

Risk Factors in Retinal Vein Occlusion

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ABSTRACT

Introduction: Retinal vein occlusion (RVO) is a common vascular disorder of the retina and one of the most common causes of vision loss worldwide. Specifically, it is the second most common cause of blindness from retinal vascular disease after diabetic retinopathy. Purpose of the research was to evaluate risk factors for retinal venous occlusion (RVO)

Material and Methods: Study was conducted on a total of 25 patients who attended the OPD of ophthalmology, Govt. Medical College, Jammu between Aug. 2014 to July 2015. Patients were investigated for risk factors of RVO.

Results: 14 males, 11 females patients with mean age of 51.8 years were studied. Hypertension and hyperlipidemias were strongly associated with RVO. Smaller number of patients showed association with diabetes mellitus, chronic kidney disease and POAG. Homocysteine levels were evaluated in four patients only and two of them showed raised fasting S. homocysteine levels.

Conclusion: We found RVO is a significant cause of visual impairment in general population. Identifying associated risk factors and treating these could help reduce the incidence of RVO.

Keyword: Retinal vein occlusion, retinal artery, central retinal vein occlusion

INTRODUCTION

“Retinal venous obstruction was first established as a clinical entity due to thrombosis by Julius Von Michel” (1878).¹ It is generally accepted that close proximity of the central retinal artery and vein in the region of lamina cribrosa and their common adventitial sheaths are the critical anatomical factors which cause compression of the vein by sclerotic artery leading to turbulent blood flow, endothelial damage and thrombus formation in retinal venous obstruction.² There are three distinct types of RVO: branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO), and an anatomical variant of CRVO, namely, hemiretinal vein occlusion (HRVO). Retinal vein occlusions have a characteristic, although somewhat variable, appearance with intraretinal haemorrhage, cotton – wool spots, tortuous and dilated retinal veins, retinal edema and occasionally optic disc swelling. These findings are present segmentally in BRVO, in either the superior or inferior two quadrants in HRVO and in all quadrants of the fundus in CRVO.³ Retinal venous obstructions are multifactorial in origin and no single factor on its own causes the occlusion. A whole host of local and systemic factors acting in different combinations and to different extents may produce the vascular occlusion.⁴ At present, the efforts to improve visual acuity in retinal venous obstruction have been disappointing and a better understanding of various predisposing factors and pathophysiology assumes a lot of importance in the prevention and in the development of newer treatment modalities. The purpose of this study was to

evaluate the risk factors for retinal venous occlusion.

MATERIAL AND METHODS

The study was conducted in the Department of Ophthalmology, Government Medical College, Jammu. All the patients who reported to OPD with RVO during the period from August 2014-July 2015 were evaluated.

Inclusion criteria

All patients with Age > 20 years diagnosed with diabetes mellitus, hypertension and hyperlipidaemia

Exclusion criteria

1. Age <20 years and > 80 years
2. Associated other ocular diseases that cause significant visual impairment, Immunocompromised patients and pregnant patients.

A total of 25 patients of retinal vein occlusion were included in the study as per the inclusion and exclusion criteria. Patient particulars like name, age, sex and address were recorded. A detailed ocular history from all the patients was also recorded. All the patients underwent complete systemic examination in which the vitals of the patient i.e. pulse rate, blood pressure, respiratory rate were recorded, special emphasis was paid on the cardiovascular system. Detailed local examination of both the eyes was done. This included.

- Visual acuity both uncorrected and best corrected.
- Anterior segment examination by slit lamp.
- Pupillary reaction was noted to find the RAPD.
- Fundus examination was done by both direct and Indirect Ophthalmoscopy.
- IOP measurement by NCT.
- Investigations were done.
- HB, BT, CT
- FBS, RFTs
- Lipid Profile
- S. Homocystiene level (in young patients only)

Hypertension was defined as patients with blood pressure (BP) > 140/90 mm Hg or patients taking anti – hypertensive medication.

- Diabetes mellitus is defined as FBS > 126mg/dl.

- Hyperlipidemia was defined as

S. cholesterol > 200 mg/dl., S. triglycerides > 180 mg/dl., HDL cholesterol > 30 – 60 mg/dl, LDL cholesterol > 100 mg/dl.

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Serum Homocysteinemia was defined as fasting S.Homocysteine levels > 12 mmol/dl.

Deranged RFTs were defined as S. creatinine levels > 1.2 mg/dl., S. urea levels > 40 mg/dl.

POAG was labeled in patients already on anti-glaucoma medication or IOP > 21 mmHg with optic disc changes or visual field defects.

STATISTICAL ANALYSIS

Data is represented in the form of tables and analyzed with the help of descriptive statistics.

RESULTS

The mean age of patients in the present study was 51.8 years (range 24-72 years). Male: female ratio was 3:1. Demographic data of the patients is shown in Table 1.

Of the systemic factors which were studied for association with RVO, hypertension showed the strongest association. 64% of patients had systemic hypertension. Mean systolic blood pressure was 143.68 ± 20.42 , mean diastolic blood pressure was 126.00 ± 13.67 . Type – II Diabetes mellitus was present in 12% of patients. 2 patients who had Diabetes mellitus also showed Non – proliferative diabetic retinopathy changes in the fundus. 32% of patients showed increased lipid levels. Of the 4 Patients who were below 30 years, 2 patients had hyperlipidemia. 12% of patients with history of hypertension on irregular treatment showed deranged RFTs. S.Homocysteine levels were studied only in patients who were below 40 years of age. Out of 4, 50% of patients showed homocysteinemia. These two patients also had hyperlipidemia. One of them had bilateral veinous obstruction and the other had central Retinal veinous occlusion. The CRVO patient was female and had systemic hypertension also. The other two young patients showed no systemic or ocular association except one of them had marginally raised triglyceride levels.

