

Case report on a study of evaluation of various systemic risk factors in retinal vein occlusion

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Abstract

Purpose: To study the various systemic risk factors of RVO (BRVO & CRVO).
Materials and Methods and Results: Hospital-based study was conducted on all RVO patients attending the OPD of Department of Ophthalmology –K K Eye Institute, Pune. CMT was measured using Heidelberg OCT scan.
Conclusion: 1. According to this study incidence of CRVO was 26.3% and BRVO was 71.1%; 2. According to this study BRVO was found in 51 subjects (92.73%) and CRVO in subjects (7.27%) among the RVO subjects; 3. In our Study the incidence of CRVO is 25% and BRVO is 75% (IN BRVO, STBRVO was 58.33%, ITBRVO was 16.66%). RVO was seen more common among females than males; 4. Hypertension was found in 37.5% in RVO and 20.8% of subjects with RVO had diabetes mellitus; 5. 20.8% had history of stress without DM and HTN. RVO was found in 4.16% of the subjects having both diabetes and hypertension. About 12.5% had no history of STRESS, DM, HTN which needs further evaluation. There was increased risk of RVO among those with hypertension, and those having both diabetes and hypertension. The risk was lower, however, among the subjects who had only diabetes. CMT was maximum in CRVO, followed by ITBRVO and least in STBRVO.CMT was more in males than in females.

Keywords: OCT, RVO, CMT, BP, DM, Stress, STBRVO, ITBRVO, CRVO

Introduction

Retinal Vein Occlusion (RVO) is the second most common retinal vascular disease. There are 2 types such as **Branch** Retinal Vein Occlusion (BRVO) and Central Retinal Vein Occlusion (CRVO).
Hypertension, Diabetes and Stress are the main causes. 90% of patients are older than 50 years. It causes sudden painless loss of vision. Prevalence of retinal vein occlusion is found to be 5.2/1000.

It includes age group from 40 years to 80 years. Male and Female both are involved. History of either hypertension, diabetes or both histories taken. History of any Stress is also taken
BCVA checked at the time of presentation. All patients were sent for OCT scan and CMT (Central Macular Thickness) calculated at the time of presentation.

Materials and Methods

This is a hospital based, single observer, retrospective study conducted on all Retinal Vein Occlusion patients attending the OPD of Department of Ophthalmology, KKEI, Pune from May 2022 to August 2024

Inclusion criteria (Ophthal)

- 1. Central retinal vein occlusion (CRVO): Its flame-shape, dot or punctate retinal hemorrhages or both in all four quadrants of the retina, dilation. Increased tortuosity of the retinal veins with or without Optic disc swelling.
- 2. Branch retinal vein occlusion (BRVO): Its flame-shaped, dot or punctate retinal hemorrhages along the occluded branch retinal vein. In whom retinal hemorrhages had resolved, new vessels and/or collateral vessels had developed. Depending on STQ (Superio Temporal Quadrant) or ITQ (Inferio Temporal Quadrant) classified as STBRVO or ITBRVO.

Average data

Table 1 showing Average of Central Macular Thickness in various categories of Retinal Vein Occlusion and gender.

Table 1:

Average of CMT	Average count
CMT	586.3 (All)
STBRVO	420.57 (14 out of 24)
ITBRVO	679.75 (4 out of 24)
CRVO	911 (6 out of 24)
Male	653.9 (11 out of 24)
Female	529.23 (13out of 24)

Average sex ratio: Figure 2 showing average sex ratio in retinal vein occlusion patients in our study.

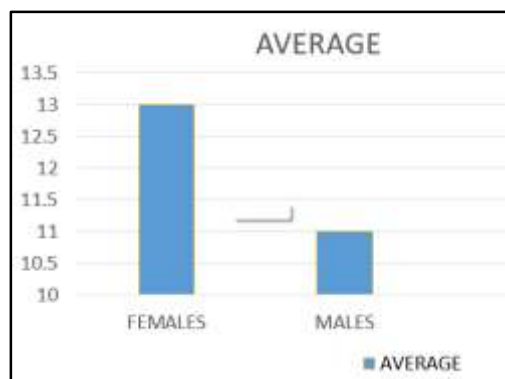


Figure 1:

Percentage data: Figure 2 showing percentage distribution of different types of retinal vein occlusion in our study.

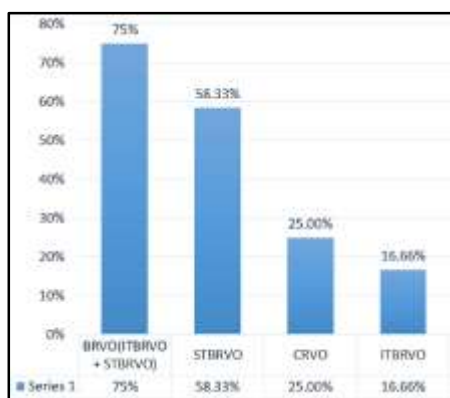


Figure 2:

Percentage data: Figure 3 showing percentage distribution of various systemic risk factors in retinal vein occlusion patients.

