Original Research

Demographic Profile & Associated Risk Factors of Patients with Retinal Vein Occlusion in a Tertiary Eye Hospital

Sohel Mahmud [1*], Sharmin Ara Yasmin [2], Nahal Mostak Khan [3], Soheb Ahmed Robin [4], Lutfullahil Khabir [5]

1. Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh.
2. Combined military hospital, Camilla, Bangladesh.
3. Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh.
4. Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh.
5. Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh.

* Correspondence: sohel_sumon7070@yahoo.com

Abstract: The present study was planned to find out the demographic profile and risk factors of patients with retinal vein occlusion it was a prospective observational cross sectional study. The study was done in Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh from 1st December 2021 to 31st May 2022. Detailed information was obtained in each cases according to protocol. Thorough ophthalmic examination of all patients were done including visual acuity, anterior segment evaluation by slitlamp-biomicroscopy, post dilated examination of fundus using indirect ophthalmoscopy. All basic lab investigations were studied as complete blood count, ESR, random blood suger, HbA1c, ECG, serum lipid profile, serum creatinine and other investigations (if necessary) like serum homocysteine levels. Collected data were classified, edited, coded and entered into the computer for statistical analysis by using SPSS version 23. Out of 200 patients, majority 147(73.5%) patients were diagnosed with BRVO, 44(22.0%) were diagnosed with CRVO and 9(4.5%) were diagnosed with HRVO. The commonest (33.5%) age group affected in RVO was 61-70 years. The HRVO and BRVO patients were predominantly in the 61–70 years of age group (66.7%) and (36.1%) respectively. Male patients were predominant 119(59.5%). Among male patients, 25(56.8%) had CRVO, 6(66.7%) had HRVO and 88(59.9%) had BRVO. Hypertension was significantly higher in the BRVO patients (64.6%) than CRVO (20.5%) and HRVO patients (44.4%). Glaucoma was significantly higher in the HRVO patients (33.3%) than CRVO (15.9%) and BRVO patients (6.8%). However, IHD, short axial length and hyper-omocysteinemia were not significantly associated with RVO. In conclusion, RVO is a significant cause of visual impairment, with BRVO being more common. The results of this study show that hypertension and DM were strongly associated with BRVO and dyslipidemia, smoking and glaucoma were more strongly associated with CRVO in patients with RVO.

Keywords: associated risk factors, demographic profile, retinal vein occlusion

1. INTRODUCTION

Venous obstructive disease of the retina is a common retinal vascular disorder causing significant visual morbidity affecting quality of life of patient. RVO most commonly affects the venous blood supply of entire retina [CRVO] or a quadrant drained by one of the branches [BRVO] less commonly superior or inferior half of retina alone is affected [HRVO] [1]. Central retinal vein obstruction [CRVO] and branch

retinal vein obstruction [BRVO] differ with respect to pathophysiology, underlying systemic associations, average age of onset, clinical course and therapy [2]. CRVO most commonly occurs in the elderly usually above 50 years. Many systemic and local factors that contribute to the thrombus formation can predispose to the development of central retinal vein occlusion, including hypertension, diabetes mellitus, hyper viscosity, hyperlipidemia, POAG, and hyperopia [3]. Branch retinal vein occlusions occur three times more common than central retinal vein occlusion. Men and women affected equally, usual age of onset is 60-70 years [4]. BRVO almost always occur at an arterio-venous crossing, where the artery and vein share a common adventitial sheath. Most BRVO's occur superotemporally, probably due to the highest concentration of arteriovenous crossings lied there. Most common risk factors associated with BRVO are systemic hypertension, diabetes, hyperlipidemia, glaucoma, smoking and age related atherosclerosis.[4] Antiphospholipid antibodies and elevated plasma homocysteine levels have been associated with increased risk of vein occlusion [5-7]. In a cross sectional observational study conducted [9] where they determine the demographic characteristics and risk factors in a tertiary care hospital in South India. The majority of the patients were aged more than 60 years (55%) with male preponderance (54%). The study also found that RVO was strongly associated with increasing age. Glaucoma was an important ocular risk factor. BRVO is the most common type of RVO. Their study findings showed that RVO is associated with many systemic and ocular diseases. Identifying and managing these risk factors help in preventing a second attack in either eye and thereby the visual morbidity. In a study [10] determined the age- and sex-specific prevalence and determinants of retinal vein occlusions (RVOs) in a large population-based German cohort. A total of 15010 participants with aged 35–74 years were included in the study. Men were 1.7 times more frequently affected by RVO than were women. Their study concluded that the prevalence of RVO in this German population was 0.4%, and men were 1.7 times more frequently affected than women. CRVO was associated with higher age and a family history of stroke and BRVO was associated with arterial hypertension and atrial fibrillation. In a hospital-based case–control study conducted at the Tilganga Institute of Ophthalmology of Nepal [11] where they investigated the demographic characteristics, patterns and risk factors for RVO in this developing Asian country. A total of 218 patients with RVO presented during the study period. Hypermetropia, primary open angle glaucoma, hypertension, mixed diabetes and hypertension, and heart disease were significantly higher in RVO cases as compared with the control group. Their study concluded that the demographic characteristics, patterns and risk factors of RVO in Nepal can help guide interventions against these blinding diseases in similar developing countries. Study aimed to study demographic characteristics and risk factors of retinal vein occlusions in patients who attend Retina Department of Ispahani Islamia Eye Institute and Hospital, Dhaka. Many studies are describing the demographic characteristics and risk factors of RVO in the Western population. The results from these studies may not be representative of the Bangladeshi population. This study wants to determine the demographic profile of patients with RVO and to identify common systemic and ocular risk factors of RVO among Bangladeshi patients. By identifying and managing the risk factors we can prevent the recurrence of RVO in either eye and diminish the severity of the disease.

