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CORRESPONDENCE

Platelet distribution width is a predictive marker for development of severe retinopathy of prematurity

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Introduction

The role of circulating blood cells and haematological parameters in the development of retinopathy of prematurity (ROP) is an issue of interest in recent times [1].

The aim of our study was to compare certain haematological parameters among infants with severe ROP, mild ROP and no-ROP, who were equivalent for gestational age (GA) and birth weight (BW).

Materials and methods

This study was confirmed by the institutional review board of Baskent University, Faculty of Medicine (KA 17/308) and adhered to the tenets of the Declaration of Helsinki. Study groups consisted of Type 1 (severe) ROP, treated with laser photocoagulation (Group 1, $n = 25$), spontaneously regressed mild ROP (Group 2, $n = 24$) and no-ROP (Group 3, $n = 23$). The study groups were formed from 'matchable' controls according to GA and BW. Haematological parameters were evaluated at the first 24 hours of life, and within one week of diagnosis for Group 1 and 2 and matched week for Group 3.

For statistical analysis, the MedCalcv19.2.6 software program (MedCalc, Belgium) was used. Kolmogorov–Smirnov test was performed to demonstrate the normal distribution of quantitative measurements. Chi-square was used to analyse categorical measures between the groups. ANOVA or Kruskal–Wallis tests were applied for comparison of quantitative measurements between the three groups. The probability of making a Type I error (alpha, significance) was 0.05 in all tests.

Results

Mean GA of the groups were 27 (±1.55), 27.3 (±1.23) and 27.5 (±1.20) weeks and mean BW of the groups were 979.2 (±269), 1012 (±168.7) and 1077 (±132.2) grams, and $P =$ 0.399 and 0.213, respectively.

Leukocyte count and platelet distribution width (PDW) at the week of delivery and PDW at the week of diagnosis were statistically significantly different among groups ($P = 0.006$, 0.016 and 0.049, respectively) (Tables 1 and 2). Thrombocytopenia rates were statistically significantly different among groups at the week of delivery (24%, 4.16% and 4.34%; $P = 0.039$), but not at the week of diagnosis (16%, 16.66% and 8.69%, respectively; $P = 0.145$).

Discussion

Several angiogenic factors comprising IGF-1 and VEGF are stored, transported and delivered by platelets [2]. Jensen et al. found association among thrombocytopenia and Type 1 ROP in earlier (GA weeks 24–34) though not later (GA weeks 35–38) terms of postpartum development as we found in our study [3].

Platelet distribution width indicates heterogeneity in platelet size and is thought to be a marker of platelet activation [4]. We found PDW measurements to be statistically significantly different among the groups at delivery and at the time of diagnosis. However, the significance was more prominent at delivery regarding to P values.

There is no study pointing out the importance of PDW measurements in ocular diseases, however, elevated PDW

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Table 1. Haematologic parameters of the study groups at the first week of delivery and *P* values of comparisons.

	Group 1 Severe ROP	Group 2 Mild ROP	Group 3 Non-ROP	*P* value
Hct (%)	47.8 ± 6.01	48.5 ± 5.78	47.2 ± 4.95	0.723
WBC (10^3/μL)	10.9 ± 5.36	7.29 ± 2.25	9.69 ± 4.75	0.016
Neutrophils(10^3/μL)	3.30 (1–13)	1.75 (1–3)	2.60 (1–12)	0.338[a]
Lymphocytes(10^3/μL)	5.60 ± 2.10	4.66 ± 1.68	5.69 ± 1.86	0.125
NLR	59.9 (14–260)	41.4 (14–100)	54.4 (11–400)	0.191[a]
Platelets(10^3/μL)	236.6 ± 91.9	239.6 ± 67.2	241.2 ± 68.8	0.978
MPV(fL)	9.16 ± 1.79	9.37 ± 1.55	9.78 ± 1.56	0.420
PDW	19 (10–64)	12 (10–68)	12 (10–61)	0.006[a]
PMI	2134.1 ± 879	2222.8 ± 639.6	2340.5 ± 722.7	0.641

[a]Kruskall–Wallis test.

ROP retinopathy of prematurity, *Hct* hemocrit, *WBC* white blood cells, *MPV* mean platelet volume, *PDW* platelet distribution width, *PMI* platelet mass index, *NLR* neutrophil/ leukocyte ratio.

Table 2. Haematologic parameters at the week of diagnosis for ROP groups and at the same weeks of matched non-ROP group and *P* values of comparisons.

	Group 1 Severe ROP	Group 2 Mild ROP	Group 3 Non-ROP	*P* value
Hct (%)	30.7 ± 4.67	28.9 ± 4.26	28.1 ± 3.67	0.103
WBC (10^3/μL)	9.90 (5–21)	10.30 (6–22)	9.60 (5–18)	0.872[a]
Neutrophils(10^3/μL)	2.40 (1–8)	2.0 (1–5)	1.6 (1–3)	0.314[a]
Lymphocytes(10^3/μL)	5.20 (3–13)	5.50 (1–10)	6.0 (3–10)	0.275[a]
NLR	49.3 (15–160)	45.2 (10–200)	27.0 (12–42)	0.106[a]
Platelets(10^3/μL)	283.1 ± 140.1	284.3 ± 125.2	352.7 ± 145.4	0.145
MPV(fL)	10.0 ± 1.73	11.1 ± 1.3	10.5 ± 1.8	0.071
PDW	34 (11–76)	15 (12–71)	15 (12–62)	0.049[a]
PMI	2743 ± 1251	3126 ± 1341	3615 ± 1522	0.096

[a]Kruskall–Wallis test.

ROP retinopathy of prematurity, *Hct* hemocrit, *WBC* white blood cells, *MPV* mean platelet volume, *PDW* platelet distribution width, *PMI* platelet mass index, *NLR* neutrophil/ leukocyte ratio.

was shown to be associated with seriousness of several diseases such as kidney disease, ischaemic coronary artery disease, pneumonia and cancer [5]. Between our homogeneous groups regarding GA and BW, we concluded that higher PDW serves as a marker of the severity of ROP.

Despite the small number of patients, we hope our results will give inspiration to the researchers about new molecules for treatment.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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