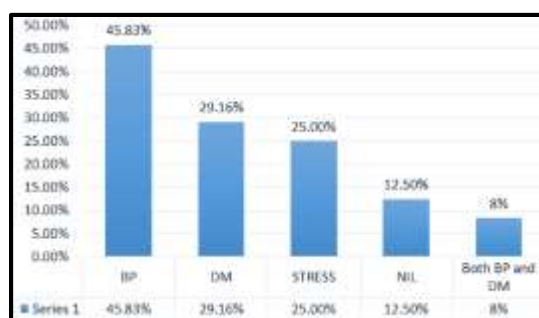


Figure 3:

Results

According to this study incidence of CRVO was 26.3% and BRVO was 71.1%.⁴ According to this study BRVO was found in 51 subjects (92.73%) and CRVO in subjects (7.27%) among the RVO subjects.⁵ In our Study the incidence of CRVO is 25% and BRVO is 75% (IN BRVO, STBRVO was 58.33%, ITBRVO was 16.66%). RVO was seen more common among females than males. Hypertension was found in 37.5% in RVO and 20.8% of subjects with RVO had

diabetes mellitus. 20.8% had history of stress without DM and HTN. RVO was found in 4.16% of the subjects having both diabetes and hypertension. About 12.5% had no history of STRESS, DM, HTN which needs further evaluation. There was increased risk of RVO among those with hypertension, and those having both diabetes and hypertension. The risk was lower, however, among the subjects who had only diabetes. CMT was max in CRVO, followed by ITBRVO and least in STBRVO. CMT was more in males than in females.

Discussion

Mental disorders were associated with an increased incidence rate of RVO (hazard ratio), [HR]: 1.268; 95% confidence interval; [CI]: 1.196-1.344). In the subgroup analysis, subjects with depression, sleep disorder, and anxiety disorder exhibited an increased risk of incidence of RVO in all regression models (all $p < 0.001$).¹ In our study 20.8% had history of stress without any systemic illness like DM and HTN.

The two main types of RVO, branch retinal vein occlusion (BRVO) is 4 to 6 times more prevalent than central retinal vein occlusion (CRVO). A basic risk factor for RVO is advancing age. A strong risk factor for RVO is the metabolic syndrome (hypertension, diabetes mellitus).² In our study it was seen that BRVO was 3 times more than CRVO.

The major risk factor associated with RVO was systemic hypertension. There is a significant link between diabetic mellitus and RVO.³ Even in our study the major risk factor associated with RVO was systemic hypertension. Almost 45% had systemic hypertension associated with retinal vein occlusion. Nearing 30% of the patients with retinal vein occlusion had diabetes. Hypertension is most commonly seen in patients with RVO and is a well-known risk factor of RVO.⁴ RVO, BRVO and CRVO each was seen more common among females, hypertension was found in 45.45% in RVO. 7.27% of subjects with RVO had diabetes mellitus RVO was found in 5.45% of the subjects having both diabetes and hypertension. There was increased risk of RVO among those with hypertension, and those having both diabetes and hypertension. The risk was lower, however, among the subjects who had only diabetes.⁵

Limitation

Some limitations of this study should be considered. The first limitation of this study it was designed as a retrospective observational study and a single-centre experience. We may have overlooked the presence of RVO in asymptomatic patients, because only relatively symptomatic patients generally visit ophthalmologists and are diagnosed with RVO.

Next, we analysed a relatively small sample size without a control group that was assessed for systemic risk factors without retinal disease. Generalizing our results to a broader group may be limited because we only recruited patients with RVO who underwent systemic risk factor evaluation without a control group.

Further, mental stress was not quantified and was purely taken on the basis of history and was subjective. Research on

a larger sample of RVO patients is needed to confirm the generalizability of our new findings.

Conclusion

In the OPD of K K EYE INSTITUTE - PUNE, of the subjects examined 24 had Retinal Vein Occlusion. Among the systemic risk factors, it was found that hypertension was significantly associated with Retinal Vein Occlusion. Also, diabetes and stress were significantly associated with Retinal Vein Occlusion. Also noted that patients with no history of HTN or DM and had stress had Retinal Vein Occlusion. Females had more Retinal Vein Occlusion than males. Comparing CMT, patients with CRVO had highest average CMT compared to patients with BRVO. In BRVO, ITBRVO had more CMT than STBRVO.

Supplementary Materials

No supplementary data attached

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Conflicts of Interest

There was no conflict of interest.