Of the ocular associations history of Primary open angle glaucoma was present in 16% of patients in our study. Systemic and Ocular risk factors are depicted in Table2. Table 3 shows the amount of visual impairment at the time of presentation.

DISCUSSION

The current study evaluated 25 consecutive patients with Retinal veinous obstruction to assess the significance of risk factors that may be associated with RVO 84% of patients were above 40 years of age in our study. Gutman (1983) in his study reported that 90% of retinal vein obstructions occur above 50 years of age.⁵ Hayreh (1994) also reported only 3-5% of cases of Retinal Veinous occlusion under the age of 40 years in his study.⁶ So increasing age is an important risk

factor for RVO as supported by previous studies.

Cugati et al (2006) noted increasing mean arterial blood pressure and atherosclerotic retinal vessels were significant predictors of incident Retinal vein obstruction.⁷ Arakawa et al (2011) concluded in their study that higher blood pressure is an independent risk factor for the development of Retinal Veinous Occlusion.⁸ Stem et Al (2013) confirmed in their study that hypertension and vascular diseases are important risk factors for central Retinal vein Occlusion.⁹ Therefore the findings of our study correlate well with above mentioned studies.

Srestha at al (2006) showed incidence of 8% isolated diabetes in their study.¹⁰ In our study also, isolated diabetes was seen in 8% subjects. However DM was present in 12% patients. One patient had both HTN and DM. Lee et al (2013) concluded in their nationwide survey that both HTN and DM are associated with RVO. However they found HTN more strongly associated with BRVO and DM more often associated with CRVO.¹¹

Coluciell (2005) in his study confirmed hypertension, diabetes, hyperlipidemias as risk factors for retinal obstruction.¹² Paul et al (2008) in their study concluded that hypertension and hyperlipidemia are common risk factors for Retinal veinous occlusion in adults and diabetes mellitus is less common.¹³ Lim et Al (2008) found association of RVO with older age, higher systolic blood pressure and hypercholesterolemia.¹⁴

In Beaver Dam Eye study, higher serum creatinine levels constituted a significant risk factor for retinal veinous occlusion over 15 years follow-up.¹⁵ Arakawa et al (2011) reported in their study association between chronic kidney diseases and retinal veinous obstruction independent of age, sex and diastolic blood pressure.⁸ Renal dysfunction and RVO are both closely related to Hypertension. This fact indicates simultaneous pathology in the retinal and renal vasculature caused by hypertension. In our study, we found chornic kidney disease in 12% patients who were on erratic treatment for hypertension.

Serum homocysteine levels were evaluated in only 4 patients who were below 40 years of age. 50% of those evaluated showed raised levels. This suggests strong association between S. homocysteinemia and RVO. Although our sample size is too small to deduce any significant outcomes. According to study by Narayansamy et al (2007) 15 of 29 patients (51.72%) of CRVO with mean age of 30 ± 6 years exhibited hyperhomocysteinemia.¹⁶ Study by Tuello et al (2010) concluded that hyperhomocysteinemia is the most common emerging risk factor related to Retinal Veinous occlusion.¹⁷ POAG was present in 16% patients in our study. Glaucoma was found to be significantly associated with CRVO accord-

Age in years	Patients of RVO	Sex		Type of RVO		
		Male	Female	CRVO	BRVO	HRVO*
21 – 40	4	3	1	2	2	1
41 – 60	14	8	6	6	7	1
61 – 80	7	3	4	2	5	
Total	25	14	11	10	14	2

*One young patient had bilateral involvement where he had BRVO in one eye and HRVO in other eye.

Table-1: Demographic Profile of Patients of RVO.

S. No	Characteristic	Present	Absent
1	Systemic HTN	16	9
2	FBS> 126mg%	3	22
3	Hyperlipidemia	8	17
4	Deranged RFTs	3	22
5	Homocysteinemia*	2	2
6	Raised IOP (POAG)	4	21

*S. Homocysteine levels were done only in 4 patients under 40 years of age.

Table-2: Systemic and Ocular Risk factors In RVO.

Category	Category of visual Impairment	Patients of RVO
0	Normal (6/6 – 6/18)	4
1	Visual Impairment (<6/18 – 6/60)	8
2	Sever visual imp (.6/60 – 3/60)	3
3	Blind (<3/60 to 1/60)	6
4	Blind (<1/60 to only PL)	4
5	Blind (No PL)	0

Table-3: Showing visual Impairment in RVO

ing to Koizumi et al (2007) in their study.¹⁸ It is postulated that the central retinal Vein may get compromised at the lamina cribrosa in patients with raised intraocular pressure. Last but not the least, the prognosis for vision is not good if the macula is involved and this applies to all cases of central and to many cases of tributary thromboris, proved by Moore (1924) and Brandstrup (1950).¹⁹⁻²⁰ In our study also ten patients were blind at the time of presentation and all those patients had CRVO. This shows that severe amount of visual impairment is associated with CRVO than with BRVO or HRVO. Satyavathi et al. (2015) in their study showed 8 out of 13 cases of CRVO, 15 out of 35 cases of BRVO and 1 out of 2 cases of HCRVO had visual acuity less than 6/60.²¹

CONCLUSION

Our study shows that increasing age, systemic hypertension and hyperlipidemia are the three risk factors which are strongly associated with RVO. However, smaller amount of risk is associated with Diabetes melliteus, chronic kidney disease and raised intra-ocular pressure. Therefore, we recommend primordial prevention of these lifestyle diseases to reduce the incidence of RVO in general population and emphasize the importance of regular IOP checkup in patients above 40 years.

Limitation of our study is smaller sample size and probably S.Homocysteine levels should have been evaluated in the whole study group to derive significant relationship between homocysteinemia and RVO.

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