBW) population Christensen RD et al observed thrombocytopenia in 73% of the extremely low birth weight (ELBW) population, being more common in the neonates with birth weight <800g[22].

Thrombocytopenia was observed in 64% of septic neonates while Gupta AK et al observed that 81.5% of septic neonates developed thrombocytopenia[23]. Gupta AK et al observed that 43% of thrombocytopenic neonates had respiratory risk factor[23]. The mechanism by which septicemia leads to thrombocytopenia is by decreased platelet production as well as increased platelet consumption and sequestration in the enlarged spleen usually resulting in severe thrombocytopenia. This difference may be due to the higher incidence of septicemia in our extramural admissions which warrants the need for strict aseptic precautions while conducting deliveries as well as in handling the newborn babies. Sepsis also causes DIC, immune-mediated destruction and decreased production of platelets from infected marrow[24].

32% of neonates had history of pregnancy induced hypertension in mothers. Bhat YR et al observed that 36% of neonates born to mothers with Pregnancy induced hypertension had thrombocytopenia[14]. Although not much studies on platelet count in sepsis, yet it has well been described for more than 40 years that patients with sepsis often have thrombocytopenia and the intravenous injection of lipopolysaccharides in mice induce rapid thrombocytopenia. All sepsis agents can cause thrombocytopenia in newborn. Platelets are believed to be active participants in host defence. Diffuse endothelial cell trauma, bacterial, fungal toxins, increased platelet activation and increased platelet consumption due to DIC

are among the factors that play a role in the mechanism of thrombocytopenia. Lipopolysaccharide, which is a component of cell wall of gram-negative organisms, leads to thrombocytopenia. Lipid – A, a component of lipopolysaccharide, increases the consumption[25].

Conclusion

The neonatal thrombocytopenia incidence was 30.77%. There were more premature neonates of thrombocytopenia induced by sepsis.

Reference

1. Gupta A, Mathai SS and Kanitkar M. Incidence of thrombocytopenia in neonatal intensive care unit. Medical journal armed forces India. July 2011; 67(3): 234-6.
2. Roberts I, Stanworth S, Murray NA. Thrombocytopenia in neonates. Blood Review. 2008; 22:173-86.
3. Sola-Visner M, Saxonhouse MA and Brown RE. Neonatal thrombocytopenia: what we do and don't know. Early Human Development. 2008; 84: 499-506.
4. Eslami Z, Lookzadeh MH, Noorishadkam M, Hashemi A, Ghilian R and Phir Dehghan A. Thrombocytopenia and associated factors in neonates admitted to NICU during years 2010-2011. Iran J Ped Hematol Oncol. 2013; 3(1):205-15.
5. Roberts I, Murray NA. Neonatal thrombocytopenia: causes and management. Arch Dis Child Fetal Neonatal Ed. 2003; 88: 359-64.
6. Aman I, Hassan KA and Ahmad TM. The study of thrombocytopenia in sick neonates. J Coll Physicians Surg Pak. May 2004; 14(5): 282-5.
7. Modanloud HD, Ortiz O and Gluck L. Thrombocytopenia in neonatal sepsis: Time relationship between clinical signs, detection of thrombocytopenia and positive blood culture. Pediatric Research. 1977; 11: 503.
8. Ghamdi AM, Umran KA and Buali WA. A practical approach to assessment of neonatal thrombocytopenia in NICU. Journal of Neonatal-Perinatal Medicine. 2008; 1(3): 175-80.
9. Holzhaur S and Zieger B. Diagnosis and management of neonatal thrombocytopenia. Seminar in fetal and neonatal medicine. 2011; 16: 305-10.
10. Wong W and Glader B. Approach to newborn who has thrombocytopenia. NeoReviews. 2004; 5(10): 444-9.
11. Groves A, Kuschel C. NW Newborn Clinical Guideline: Neonatal Thrombocytopenia.
12. Anil K. Gupta, Sudarshan Kumari, Abhishek Singhal, and Aruna Bahl Neonatal thrombo- cytopenia and platelets transfusion. Asian journal of transfusion science Asian J Transfus Sci. 2012 Jul-Dec; 6(2): 161–164.
13. Anubha Sharma1, Karuna Thapar. A prospective observational study of thrombo- cytopenia in high risk neonatesin a tertiary care teaching hospital,Sri Lanka Journal of Child Health, 2015: 44(4): 213-219.
14. Bhat YR, Cherian CS. Neonatal thrombocytopenia associated with maternal pregnancy induced hypertension. Indian J Pediatr. 2008 Jun;75(6):571-3.
15. Beiner ME, Simchen MJ, Sivan E, Chetrit A, Kuint J, Schiff E. Risk factors for neonatal thrombocytopenia in preterm infants. Am J Perinatol. 2003 Jan;20(1):49-54.
16. Roberts I, Stanworth S, Murray NA. Thrombocytopenia in the neonate. Blood Rev. 2008 Jul;22 (4):173-86.
17. Christensen RD. Advances and controversies in neonatal ICU platelet transfusion practice. Adv Pediatr. 2008; 55:255-69.
18. Het Kwaliteitsinstituut voor de Gezondheidszorg CBO: CBO-richtlijn bloed- transfusies. Alphen aan den Rijn, Van Zuiden Communications B.V 2004, 247-257.
19. Bonifacio L, Petrova A, Nanjundaswamy S, Mehta R.

Thrombocytopenia related neonatal outcome in preterms. Indian J Pediatr. 2007 Mar;74 (3): 269-74.
20. Andrew M, Castle V, Saigal S, Carter C, Kelton JG. Clinical impact of neonatal thrombocytopenia. J Pediatr. 1987 Mar;110(3): 457-64.
21. I Roberts and N Murray, Neonatal thrombocytopenia: causes and management, Arch Dis Child Fetal Neonatal Ed. 2003 Sep; 88(5): F359–F364.
22. Christensen RD, Henry E, Wiedmeier SE, Stoddard RA, Sola-Visner MC, Lambert DK, Kiehn TI, Ainsworth S. Thrombocytopenia among extremely low birth weight neonates: data from a multihospital healthcare system. J Perinatol. 2006 Jun;26(6):348-53.
23. Gupta AK, Kumari S, Singhal A, Bahl A. Neonatal thrombocytopenia and platelets transfusion. Asian J Transfus Sci. 2012 Jul;6 (2): 161-4.
24. Zipursky A, Palko J, milner R et al. The haematology of bacterial infections in premature infants. Pediatrics, 1976; 57:838- 41.

Parvez Ahmad, Rajnesh Kaith, Imran Gattoo, Bilal Ahmad Najar, Sheikh Quyoom Hussain. Thrombocytopenia as A Predictor of Neonatal Sepsis in Very Low Birth Weight Babies and Its Correlation with Specific Organism Involved: A Hospital Based Observational Study.Indian Journal of Neonatal Medicine and Research. 2015 Jul, Vol- 3 (3): 7-13.