2. MATERIALS AND METHODS

The study was prospective observational cross sectional study and conducted in the Department of vitreo-retina, Ispahani Islamia Eye Institute & Hospital, Farmgate, Dhaka during 1st December 2021 to 31st May 2022. Patients with retinal vein occlusion in the vitreo-retina clinic of Ispahani Islamia Eye Institute and Hospital were the study population. Institutional permission to collect data was obtained before

conducting the study. All patient parties were explained their conditions in details with treatment options in easily under stable local language. Informed written consents were obtained from the patients/Attendants/Parents before intervention. The study not interfered with patient management or deal with moral or social issue. All the information and records were kept confidential. 200 consecutive patients with retinal vein occlusion were included in the study. Purposive sampling was used in study. All patients with retinal vein occlusion with clear media for evaluation were included in study. Patients with other ocular diseases that create dilemma in diagnosis were excluded from study. Demographic characteristic and risk factors were study variables. Sample selection via purposive sampling method interview- taking consent - result collection -preparing for tabulation were done. Slit-lamp biomicroscope, volk 90D lens, applanation tonometer, B-scan, paper, and pen were used as a material. A complete ophthalmic examination of all patients were done including visual acuity, anterior segment evaluation by slitlamp-biomicroscopy, post dilated examination of fundus using indirect ophthalmoscopy. All basic lab investigations were studied as complete blood count, ESR, random blood suger, HbA1c, ECG, serum lipid profile, serum creatinine and other investigations (if necessary) like serum homocysteine levels. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages. Chi square test were used for categorical variables as shown cross tabulation. A probability (p) value of < 0.05 ($p<0.05$) was considered statistically significant.

3. RESULTS AND DISCUSSION

Figure 1 demonstrated that majority 147(73.5%) patients were diagnosed with BRVO and 44(22.0%) were diagnosed with CRVO and 9(4.5%) were diagnosed with HRVO. Table 1 showed that the commonest (33.5%) age group affected in RVO was 61-70 years. The HRVO and BRVO patients were predominantly in the 61–70 years of age group (66.7%) and (36.1%) respectively. CRVO patients were predominantly in the 41–50 years of age group (34.1%). Table 2 showed that male patients was found in 119(59.5%) and female was 81(40.5%). Among male patients, 25(56.8%) had CRVO, 6(66.7%) had HRVO and 88(59.9%) had BRVO. In female patients, 19(43.2%) had CRVO, 3(33.3%) had HRVO and 59(40.1%) had BRVO. Table 3 showed that majority 78(39.0%) patients were housewife, among them 18(40.9%) had CRVO, 3(33.3%) had HRVO and 57(38.8%) had BRVO. Other results are depicted. Table 4 showed that majority 117(58.5%) patients came from rural area. Among them 26(59.1%) patients had CRVO, 6(66.7%) had HRVO and 85(57.8%) had BRVO. Table 5 showed that most of the patients of CRVO & BRVO group belonged to middle class family with 63.6% of CRVO and 55.1% patients of BRVO were from the middle class strata. Majority 5(55.6%) patients of HRVO were from lower class strata. Table 6 showed that more than 50% of RVO cases were due to hypertension ($p<0.001$) and it was significantly higher in the BRVO patients (64.6%) than CRVO (20.5%) and HRVO patients (44.4%). Diabetes mellitus (DM) was significantly higher in the BRVO patients (43.5%) than CRVO (22.7%) and HRVO patients (33.3%). Dyslipidemia was significantly higher in the HRVO patients (88.9%) than CRVO (31.8%) and BRVO patients (13.6%). Smoker was significantly higher in the HRVO patients (77.8%) than CRVO (38.6%) and BRVO patients (27.2%). Glaucoma was significantly higher in the HRVO patients (33.3%) than CRVO (15.9%) and BRVO patients (6.8%). However, IHD, short axial length and hyperomocysteinemia were not significantly associated with RVO.

