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Relationship Between Retinopathy Severity And Average Thrombocyte Volume
Purpose:

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Platelet activation is thought to play a role in the process of angiogenesis in the pathophysiology of retinopathy of prematurity (ROP) (Chu 2010). We aimed to investigate whether mean platelet volume (MPV), which is used to evaluate platelet activation, can be a marker for the diagnosis and treatment of ROP.

METHODS:
In our study, we evaluated infants who underwent ROP examination among infants born at 32 weeks or less and/or 1500 grams or less as well as infants who had more than these values but had a risky neonatal period. We used SAS University Edition 9.4 for statistical analysis. We divided the patients into two groups as those with and without ROP, and in those with ROP group, as requiring treatment and not-requiring treatment. We recorded the patients' identity, maternal characteristics, antenatal/natal/postnatal features, and complications during follow-up, ROP control times, and complete blood count parameters (platelet count, MPV, platelet count/MPV). Primarily, we evaluated the differences of platelet parameters, especially the MPV values, between ROP requiring treatment and ROP not-requiring treatment groups and secondarily, we evaluated the correlation between scanned parameters and ROP development.

RESULTS:
ROP developed in 49 of 144 (34%) patients included in the study. ROP requiring treatment was detected as 51% of the ROP group (n: 25). The gestational age, birth weight, incidence of RDS, surfactant use and oxygen usage time, intraventricular hemorrhage, PDA, neonatal sepsis, erythrocyte transfusion number, NEC, BPD and time to catch birth weight were higher in patients with ROP than those without ROP. However, there was no significant difference in terms of MPV, platelet and platelet/MPV ratio.

Table 1: MPV, platelet values and platelet / MPV ratios of groups with and without ROP

	ROP detected group (n=49)	**ROP non-detected group (n=95)**	**p value**
MPV (f/L) (mean±SD)	9.81±1.76	9.55±1.57	0.38
Platelet (10^3/µL) (mean±SD)	220.9±118.7	229.1±80.9	0.63
Platelet/MPV ratio (mean±SD)	23.2±13.6	24.7±9.8	0.46

Gestational age, invasive ventilation and total oxygen use time, BPD and time to catch birth weight were higher In the ROP requiring treatment group than not-requiring group and the results were statistically significant. No significant difference was found between these groups in terms of MPV, platelet count, platelet / MPV ratio.

Table 2: MPV, platelet values and platelet / MPV ratios of requiring treatment and not-requiring treatment groups

	ROP requiring treatment group (n=24)	ROP not-requiring treatment group (n=25)	p value
MPV (f/L) (mean±SD)	9.54±1.73	10.06±1.79	0.301
Platelet (10^3/µL) (mean±SD)	208.6±117.8	232.8±120.7	0.48
Platelet/MPV ratio (mean±SD)	22.78±14.9	23.74±12.5	0.81

In the ROP requiring treatment group, a statistically significant elevation was detected in terms of the most advanced stage and presence of plus as examination findings.

Table 3: ROP findings of the requiring treatment and not-requiring treatment groups

		ROP requiring treatment group (n=24)	ROP not-requiring treatment group (n=25)	p value
Most advanced stage				
	Stage 1	0(%0)	16(%64)	<0.0001
	Stage 2	13(%54.2)	9(%36)	
	Stage 3	11(%45.8)	0(%0)	
Most advanced zone				
	Zone 1	2(%8.3)	3(%12)	0.17
	Zone 2	20(%83.3)	15(%60)	
	Zone 3	2(%8.3)	7(%28)	
Plus				
	Present	23(%95.8)	1(%4)	<0.001
	Absent	1(%4.2)	24(%96)	
First ROP detection age (days) (mean±SD)		44.21±10.85	43.80±15.47	0.92

DISCUSSION:

Studies investigating parameters associated with retinopathy between treatment-requiring and not-requiring groups in patients with ROP are available in the literature. Kavurt et al. (2012) compared patients with ROP with and without laser; low gestational week, low birth weight, long-term oxygen therapy, presence of BPD, erythrocyte transfusion, intraventricular hemorrhage and apnea were found to be effective risk factors for laser photocoagulation. Zengin et al. (2014) found in their study that gestational age, birth weight, length of hospitalization, RDS, use of surfactant, requirement for invasive and noninvasive ventilation, presence of PDA, NEC, IVC, sepsis and apnea were significantly higher in laser-treated ROP patients than non-laser-treated ROP group. In our study, we found that gestational week, invasive ventilation, total oxygen usage time, BPD and time to catch birth weight were higher in the ROP requiring treatment group than not-requiring group and these results were statistically significant. We compared the parameters of the most advanced stage, the most advanced zone, the presence of plus, and the first age (in days) with ROP and we found a statistically significant increase in the presence of the most advanced stage and plus in the ROP requiring treatment group. These results in our study supported the presence of stage and plus parameters as important parameters in the treatment decision.

The role of platelets in the etiology of vascular diseases has been shown. Especially, it has been reported that MPV values are higher in obstructive vascular diseases compared to normal population (Çil et al. 2012, Arikanoglu et al. 2013). Çekmez et al (2013) measured MPV in cord blood of 272 patients with gestational week <34 and birth weight <1500 gr and this parameter was repeated in the first three days of life and there was no significant difference in both MPV values in patients with and without ROP. In another study (Tao et al. 2015), ROP patients who underwent laser treatment were included in the case group, while those who did not develop ROP and those with stage 1 ROP were included in the control group and the most recent platelet and MPV values were recorded. MPV values were significantly higher in the ROP group requiring laser compared to the control group, but there was no significant difference in platelet and MPV / platelet ratio. There was also shown that 1.94 times increase in ROP risk as MPV value increased. It was concluded that MPV, which is the most common measure of platelet size, is a potential marker of platelet reactivity. In our study, we evaluated MPV and platelet count and platelet / MPV ratios in complete blood count in the first day of life in the with and without ROP groups, but we did not find a statistically significant difference between the groups. We also compared these parameters between ROP requiring treatment and not requiring treatment groups, but we did not find a statistically significant difference. Although we attributed the inadequacy of our study for showing the relationship between MPV and retinopathy to the small number of patients, we concluded that evaluating these parameters not only in the first day of life, but also in intermittent blood counts would help us more to understand the relationship between MPV and the presence and severity of retinopathy.

CONCLUSION:

In conclusion, there are a limited number of studies investigating the relationship between MPV and ROP in the literature. As a result of our study, we can say that MPV is not a marker that can be used in the diagnosis of ROP and measuring the severity of retinopathy. We think that we need more numerous and more comprehensive studies in order to understand the relationship between the presence and severity of retinopathy and MPV which is used to show the activity of platelets which are known to play a role in the etiology of vascular diseases. We also believe that screening of premature infants in neonatal units for retinopathy and early referral of risky infants to a limited number of treatment centers will be of great importance in preventing premature blindness.

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