Available online at www.ijmrhs.com

ISSN No: 2319-5886

International Journal of Medical Research and Health Sciences, 2023, 12 (5): 1-4

Association between Platelet to Lymphocyte Ratio to ROP in a Preterm Neonate in a Tertiary Centre in Northern India: A Retrospective Observational Study

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Received: 29-January-2023, Manuscript No. IJMRHS-23-88172; **Editor assigned:** 31-January-2023, Pre QC No. IJMRHS-23-88172 (PQ); **Reviewed:** 14-February-2023, QC No. IJMRHS-23-88172; **Revised:** 28-April-2023, Manuscript No. IJMRHS-23-88172 (R); **Published:** 12-May-2023

ABSTRACT

Objective: *To figure out association between Retinopathy of Prematurity (ROP) and Platelet to Lymphocyte Ratio (PLR).*

Methods: *A retrospective observational study was conducted, in tertiary care NICU where screening for ROP from January 2021 to December 2021 was done as per institutional protocol. Neonates who were born preterm ≤ 34 gestational weeks with ROP were enrolled as the observation group and neonates with no ROP were enrolled as the control group, whose complete blood cell were measured within the first 24 h of life. The levels of PLR were studied in all groups.*

Results: *In this study, 20 cases of ROP were enrolled and 20 cases of no-ROP as controls. The median PLR values were 75.99 (IQR, 50.43-87.11) in the ROP group and 69.24 (IQR, 55.52-88.12) in the non-ROP group, but the difference between groups was not statistically significant (P=0.104).*

Conclusion: *Our study has shown that higher PLR in preterm neonates admitted in NICU in first day of life can be evaluated as a biochemical marker for predicting ROP early.*

Keywords: Preterm, NICU, Platelet to lymphocyte ratio, Retinopathy of prematurity, Protocol

INTRODUCTION

ROP is one of the leading causes of morbidity in sick preterm [1]. Due to increased survival rate of NICU preemie patients in the last decades, newer diagnostic methods with improved sensitivity and specificity are necessary for the proper detection and prognosis of ROP [2]. So, both clinicians and researchers have made widespread efforts to identify biomarkers that predict progression of the disease, response to treatment and survival. Nevertheless, currently there are no suitable predictors that can be widely used in clinical settings, and therefore, better predictive

biomarkers, especially serum biomarkers for predicting the prognosis of various morbidities either BPD, NEC or it may be ROP are urgently needed to save guard these preemies from disability in adulthood.

LITERATURE REVIEW

Recently, more and more evidence showed that a systemic inflammatory response could play an important role in the development and progression of ROP [3-6]. It is well known that inflammation is closely related to different stages of ROP development, including initiation and progression to different stages. Systemic inflammation can be assessed by means of markers such as C-Reactive Protein (CRP), albumin, Neutrophil Lymphocyte Ratio (NLR) and Platelet Lymphocyte Ratio (PLR). Among these markers, PLR, a combination of circulating platelet and lymphocyte counts, represents systemic inflammation. Its laboratory significance is in under hot topic of research. And now, a series of studies have tried to find out the correlation between PLR and prognosis of ROP. However, according to their results, the current opinion on trole of PLR in ROP is still controversial. We therefore conducted this observational study in our tertiary care NICU to know about the association of PLR in ROP.

METHODOLOGY

This study was conducted in a medical college in a northern India. Data was collected from admission files of a premature infant who underwent ROP screening in the SMGS hospital GMC Jammu from January 2021 to December 2021. Infants without any other retinal disease and who gestational age less than 34 weeks or birth weight less than 2000 g were included in the study [7].

Neonates with blood culture proven sepsis, necrotizing enterocolitis and blood dyscariasis, and neonates who received a blood product transfusion or postnatal steroid therapy before the ROP screening were excluded. This study followed the medical ethics and to the declaration of Helsinki. ROP screening was performed on all infants according to the screening guidelines for ROP in India (RBSK). Initial screenings occurred at four to six weeks or 21 days after for an extreme preterm neonate after birth. All exams were performed by applying two drops of tropic amide 0.5% and phenylephrine 2.5% for dilating pupil. Ophthalmological examinations were performed using a RetCam III wide angle digital retinal imaging system after topical anaesthesia [8].