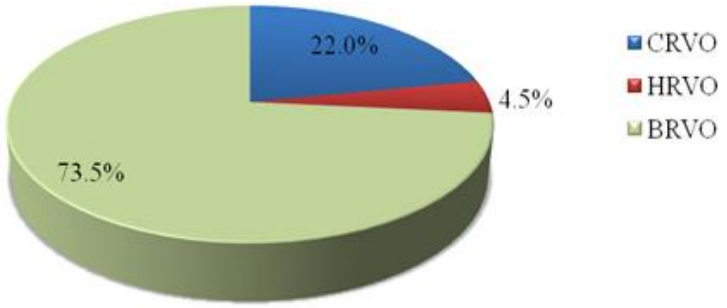

Figure 01: Distribution of RVO types (n=200)

Table 01: Age distribution of RVO patients (n-200)

Age group (years)	CRVO (n=44)		HRVO (n=9)		BRVO (n=147)		Total	
	N	%	n	%	n	%	n	%
≤40	4	9.1	0	0.0	5	3.4	9	4.5
41-50	15	34.1	0	0.0	17	11.6	32	16
51-60	3	6.8	0	0.0	42	28.6	45	22.5
61-70	8	18.2	6	66.7	53	36.1	67	33.5
>70	14	31.8	3	33.3	30	20.4	47	23.5

Table 02: Sex distribution of RVO patients (n-200)

Sex	CRVO (n=44)		HRVO (n=9)		BRVO (n=147)		Total	
	n	%	n	%	n	%	n	%
Male	25	56.8	6	66.7	88	59.9	119	59.5
Female	19	43.2	3	33.3	59	40.1	81	40.5

Table 03: Occupational status of RVO patients (n-200)

Occupational status	CRVO (n=44)		HRVO (n=9)		BRVO (n=147)		Total	
	n	%	N	%	n	%	n	%
Housewife	18	40.9	3	33.3	57	38.8	78	39.0
Agriculture	10	22.7	2	22.2	35	23.8	47	23.5
Service	12	27.3	2	22.2	12	8.2	26	13.0
Others	4	9.1	2	22.2	43	29.3	49	24.5

Table 04: Residence distribution of RVO patients (n-200)

Residence	CRVO (n=44)		HRVO (n=9)		BRVO (n=147)		Total	
	n	%	n	%	n	%	n	%

Rural	26	59.1	6	66.7	85	57.8	117	58.5
Urban	18	40.9	3	33.3	62	42.2	83	41.5

Table 5: Socioeconomic status of RVO patients (n-200)

Socioeconomic status	CRVO (n=44)		HRVO (N=9)		BRVO (N=147)		Total	
	n	%	n	%	n	%	n	%
Lower	13	29.5	5	55.6	57	38.8	75	37.5
Middle	28	63.6	4	44.4	81	55.1	113	56.5
Upper	3	6.8	0	0.0	9	6.1	12	6.0

Table 6: Risk factors of RVO patients (n-200)

