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Platelet Profile and Other Related Risk Factors in Subjects with Retinal Vein Occlusions

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ABSTRACT: The present study is intended to analyse real role of the clinical profile and relevant hematological profile with a special reference to platelet parameters in subjects with diagnosed Retinal Vein Occlusions. A detailed history, ocular examination and laboratory values of platelet count and cholesterol were noted in patients of retinal vein occlusions and associated risk factors noted.

I. INTRODUCTION

Retinal vein occlusions are the second most common retinal vascular disorders next only to Diabetic retinopathy with potentially blinding complications.[1] They constitute to a prevalence rate of about 1-2% in patients above 40 years of age. Most patients with retinal vein occlusions suffer severe visual impairment or irreversible visual loss, pathogenesis of which is still unclear.[2] The incidence of Retinal vein occlusions increases with advancing age with the mean age at onset of vein occlusions being 63 years.[3]Various types of vein occlusions share common risk factors such as advancing age, male gender, systemic hypertension, diabetes, elevated serum lipid levels, elevated blood viscosity and open angle glaucoma.[3]

Atherosclerosis and arteriolosclerosis play very important role in the pathogenesis of Central Retinal Vein Occlusions (CRVO) and Branch Retinal Vein Occlusions (BRVO) respectively. Platelets play a pivotal role in the vascular disorders like atherosclerosis, hypertension, diabetes and hyperlipidemia.

Platelet parameters like Mean Platelet Volume (MPV normal value is 6.9 to 10.8fL) is an indicator of the platelet size and is known to be a very important biomarker of platelet activity and increased platelet count (normal value 2-4 lakhs/cumm) which are simple and can be easily assayed in autoanalyser.[4]

The present study is intended to analyse real role of the clinical profile and relevant hematological profile with a special reference to platelet parameters in subjects with diagnosed Retinal Vein Occlusions.

II. METHODS AND METHODOLOGY

The objective of the study is to study the Platelet profile and other related risk factors in subjects with Retinal Vein Occlusions. It is a cross sectional, hospital based study. The source of data includes Patients attending OPD of Department of Ophthalmology at Santhiram medical college and general hospital, Nandyal, Andhra Pradesh from period JAN 2022 to NOVEMBER 2022. The sample size is 40.

INCLUSION CRITERIA**:**
1)All types of diagnosed Retinal Vein Occlusions
2). Those giving informed and written consent.

EXCLUSION CRITERIA:
1)Patients with significant media opacities which obscure fundus examination in detail.
2)Patients who denied informed and written consent.

A detailed history, ocular examination and laboratory values including complete haemogram, patelet profile , and blood cholesterol levels was noted.Fundus photography, FFA and OCT were done wherever necessary.

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III. RESULTS

TABLE 1: AGE DISTRIBUTION

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Age group (years)	Frequency	Percentage
40-50	11	27.5
51-60	**16**	**40**
61-70	8	20
71-80	3	7.5
81-90	2	5
Total	40	100.0

value: <0.001 (significant).

TABLE 2: SEX DISTRIBUTION

	Frequency	Percentage
Male	**29**	**72.5**
Female	11	27.50
Total	40	100.0

P value: 0.012% (significant)

TABLE 3: HYPERTENSION AND RVO

Type of RVO	No. of patients	No. of known hypertensives	Percentage
BRVO	**28**	**26**	**92.85%**
CRVO	9	4	44.44%
HRVO	3	2	66.7%
Total	40	32	80%

P value:0.003% (significant)

TABLE 4: DIABETES AND RVO

Type of RVO	No. of patients	No. of known diabetes	Percentage
BRVO	**28**	**9**	32.14%
CRVO	9	**5**	**55.55%**
HRVO	3	1	33.3%
Total	40	15	37.5%

Out of total 40 RVO patients, 15(37.5%) were known Diabetics.
P value: 0.172% (not significant)

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TABLE 5: HYPERCHOLESTEROLEMIA AND RVO

Type of RVO	No. of patients	No. of patients with Hypercholesterolemia(known)	Percentage
BRVO	28	10	35.71%
CRVO	9	2	22.22%
HRVO	**3**	**2**	**66.60%**
Total	40	14	35.00%

14 (35.00%) Patients were known case of Hypercholesterolemia.
P value: 0.236% (not significant).

TABLE 6: POAG AND RVO

Type of RVO	No of patients	No of known POAG patients	Percentage
BRVO	28	2	7.14%
CRVO	9	1	11.11%
HRVO	3	0	0.0%
Total	40	3	7.50%

Only 3 (7.5%) patients were known POAG patients.
P value: 0.116% (not significant)

TABLE 7: CURRENT SMOKING AND RVO

Type of RVO	No. of patients	No. of current smokers	Percentage
BRVO	**28**	**24**	**85.71%**
CRVO	9	2	22.22%
HRVO	3	1	33.33%
Total	40	29	72.50%

P value: 0.001 % (significant)

TABLE 8: PLATELET COUNT AND RVO

Type of RVO	No. of patients	Mean platelet Count/microlitre	Minimum	Maximum
BRVO	28	248,321.11	151000.00	368000.00
CRVO	9	247,346.34	152000.00	281000.00
HRVO	3	261,333.33	251000.00	276000.00
Total	40	**252,333.56**	151000.00	368000.00

