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MEAN PLATELET VOLUME AND PLATELET COUNT CORRELATION IN PATIENTS WITH RETINAL VEIN OCCLUSION

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ABSTRACT:

Introduction: Retinal Vein occlusion (RVO) is the second most common retinal vascular disorder, after diabetic retinopathy which causes painless visual impairment. Thrombus formation caused by platelet hyper aggregation may significantly influence the development and/or evolution of RVO. **Purpose:** Our research attempts to establish the link between platelet indices in RVO patients. **Materials and Methods:** The study comprised 50 patients with the diagnosis of RVO and 50 healthy control persons. The eyes of all RVO patients and control subjects were thoroughly examined a retina clinic in S.S. Medical College Rewa (M.P.) during a period of January 2021 to September 2022. The subject's platelet count (PLT) and mean platelet volume (MPV) were noted. The data from RVO patients and control persons were compared. **Results:** The mean platelet volume in the 50 cases (10.32±1.44fL) was found to be significantly higher as compared to controls (9.28±0.71fL) (P= 0.0205).The mean platelet count in the 50 cases (230.92±78.02 thousand/microlitre) was not statistically significant with the control group (226.44±54.32 thousand/microlitre) (P= 0.2627). **Conclusion:** Our findings showed that the MPV values were considerably greater in RVO patients as compared with the controls, indicating that larger platelets might be involved in the pathophysiology of RVOs.

Keywords: RVO, MPV, PLT, RVO, CRVO, BRVO, HRVO

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INTRODUCTION:

The second most prevalent retinal vascular condition after diabetic retinopathy, which results in painless vision impairment, is retinal vein occlusion (RVO). Despite the fact that the pathogenesis of RVO is still not fully understood, it is generally accepted that the Virchow's triad—venous stasis, endothelial dysfunction, and blood hypercoagulability—combine to generate the condition.[1-3] The multi factorial etiology of RVO can be attributed to a variety of systemic, local, and hematologic illnesses. RVO is more likely to occur in those who have hypertension, diabetes mellitus, dyslipidemia, atherosclerosis, obesity, smoking, trauma, glaucoma, thrombophilia, hyper viscosity, abnormalities in coagulation, hyper homocysteinemia, use of oral contraceptives, and advanced age.[4-6]

In the prognosis of inflammatory illnesses, some biomarkers have become important predictors.

A quick and easy approach to measure platelet volume, which is a metric of platelet function and activation is mean platelet volume (MPV), it has been suggested that the onset and/or development of RVO may be significantly influenced by thrombus formation brought on by platelet hyperaggregability.[7-14]

METHODOLOGY:

A total of 50 patients diagnosed with different types of retinal vein occlusion and 50 age gender matched healthy controls attending the Retina Clinic of Ophthalmology Department of S.S. Medical College, Rewa (M.P.) fulfilling the following criteria was enrolled in the study.

Cases: Recently diagnosed retinal vein occlusion (RVO) in at least 1 eye included in our study. Patient on hypolipidemic drug, anticoagulant treatment, using non steroid anti- inflammatory drug and oral contraceptives not included in our study. Patient having other connective tissue disorder, patient with acute and chronic illness in which systemic markers are deranged and patient with malignancy were also excluded.

Normal subjects (controls): Age and gender matched individuals with Normal anterior and posterior segment.

All subjects underwent a full ocular examination using slit lamp biomicroscopy and fundoscope. Patients who were diagnosed as any type of RVO were enrolled. The control group was made up of healthy individuals who had completed a standard ocular checkup. All subjects' best corrected intraocular pressures and visual acuities were noted. Patients with RVO underwent fundus fluorescein angiography. When RVO was diagnosed, blood samples were taken. Complete blood count samples were drawn into vacutainer tubes containing 0.04 mL of the 7.5% K3 salt of EDTA, and they were analyzed with a commercially available analyzer within an hour of sampling. The subjects' MPV, platelet count values were noted.

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STATISTICAL ANALYSIS PLAN:

All the data was selected randomly and tabulated, and then analyzed with appropriate statistical tools "SPSS version 24". Data was presented as mean with standard deviation or proportions as appropriate. For Test of Significance in age and gender distribution , we used "Chi – square Test {$\chi 2$ – Test}" For test of significance in comparison of MPV & PLT between cases and controls we used "POST HOC TEST/Multiple comparison test" [Post Hoc Test are an integral part of Analysis of Variance/ANOVA." Unpaired |t| - test also used for comparing two mean of continuous data.