Risk factors of RVO	CRVO (n=44)		HRVO (N=9)		BRVO (N=147)		Total	P value
	n	%	n	%	n	%		
Hypertension	9	20.5	4	44.4	95	64.6	108	0.001^{s}
IHD	6	13.6	2	22.2	21	14.3	29	0.792^{ns}
DM	10	22.7	3	33.3	64	43.5	77	0.042^{s}
Dyslipidemia	14	31.8	8	88.9	20	13.6	42	0.001^{s}
Smoking	17	38.6	7	77.8	40	27.2	64	0.003^{s}
Glaucoma	7	15.9	3	33.3	10	6.8	20	0.012^{s}
Short axial length	6	13.6	1	11.1	6	4.1	13	0.06^{ns}
Hyperomocysteinemia	0	0.0	0	0.0	0	0.0	0	0.00^{ns}

*S= significant; ns = not significant, P value reached from Chi square test

This prospective observational cross sectional study carried out with an aim to find out the demographic profile and risk factors of patients with retinal vein occlusion. Patients with other ocular diseases that create dilemma in diagnosis were excluded from the study. The present study findings were discussed and compared with previously published relevant studies. In this study majority 147(73.5%) patients were diagnosed with BRVO, 44(22.0%) were diagnosed with CRVO and 9(4.5%) were diagnosed with HRVO. In a study [12] described that 203 (36.4%) patients were diagnosed with CRVO and 354 (63.6%) patients were diagnosed with BRVO. A study [13] reported that central retinal vein occlusion (CRVO) 20 (74%) was more predominant than branch retinal vein occlusion (BRVO) 7 (26%). Another study [14] had observed that the prevalence of RVO, CRVO, BRVO, and HRVO in the population was 0.40%, 0.8%, 0.32%, and 0.1%, respectively. The prevalence for BRVO and CRVO in these two studies was 0.6% vs. 0.5% and 0.2% vs. 0.1%, respectively [15]. Present study observed that the commonest (33.5%) age group affected in RVO was 61-70 years. The HRVO and BRVO patients were predominantly in the 61–70 years of age group (66.7%) and (36.1%) respectively. CRVO patients were predominantly in the 41–50 years of age group (34.1%). In a study [16] showed the commonest (60.87%) age group affected in RVO was 50-69 years. A study [17] reported that the BRVO and CRVO patients were predominantly in the 61–70 years of age group (36.7%). They found RVO more in the elderly, and the proportion of BRVO cases rose with increasing age as compared with CRVO cases. Another previous study [18] consisted that the mean ages