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References

1. J. Clin. Med. The Risk of Retinal Vein Occlusion in Young Patients with Mental Disorders, Journal: *A Nationwide Cohort Study*, Volume: [12(14),] Year: 2023 Article Page- 4874
2. [2] Petr Kolar 1. Risk factors for central and branch retinal vein occlusion: a meta-analysis of published clinical data. *J Ophthalmol*. 2014;2014:724780. doi: 10.1155/2014/724780. Year: 2014
3. Lipi Mittal, Vijay Gupta, Anjali Meena*. A study of evaluation of various risk factors of retinal vein occlusion. *Indian Journal of Clinical and Experimental Ophthalmology*, Volume: 8, Issue: 3, Year: 2022, Article Page: 398-402
4. Hyun-Jin Kim, Yong Un Shin, Yonggu Lee, Min Ho Kang, Mincheol Seong, Heeyoon Cho, Ran Heo, Jin-kyu Park, Young, Hyo Lim & Jeong-Hun Shin. Increasing incidence of macular edema in excessive morning blood pressure surge in patients with retinal vein occlusion. *Scientific Reports (Nature Research)*, Volume: 10, Year: 2020, Article number: 4420
5. Raba Thapa, Sanyam Bajimaya, Govinda Paudyal, Shankar Khanal, Stevie Tan, Suman S. Thapa & Ger van Rens Prevalence, pattern and risk factors of retinal vein occlusion in an elderly population in Nepal: The Bhaktapur retina study. *BMC Ophthalmology*, Volume 17, Year - 2017, Article number: 162
6. Yun Wang ^a, Shanjun Wu ^a, Feng Wen ^a, Qixin Cao Diabetes mellitus as a risk factor for retinal vein occlusion *Medicine (Baltimore)* 2020, 99(9):e19319
7. Shin Chang ^{a b}, Chung-Han Ho ^{c d}, Chin-Chen Chu ^{e f}, Jhi-Joung Wang ^{c e}, Ren-Long Jan ^{b g}. Risk of retinal vein occlusion in patients with diabetes mellitus: *A retrospective cohort study*, 2021 Jan;171:108607
8. J G Santiago, S Walia, J K Sun, J D Cavallerano, Z A Haddad, L P Aiello & P S Silva Influence of diabetes and diabetes type on anatomic and visual outcomes following central rein vein occlusion *Eye*, (2014) volume 28, pages259–268
9. Tae Ryom Oh ^a, Kyung-Do Han ^b, Hong Sang Choi ^a, Chang Seong Kim ^a, Eun Hui Bae ^a, Seong Kwon Ma ^a, Soo Wan Kim ^{a,*} Hypertension as a risk factor for retinal vein occlusion in menopausal women. *Medicine (Baltimore)* 2021 Oct 29;100(43):e27628.
10. Paul R. A. O'Mahoney; David T. Wong, MD, FRCSC; Joel G. Ray, MD, MSc, FRCPC. Retinal Vein Occlusion and Traditional Risk Factors for Atherosclerosis. *Epidemiology Arch Ophthalmol*. 2008;126(5):692-699.
11. lLeoné Malan ^a, Mark Hamer ^b, Roland von Känel ^c, Roelof D. van Wyk ^d, Annemarie Wentzel ^a, Hendrik S. Steyn ^e, Pieter van Vuuren ^f, Nico T. Malan ^a Retinal-glia ischemia and inflammation induced by chronic stress: *The SABPA study*, 2019 Dec 17;2:100027
12. Kuan-Hsuan Chen, En-Lin Hsiang, Min-Yen Hsu, Yueh-Ching Chou, Tai-Chi Lin, Yuh-Lih Chang, Ching-Yao Tsai, Tzu-Hsuan Li, Lin-Chung Woung, Shih-Jen Chen, Chi-Hsien Peng, De-Kuang Hwang Elevation of serum oxidative stress in patients with retina vein occlusions. *Front Med (Lausanne)* .2022 Jun 15;9:910600
13. Yi Tang, Yan Cheng ¹, Shuo Wang ¹, Yongjie Wang ², Pengjia Liu ³, Hong Wu ^{1,*}. The Development of Risk Factors and Cytokines in Retinal Vein Occlusion *CURRENT OPHTHALMOLOGY*, 2022 Jun 15:9:910600.
14. Hyun-Jin Kim, Yong Un Shin, Yonggu Lee, Min Ho Kang, Mincheol Seong, Heeyoon Cho, Ran Heo, Jin-kyu Park, Young-Hyo Lim & Jeong-Hun Shin Increasing incidence of macular edema in excessive morning blood pressure surge in patients with retinal vein occlusion *Scientific Reports*, 2020, volume 10, Article number: 4420
15. Hayreh, Sohan S. Retinal vein **occlusion** *Indian Journal of Ophthalmology*, Jul–Sep 1994, 42(3):p 109-132.