RESULTS:

The mean age of the case group was 57.14 ± 10.55 years and for the control group was 60.10 ± 6.70 years. Maximum number of patients in the case group belonged to the age group 40-60 years (50%), followed by the age group 60- of 80 years (48%), 1 patient of age group >80 years (2%), and no patients in the age group between 0-40 years. Maximum number of patients in the control group belonged to the age group 40-60 years (52%), followed by 60-80 years age group (48%), and no patients in the age group of >80 years or between 0-40 years. [Table 1]

Table no: 01 Distribution of ages with gender among two groups

Age distribution (in years)	Case (n=50)		Control (n=50)	
	Male	Female	Male	Female
0 – 20 years	0	0	0	0
20 – 40 years	0	0	0	0
40 – 60 years	18	7	13	13
60 – 80 years	13	11	11	13
≥ 80 years	1	0	0	0

Of total cases included in the study, 32 patients (64%) were male and 18 patients (36%) were female. And the control group included 24 (48%) male and 26 (52%) female patients.. The mean PLT in the 50 cases was 230.92±78.02 (thousand/microlitre), among which the CRVO cases had a count of 219.89±68.86, BRVO cases had 248.19±97.6, and HRVO cases had 239.60±59.05 in thousand/microlitre respectively. The control group had mean platelet count of 226.44±54.32 (thousand/microlitre). Although, there was no statistically significant difference found between cases and controls (p=0.2627). [Table 2]

Table no: 02 Distribution of mean PLT (thousand/micro liter) between case and control groups

PLT (thousand/micro liter)		No.	Mean ± Standard deviation	P value
Case	CRVO	29	219.89 ± 68.86	0.2627
	BRVO	16	248.19 ± 97.6	
	HRVO	5	239.60 ± 59.05	
Control		50	226.44 ±54.32	

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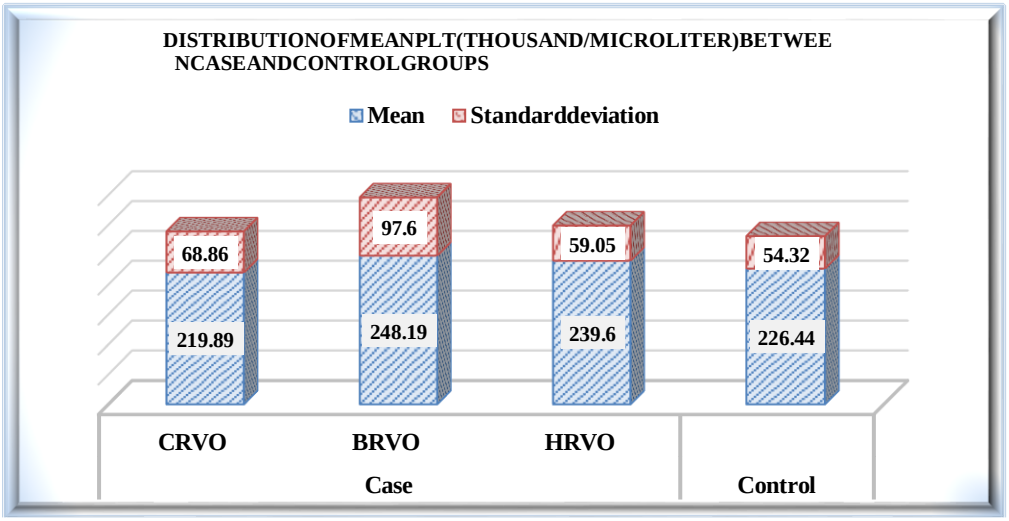

Graph no: - 1 Shows distribution of mean of PLT (thousand/micro liter) between case and control groups

The MPV (fL) in the 50 cases was 10.32±1.44, in which CRVO patients (29) had mean platelet volume of 10.08±1.47, BRVO patients (16) had 10.84±1.46 and HRVO patients (5) had 10.08±0.76 respectively. The control group had MPV of 9.28±0.71. Statistically significant difference was found among the case and control groups with p value being 0.0205. [Table 2]

Table no: 03 Distribution of mean MPV (fl) between case and control groups

MPV (fl)		No.	Mean ± Standard deviation	P value
Case	CRVO	29	10.08 ± 1.47	0.0205
	BRVO	16	10.84 ± 1.46	
	HRVO	5	10.08 ± 0.76	
Control		50	9.28 ± 0.71	