The ROP status of each infant was classified according to the international classification of ROP, including stage, zone, extent of disease and presence or absence of plus disease [9]. Each infant was classified according to the maximum stage of ROP observed in either eye. Among the screened premature infants, 20 infants without ROP were randomly selected as the control group and 20 infants with ROP were selected as the ROP group.

Other variables associated with ROP, such as birth weight, gestational age, sex, type of birth, and multiple pregnancies were also recorded. Patients with Hypoxic Ischemic Encephalopathy (HIE), Premature Rupture of Membranes (PROM), Respiratory Distress Syndrome (RDS), asphyxia neonatorum, were considered as have additional potential risk factors [10].

Whole blood samples were collected within the first 24 h of life, due to the potential need for blood transfusion later or the possibility of development of infection with or without sepsis [11].

All blood samples were evaluated within the first 24 h after birth. Peripheral venous blood (0.5 mL) was collected in EDTA tubes complete blood counts were evaluated by an automated haematology analyser (Sysmex XE-2100, Kobe, Japan).

Statistics

Continuous variables were presented as mean with standard deviation for normally distributed data or as medians and Interquartile Ranges (IQRs) for skewed data.

Dichotomous variables were presented as absolute counts and percentage and compared between groups by *Chi-square* statistical test. Exact P values <0.05 were considered statistically significant. All statistical analyses were performed using SPSS 22.0 (SPSS for Windows, version 22.0; SPSS, Inc., Chicago, IL, USA) [12].

RESULTS

In this study, 40 preterm infants who met the inclusion criteria were enrolled. Their birth weight ranged from 1150 g to 1900 g and gestational age ranged from 28 to 32 weeks. Of the 40 infants, 20 presented some form of ROP. The basic characteristics of premature infants in ROP group and non-ROP group are presented as, the mean birth weight was 1310 g ± 190 g (range, 1150 g-1570 g) and 1393 g ± 260 g (range, 1100 g-1900 g), respectively and mean gestational age in ROP group and non-ROP group was 28.88 ± 1.18 weeks (range, 27-31 weeks) and 29.70 ± 1.18 weeks (range, 28-32 weeks), respectively. However, there were no statistically significant differences in terms of gender, type of birth, multiple pregnancy, WBC count, platelet count, neutrophil count, lymphocyte count, monocyte count, HIE, PROM, RDS, asphyxia neonatorum and neonatal pneumonia ($P>0.05$) [13-15].

The median PLR values were 75.99 (IQR, 50.43-87.11) in the ROP group and 69.24 (IQR, 55.52-88.12) in the non-ROP group, but the difference between groups was not statistically significant ($P=0.104$).

DISCUSSION

PLR is indicator of systemic inflammation that has been validated as a prognostic predictor in some cancers and inflammatory processes [16]. Recent studies have shown that platelets play an important role in angiogenesis, fibrin formation and deposition, platelet parameters and changes in premature birth related diseases, such as sepsis and RDS [17,18]. This is the observational study that has specifically investigated the association of PLR in ROP in northern region of India. However, PLR is not found to be associated with the development of ROP in this study, which may be due to the small sample size. The mechanisms underlying the association between the PLR and ROP should be investigated in future studies.

CONCLUSION

Our study showed that higher PLR, measured initially in early life of preterm can be associated with ROP. Early detection of abnormal PLR levels can give some ray of hope of early predicting the nature of disease and its development. However, these findings should be precise and exercised in large prospective studies.

LIMITATION

Study participants constitute small sample size, to add on it is a retrospective observational study which has its own limitation. Further literature is needed to investigate the possible role of serum PLR levels and its association with ROP.

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