

Frequency of Thrombocytopenia in Neonatal Sepsis

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ABSTRACT

Objective: To determine the frequency of neonatal thrombocytopenia among patients presented with sepsis at tertiary care Hospital.

Methodology: This cross-sectional study was conducted at the Department of pediatrics SKBZ/CMH Muzaffarabad, during six months from September 2018 to March 2019. All the diagnosed septic neonates, age < 28 days and either gender were included. Their basic demographic data like age and gender, along with their contact details were taken. The sample of blood was sent in blood culture bottles to hospital laboratory to confirm bacterial growth, that was diagnosed as sepsis. Blood sample was sent to the hospital also to diagnose thrombocytopenia. Reports were consulted by the pathologist. All the data were collected by a structured study proforma. All data were entered and analyzed with the help of SPSS version 22.

Results: The mean age of patients was 8.92 ± 5.40 days with minimum and maximum age as 1 and 27 days. There were 117(47.56%) males and 129(52.44%) female cases. A total of 40(16.26%) cases had their maternal hypertension, 54(21.95%) neonates had gram + and 157(63.82%) neonates had Gram negative. A total of 63(25.61%) cases had thrombocytopenia while 183(74.39%) neonates were seen without thrombocytopenia. The frequency of thrombocytopenia was statistically insignificant according to gender and types of culture ($p > 0.05$).

Conclusion: It is concluded that frequency of thrombocytopenia in neonatal sepsis was found in a quarter of the cases. In neonatal sepsis, thrombocytopenia must be ruled out at patient's presentation and must be treated as early as possible as thrombocytopenia is an independent risk factor for sepsis-associated mortality.

Keywords: Incidence, thrombocytopenia, neonatal sepsis

INTRODUCTION

Thrombocytopenia, described as the lower platelet count $<150 \times 10^3/L$, is a common complication in neonatal intensive care units, compromising the clinical course in 22–35 percent of these admissions.¹ Thrombocytopenia and alterations in platelet indices are common in newborns with sepsis. MPV, PDW, and PCT are three significant platelet indices that can be used in therapeutic settings. If carefully evaluated, platelet indices can be useful in the diagnosis and follow-up of sepsis, including measuring the response to antimicrobial treatment.² It is a leading cause of the mortality and the morbidity among sick pre-term and full-term infants, accounting for 20 to 40% of babies admitted to Neonatal Intensive Care Units (NICU).³ Bacteria and the products of the bacteria can cause of damage of endothelial cells, causing platelet adhesion and aggregation, or they can bind to platelets directly, causing aggregation and rapid clearance by circulation.³ Thrombocytopenia was more common and lasted longer with Gram-negative and fungal infections. Thrombocytopenic newborns had a higher rate of persistent bacteremia, multi-organ failure, and mortality. Sepsis is one of the most common causes of thrombocytopenia among neonates, and thrombocytopenia can progress quickly, with the lower platelet count occurring within 24–48 hours of infection.⁴ In newborn sepsis, thrombocytopenia substantially quadruples the chance of death. A total of 460 of 6551 newborns were found to have sepsis. In 20% of septic neonates (92/460), severe thrombocytopenia (platelets $50 \times 10^9 /L$) developed.⁵

The rationale of this study is to find the frequency of thrombocytopenia in neonatal sepsis, an association of thrombocytopenia with sepsis can help in early detection of the severity of sepsis and prompt management. Thrombocytopenia is a common complication of sepsis among neonates and is one of the most reliable, independent risk factors for sepsis-related mortality.⁵ Few studies are available in our population, so there is a need to investigate for the parameter for prompt treatment. Hence, this study has been done to evaluate the frequency of neonatal thrombocytopenia among patients presented with sepsis at tertiary care Hospital.

MATERIAL AND METHODS

This cross-sectional study was conducted at the Department of paediatrics SKBZ/CMH Muzaffarabad. Study was conducted during six months from September 2018 to March 2019. Non-probability consecutive sampling was used. A total of 246 cases were taken; the sample is calculated using 20% frequency of thrombocytopenia in neonatal sepsis,⁵ with 95% confidence level and 5% margin of error. All the diagnosed septic neonates, age < 28 days and either gender were included. All neonates with other causes of thrombocytopenia, like fetal/neonatal alloimmune thrombocytopenia (FNAITP) or maternal immune thrombocytopenic purpura (ITP), congenital anomalies, hyaline membrane disease, hypoxic-ischemic encephalopathy and probable blood culture contamination (CRP $>10\text{mg/L}$ during a sepsis episode) were excluded. All data were taken after taking informed consent. Their basic demographic data like age and gender, along with their

contact details were taken. The samples of blood were sent to Hospital laboratory in blood culture bottle, to the assessment of bacterial growth, that was diagnosed sepsis as per operational definition. Blood sample was sent to the Hospital also to diagnose thrombocytopenia. Reports were consulted by the pathologist. All the data was collected by a structured study proforma. All data were entered and analyzed with the help of SPSS version 22.