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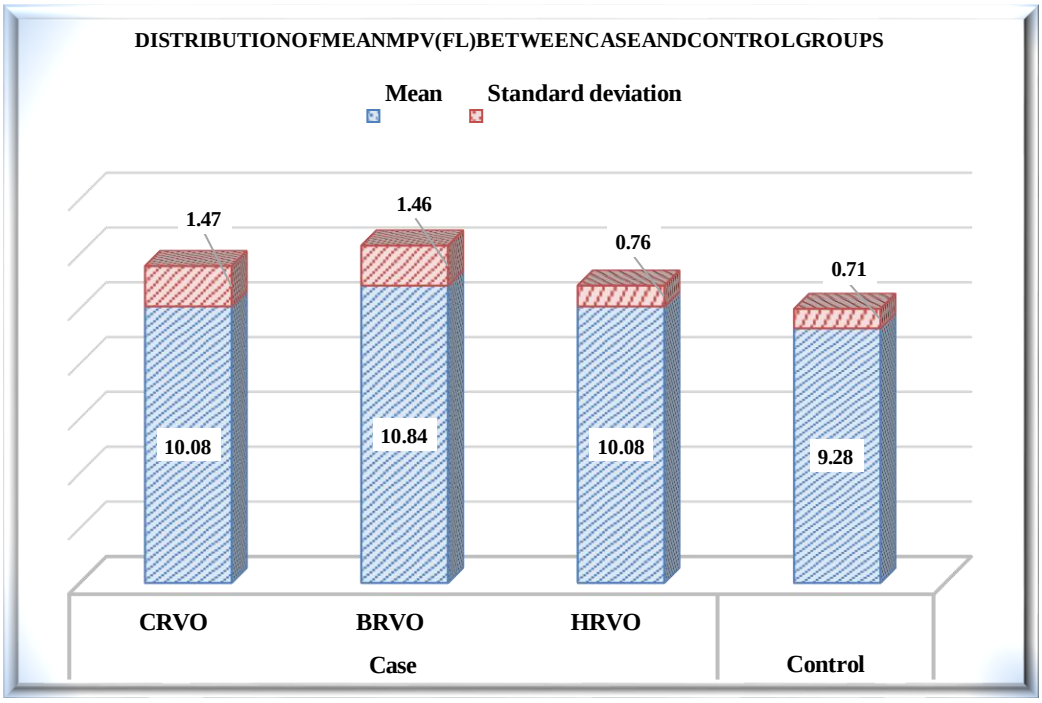

Graph no: - 2 Shows distribution of mean MPV (fl) between case and control groups.

DISCUSSION:

This study was conducted with the aim to assess different roles of inflammatory markers and their association as being risk factors in the implication of RVO. Even though there is no definitive explanation for RVO mechanism, Virchow's triad (venous stasis, endothelial dysfunction and hypercoagulability triad) is by far, the most accepted mechanism for RVO.[2] the factors studied in this study were: age and gender of the patient. The clinical features being studied for comparison are different hematological markers platelet count, Mean platelet volume). A total of 100 individuals, with 50 cases and 50 controls, were taken in this study. The patients that were included in the case group were CRVO, BRVO and HRVO patients. And the control group was the patients without them. The mean PLT in the 50 cases was 230.92±78.02 (thousand/microlitre), among which the CRVO cases had a count of 219.89±68.86, BRVO cases had 248.19±97.6, and HRVO cases had 239.60±59.05 in thousand/microlitre respectively. The control group had mean PLT of 226.44±54.32 (thousand/microlitre). Although, there was no statistically significant difference found between cases and controls (p=0.2627). The MPV (fL) in the 50 cases was 10.32±1.44, in which CRVO patients (29) had mean platelet volume of 10.08±1.47, BRVO patients (16) had 10.84±1.46 and HRVO patients (5) had 10.08±0.76 respectively. The control group had MPV of 9.28±0.71. Statistically significant difference was found among the case and control groups with p value being 0.0205. [Table 4]

Sahin A et al[9] and Pinna A et al[12] studied that the MPV values were found to be significantly

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higher in patients with RVO, thereby suggesting that high mean platelet volume contributes to the pathogenesis of RVO. Ornek N et al[8] concluded that MPV was significantly lower in patients with RVO as compared with the control group. Bawankar P et al[13] demonstrated that MPV values were significantly higher in patients with CRVO, suggesting that increased MPV contributes to the development of CRVO**.** Kumral ET et al[14] shown that MPV values were considerably greater in BRVO patients, implying that higher MPV plays a role in the development of BRVO.

LIMITATIONS:

Results cannot be extrapolated to the general population due to the limited sample size. The time of assessment from onset in the current investigation differed among the cases, which could have impacted the findings. The controls were recruited from a hospital environment despite having the same age and gender distribution as the participants in the current study. We did not adjust for additional variables including diabetes, hypertension, smoking, or renal function that may affect tHcy, lipid profile levels. The small number of instances observed in the case group explained why all the parameters that was significantly higher in HRVO cases. Therefore, a bigger sample size is required for further analysis of the inference**.**

CONCLUSION:

To conclude, it was seen that RVO is associated with inflammatory phenomenon in which the inflammatory markers, MPV increased in RVO, and also being considered as risk factor in HRVO than CRVO and BRVO. Various hematological parameters were also increased, except platelet count and there is also no age and gender association seen among the cases. However, our study has limitation that the minimal number of cases observed in the case group was the cause of all the parameters that were considerably significantly higher in HRVO cases, therefore, a bigger sample size is required in to the inference.

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