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All 40 patients had platelet count in the normal range.
P value: 0.761% (not significant)

TABLE 9: Mean Platelet Volume (fL UNITS)

	No.	Mean	No. of patients with raised MPV	Percentage
BRVO	28	10.7535	10	35.71%
CRVO	**9**	**11.1764**	**6**	**66.66%**
HRVO	3	9.7345	1	33.33%
Total	40	10.5548	17	42.50%

P value:0.041% (significant)

TABLE 10: LABORATORY CHARACTERISTICS

	No. of patients	Mean value	No. of pts with raised levels	Percentage
Total Cholesterol BRVO	28	200.55	15	53.57%
CRVO	9	203.87	04	44.44%
HRVO	3	205.26	02	66.6%
TOTAL	40	201.82	21	52.50%
LDL BRVO	28	103.89	17	60.71%
CRVO	9	121.77	05	55.55%
HRVO	3	136.83	02	66.66%
TOTAL	40	108.76	24	60.00%
HDL BRVO	28	48.27	0	0.0%
CRVO	9	46.34	0	0.0%
HRVO	3	53.86	1	33.33%
TOTAL	40	47.25	1	2.5%
Triglycerides BRVO	28	165.56	14	50.00%
CRVO	9	152.95	03	33.33%
HRVO	3	192.63	01	33.33%
TOTAL	40	165.52	18	45.00%
RBS BRVO	28	131.87	07	25.00%
CRVO	9	151.80	04	44.44%
HRVO	3	130.33	02	66.6%
TOTAL	40	137.25	13	32.50%

52.50% of patients had raised total cholesterol (>200mg/dl), 60.00% had raised LDL, and 45.00% had raised triglycerides.

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IV. DISCUSSION

After Diabetic Retinopathy, Retinal Vein Occlusions are the most common cause of visual loss, especially in elderly patients. Reduction of vision in RVO depends on the amount of macular edema and retinal ischemia. Untill now the pathogenesis of RVO has not been clearly elucidated.

Several risk factors such as age, hypertension, smoking, diabetes mellitus, hyperlipidemia, and glaucoma were attributed in the etiology of RVO. In the last few years several authors have studied the causes of RVO, but the real role played by some hemostasis related factors or by some thrombophilic parameters are still not clear.

Among the 40 consecutive patients with an established clinical diagnosis of Retinal Vein Occlusion, 29 were males and 11 were females. Age ranged between 40 and 87 years. 16 (40%) were in age range of 51 to 60 years. The relationship between RVO and age and sex was in concordance to that found in many other studies.

Out of 28 BRVO patients of the present study, 26 (92.85%) were known hypertensives. Bever Dam eye study of epidemiology of Retinal vein occlusion which showed strong association of hypertension, focal arteriolar narrowing and AV nicking with prevalent BRVO. Also data of study conducted by Miho Yasuda et al., indicated a clear association between hypertension and RVO, and their results showed that not only hypertension but also high normal BP was significantly associated with RVO. Our result of association between hypertension and RVO is consistent with the above mentioned studies.

Out of total 40 patients with RVO 29 (72.50%) patients and of 28 BRVO, 24 (85.71%) were current smokers. This result of our study is consistent with the data from the Bever Dam Eye study and study conducted by Dodson PM et al,[5] which also showed strong association between current smoking with incident BRVO. This association may be explained, in part, by the inflammatory stimulus of smoking, although the role of inflammation in the pathogenesis of RVO is not certain.

MPV is the indicator of the size and activity of platelets. Relationship between increased MPV with deep vein thrombosis, acute MI, acute ischemic cerebrovascular events were also reported. As larger platelets store and release large amounts of serotonin and beta thromboxane A2, they are more reactive and prone for aggregation.[4]

The current study showed significantly higher levels of MPV in patients with RVO. This is comparable to the clinical study conducted by Alpraslan Sahin et al.,[6] and Halil Ibrahim Onder et al.[2] Increased MPV is linked with diseases associated with chronic inflammation such as hypertension and diabetes mellitus. But our study is in discordance with study done by Omek et al., which did not find increased MPV values in patients with RVO compared to controls.[6] Studies related to platelets in RVO pathogenesis reported increased platelet activation and aggregation.[7-10]

In our study platelet counts were in normal range in all RVO patients.

Certain systemic diseases such as diabetes, hypertension and hyperlipidemia are associated with increasing age. This puts the patients at risk of end organ complications such as ocular complications. In our study we found 21/40 (52.50%) patients with raised total cholesterol (>200mg/dl), 24/40 (60.0%) patients with raised LDL, and 18/40 (45.00%) with raised triglycerides.

V. CONCLUSION

In our study, Retinal Vein Occlusions were commonly found in patients of more than 50 years of age with male preponderance.Most patients with BRVO were known hypertensives, with fundus showing features of hypertensive retinopathy changes. The present study demonstrated that BRVO is significantly associated with hypertension.

Our study shows poor association between diabetes and RVO, further large scale studies are required to establish a causal relationship between RVO and diabetes using laboratory investigations like FBS and PPBS.

The results of lipid profile and RVO requires large population study to establish association between RVO and abnormal lipid profile.

The present study shows strong association between current smoking and RVO, specifically BRVO.

Mean platelet volume was significantly higher in patients with RVO, but the total platelet count was found to be within normal range.

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