RESULTS

A total of 246 septic neonates were studied, their mean age was 8.92 ± 5.40 days with minimum and maximum age as 1 and 27 days. There were 117(47.56%) males and 129(52.44%) female cases. Out of all 54(21.95%) neonates, gram + and 157(63.82%) neonates had Gram-negative culture. Table.1

A total of 63(25.61%) cases had thrombocytopenia while 183(74.39%) neonates were found with normal levels of platelets. Fig-1

Among cases that were <14 days old, 45(23.2%) had thrombocytopenia and among cases that were 14-28 days, 18(34.6%) had thrombocytopenia. The frequency of thrombocytopenia was statistically insignificant according to gender and type of culture, p-values were insignificant. Table.2

Table 2. Descriptive statistics of demographic characteristics n=246

Variables		Statistics
Age (days)		8.92+5.40
Gender	Males	117(47.56%)
	Females	129(52.44%)
Gram positive	Yes	54(21.95%)
	No	192(78.05%)
Gram negative	Yes	157(63.82%)
	No	89(36.18%)

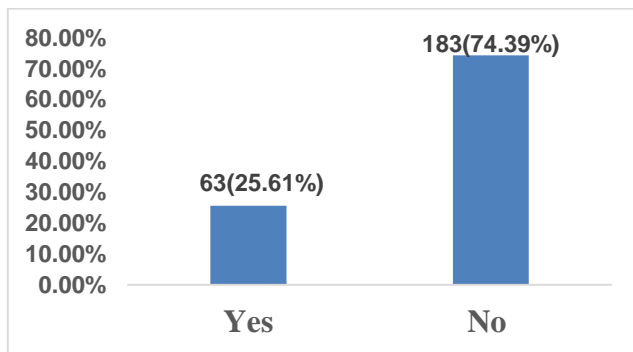


Fig:1: Frequency of thrombocytopenia among septic neonates n=246

Table.2 frequency of thrombocytopenia according to gender and type of culture n=246

Variables	Thrombocytopenia		p-value
	Yes	No	
Gender	Males	30	0.991
	Females	33	
Gram positive Culture	Yes	18	0.141
	No	45	
Gram negative Culture	Yes	35	0.113
	No	28	

DISCUSSION

In newborns, thrombocytopenia is a common issue. Thrombocytopenia has recently attracted a lot of attention, particularly the link between clinically severe bleeding and platelet count. Sepsis is one of the commonest causes of thrombocytopenia among neonates, and thrombocytopenia can progress quickly, with the lower platelet count occurring within 24–48 hours of infection.⁶ The importance of the relationship between sepsis the thrombocytopenia was emphasized by identifying thrombocytopenia as a commonest predictive, independent risk factors for neonatal sepsis linked mortality among severely low-birth weight neonates.⁷ in this study thrombocytopenia was found 25.61% out 246 septic neonates. Consistently Ahmad MS et al⁸ demonstrated that the frequency of thrombocytopenia was 116 (24.7%) in neonates of sepsis. Although Addil F et al⁹ found higher frequency of thrombocytopenia among neonates with sepsis as 68.9%, while Ree IM et al⁵ found a lower frequency of severe thrombocytopenia in neonates with sepsis as 20%. Although Sindhura YS et al¹⁰, observed very high incidence of thrombocytopenia among neonates of sepsis. Above the variation in the frequency may be because of a valuable difference in sample size of the studies and may be because of environmental variation or care of the neonates after delivery. The clinical and the pathogenic variations between the many causative bacteria, clinical syndromes, and manifestations of newborn sepsis should not be overlooked when considering sepsis as a single entity. Previous research has either identified no discernible difference in the prevalence and duration of thrombocytopenia in sepsis may be because of Gram negative or gram-positive organisms, or has found a higher frequency of thrombocytopenia in Gram negative sepsis.⁵ Consistently in this study, out of all 54(21.95%) neonates had gram positive and 157(63.82%) neonates had Gram negative culture. Similarly, Ree IM et al⁵ reported that the gram-negative sepsis was most common among 90% of the neonates of sepsis in contrast to gram-negative sepsis as 10%. Consistently Bhat S et al¹¹ demonstrated that thrombocytopenia was in 35 cases of Gram negative and in 15 cases of gram-positive sepsis. In the study of Bhat MA et al,¹² also reported that the Gram-negative sepsis was 71%, and Gram-positive sepsis was only 20%. In newborn sepsis, thrombocytopenia substantially quadruples the chance of death. Thrombocytopenia and Gram negative (as opposed to Gram positive) sepsis were independently linked with newborn death in a multivariate study. In newborn sepsis, thrombocytopenia raises the chance of death by roughly fourfold, with additional six-fold increase in mortality in Gram-negative sepsis.¹¹

In this study, mean age was 8.92 ± 5.40 days and male neonates were 117(47.56%) and 129(52.44%) were females. While inconsistently Addil F et al¹⁰ reported that the mean age of the neonates was 9.87 ± 7.68 days and males were in majority as 59.7% and females were 40.3%. On other hand Bhat Y R et al¹³ also found that males in majority 64.1% and females were 35.9%. Thrombocytopenia is a common hematological abnormality, often culminating in severe complications if not detected and managed properly.¹⁴ Neonates are

particularly vulnerable to infection because of weak immune barrier. Additionally, various risk factors have been discovered in both newborns and mothers that make them vulnerable to infections. For a better outcome, neonatal septicemia requires prompt, correct diagnosis and treatment.¹⁵ Although this investigation was limited to a single bacterial isolate, there may be other causes, such as those indicated above, that are linked to thrombocytopenia and do not demonstrate bacterial growth. Although large-scale studies still needed on this subject.

CONCLUSION

It was concluded that frequency of thrombocytopenia in neonatal sepsis was found in a quarter of the cases. In neonatal sepsis, thrombocytopenia must be ruled out at patient's presentation and must be treated as early as possible as thrombocytopenia is an independent risk factor for sepsis associated mortality.

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