were similar in both groups (59.8 yr [range: 16-89]) for CRVO and 58.2 yr [range: 31-97] for BRVO). Also, there were no differences in terms of the age distributions. In this current study it was observed that male patients was found in 119(59.5%) and female was 81(40.5%). Among male patients, 25(56.8%) had CRVO, 6(66.7%) had HRVO and 88(59.9%) had BRVO. In female patients, 19(43.2%) had CRVO, 3(33.3%) had HRVO and 59(40.1%) had BRVO. In CRVO group, 55.5% of the patients were male and 44.4% were female. In patients with BRVO, 57.1% were male and 42.8% were female. Ponto et al.[9] reported that of those, 6456 (49.8%) were women and 6498 (50.2%) were men. One female participant of the youngest age decade had an HRVO (weighted prevalence: 0.07%). Males were 1.7 times more frequently affected by RVO (prevalence of RVO in men: 0.52%) than females (0.29%). Overall, 22 (37.3%) of 59 persons with RVO, 18 (38.3%) of 47 with BRVO and four (33.3%) of 12 persons with CRVO were women. Thapa and colleagues [10] showed out of 127 male patients, 84 patients with BRVO, 3 with BRVO/CRVO and 40 with CRVO. A population-based study in Singapore [19] showed a slight female preponderance of RVO, but the difference was not statistically significant. Another study done by Lee et al.[4] demonstrated that the CRVO population contained similar proportions of men and women, however the number of female patients was higher in the BRVO population Thus, our study is in accordance with the work of the above said authors. In this study observed that majority 78(39.0%) patients were housewife, among them 18(40.9%) had CRVO, 3(33.3%) had HRVO and 57(38.8%) had BRVO. Majority 117(58.5%) patients came from rural area. Among them 26(59.1%) patients had CRVO, 6(66.7%) had HRVO and 85(57.8%) had BRVO. Present study showed that most of the patients of CRVO & BRVO group belonged to middle class family with 63.6% of CRVO and 55.1% patients of BRVO were from the middle class strata. Majority 5(55.6%) patients of HRVO were from lower class strata. In a study done [11] reported that most of the patients of both CRVO & BRVO group belonged to middle class family/ i.e, 83.33% of CRVO and 91.3% patients of BRVO were from the middle class strata. Regarding risk factors of RVO in this study observed that hypertension was significantly higher in the BRVO patients (64.6%) than CRVO (20.5%) and HRVO patients (44.4%). Diabetes mellitus (DM) was significantly higher in the BRVO patients (43.5%) than CRVO (22.7%) and HRVO patients (33.3%). Dyslipidemia was significantly higher in the HRVO patients (88.9%) than CRVO (31.8%) and BRVO patients (13.6%). Smoker was significantly higher in the HRVO patients (77.8%) than CRVO (38.6%) and BRVO patients (27.2%). Glaucoma was significantly higher in the HRVO patients (33.3%) than CRVO (15.9%) and BRVO patients (6.8%). However, IHD, short axial length and hyperomocysteinemia were not significantly associated with RVO. In a study conducted by Lee et al.[4] reported that the prevalence of DM and hypertension was generally high in both groups. However, the prevalence of hypertension at baseline was higher in the BRVO group (48.2%) than the CRVO group (34.7%, $P = 0.002$). In terms of DM, CRVO patients (20.2%) demonstrated a higher prevalence at baseline than BRVO patients (9.9%, $P = 0.001$). Hypertension may be a more important contributing factor to the development of BRVO, and DM may be related to the development of CRVO. Many of our cases suffered from both diabetes mellitus and hypertension, and although this was a significant risk factor for BRVO, it was not for CRVO. Diabetes in the absence of hypertension was not a significant risk factor for any form of RVO, similar to the results of Ratz et al.[17]. Deb and Paul[11] observed that 52.17% cases of RVO (24 out of 46 cases) were suffering from hypertension. In CRVO patient group, 47% cases were hypertensive and in BRVO, it was 55%. Thus, incidence of hypertension in our study was higher in patients with BRVO than CRVO. Quinlan et al.[18] found 18% of central vein occlusion were associated with diabetes in elderly patients, whereas only 8% cases of younger age group, below 50 years having diabetes. Deb and Paul[11] study showed 13 patients (28.2%) with RVO were diabetic. 29% were in CRVO group & 27% were in BRVO group. Dodson et al.[19] in their study found a significantly increased prevalence of hyperlipidemia (28.8%)

and hypercholesterolemia (23.7%) in the group of branch retinal vein occlusion and of hyperlipidemia (32.2%) and hypercholesterolemia (22.5%) in the group with central vein occlusions compared to the controls. In a study done by Ponto et al.[9] reported that regarding arterial hypertension in participants with CRVO and BRVO, 1 (8.3%) vs. 5 (10.6%), 2 (16.7%) vs. 14 (29.8%), and 6 (50%) vs. 18 (38.3%) participants with CRVO vs. BRVO were unaware of their hypertension, had uncontrolled/insufficiently treated hypertension, and had well-controlled arterial hypertension, respectively. Three (5.1%) of 59 persons with RVO had glaucoma (two BRVO and one CRVO) vs. 287 (2.2%) cases of glaucoma in 12 890 participants without RVO (P = .139). Thapa et al.[10] also described that hypertension was significantly higher in the BRVO patients (60%) than in control patients (16%), and combined hypertension and diabetes was significantly high in BRVO patients (10.3%) than in controls (2%). Likewise, hypertension was significantly higher in CRVO patients (51.7%) than in controls (16%). Cardiac diseases were also significantly higher in BRVO patients (3.8%) relative to the control group (0.3%). Glaucoma was found in 11.9% of the RVO patients; and primary open angle glaucoma (POAG) accounted for half of the glaucoma cases. Thus, our study corroborates with the studies of the above authors. Multicentered study, large sample was not included in this study. Therefore, in future, multicentered study may be under taken with large sample size. Unwilling participants were not included in this study.

4. CONCLUSIONS

In conclusion, RVO is a significant cause of visual impairment, with BRVO being more common. The commonest age group affected in RVO was 61-70 years and male are more predisposed to the disease than female. The results of this study show that hypertension and DM were strongly associated with BRVO and dyslipidemia, smoking and glaucoma were more strongly associated with CRVO in patients with RVO. The findings obtained at the initial visit and the ocular imaging data obtained at baseline give us additional information related to visual acuity. The results of this study can be applied to future studies on RVO.

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