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Research Article

A STUDY OF EYE CONDITIONS RELATED TO RETINAL VEIN OCCLUSION

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ABSTRACT

BACKGROUND: A significant factor in vision loss is retinal vein occlusion (RVO). Branch retinal vein occlusion (BRVO) is 4–6 times more common than central retinal vein occlusion (CRVO) among the two primary kinds of RVO. Ageing is a primary risk factor for RVO. Systemic diseases include hypertension, arteriosclerosis, diabetes mellitus, hyperlipidemia, vascular cerebral stroke, blood hyperviscosity, and thrombophilia are additional risk factors. Metabolic syndrome (hypertension, diabetes, and hyperlipidemia) is a significant risk factor for RVO. RVO risk is significantly higher in people with end-organ damage brought on by diabetes mellitus and hypertension. Additionally, socioeconomic status appears to be a risk factor. Compared to non-Hispanic whites, American blacks are diagnosed with RVO more frequently. Some research indicate that women are less at risk than men. It is still debatable how thrombophilic risk factors affect RVO.

AIM: The study's goal is to investigate the ocular morbidities brought on by retinal vein blockage.

MATERIAL AND METHOD: This cross-sectional observational study was conducted in the department of ophthalmology. Prior to the assessment, all subjects provided their written, informed consent. They were informed of and given an explanation of the study's purpose. The patient's name, age, and gender were documented. The questioner inquired about the illness's past. The question of any prior ocular trauma was raised. It was asked if there had ever been any eye surgeries. A systemic illness history was gathered. A comprehensive ophthalmologic examination was performed on all individuals. A Snellen's Chart that was lit was used to evaluate the vision. There was a thorough slit lamp assessment. A direct ophthalmoscope, an indirect ophthalmoscope, and slit lamp biomicroscopy were used for dilated fundoscopy. When necessary, an optical coherence test was performed to confirm the existence of macular edema. Acuity between 6/18 to 6/60 was considered to be visual impairment, whereas acuity greater than 6/18 was considered to be blindness.

RESULTS: The patients ranged in age from 41 to 77, with a median age of 66 and a mean age of 58. There were 57 female patients and 43 male ones. 54 patients had BRVO, 38 patients had CRVO, and 8 individuals had HRVO. Statistics did not support the relationship between BCVA and RVO. 11 BRVO patients also experienced macular edema. Vitreous hemorrhage (VH) was present in 16 individuals with CRVO, while ME and iris neovascularization (INV) were present in 9 and 3 patients, respectively. Disc neovascularization (DNV) affected 4 patients. One HRVO patient had VH. Compared to patients with BRVO and HRVO, patients with CRVO had a higher incidence of ocular problems.

CONCLUSION: Complications that could endanger vision have been observed with RVOs. Therefore, it is crucial to diagnose the disease as soon as possible. The burden of blindness can then be considerably reduced by using a variety of treatment approaches to address these issues. In our hospital, central retinal vein occlusion is more typical compared to peripheral retinal vein occlusion.

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Women are more likely than men to be impacted. RVO-related problems can cause blindness that is irreversible. Early diagnosis of these can therefore contribute to lowering the social cost of blindness.

KEYWORDS: Retinal vein occlusion, Branch retinal vein occlusion, Central retinal vein occlusion, Incidence, Pattern, Risk Factors.

INTRODUCTION:

Retinal disorders, of which retinal vein occlusions (RVO) are the second most prevalent after diabetic retinopathy, are a growing cause of vision loss and blindness worldwide.[1,2] A rise in systemic disorders such hypertension, diabetes mellitus, cardiovascular diseases, and hyperlipidemia predispose to retinal issues may result from changes in lifestyle habits.[3,4] Blindness from vision-threatening sequelae can come from improper diagnosis and inadequate treatment, which can cause irreversible visual impairment.[5,6] The second most prevalent retinal vascular disorder after diabetic retinopathy is retinal vein occlusion (RVO). Branch retinal vein occlusion (BRVO) and central retinal vein occlusion (CRVO) are the two kinds of RVO. More cases of BRVO than CRVO occur. A branch of the retinal vein system is blocked in BRVO, whereas in CRVO, the central retinal vein is blocked.[7] Hayreh divided RVO into three types: (1) BRVO is divided further into major BRVO and macular BRVO; (2) CRVO is divided into ischemic and nonischemic types; and (3) hemi-CRVO with involvement of only one half of the retina surface and like CRVO is divided into ischemic and nonischemic types.[8] After diabetic retinopathy, central retinal vein occlusion and branch retinal vein occlusion make up the second most frequent retinal vascular disease worldwide. Retinal vein blockage has been shown in reports on eye illnesses from various parts of Nigeria to contribute to ocular morbidity.[9,10] Abiose[11] and Ayanru[12] in earlier studies separately reported the rarity of retinal vascular diseases, including retinal vein occlusion in Nigeria. However, a hospital-based study in Anambra State revealed that 12.5% of retinal disorders are caused by retinal vein blockage.[13]

Retinal vein occlusions (RVOs) are the second most frequent retinal vascular disorder after diabetic retinopathy.[14] If left untreated, they can result in substantial visual loss.[15] It is a retinal venous obstruction that can either be a central retinal vein occlusion (CRVO), a branch retinal vein occlusion (BRVO), or a hemi retinal vein occlusion (HRVO). Macular edema and VH are two ocular problems that RVO patients may experience. In 5-15% of eyes with RVO, macular edema develops over the course of a year.[16] The precise pathophysiology of CRVO is still unknown. A thrombus that is lodged in the posterior lamina cribrosa or the central retinal vein causes obstruction. alterations in venous flow follow endothelial alterations as a result of artery and vein stenosis in the central retina. Alternatively, it has been proposed that compression or inflammation of the optic nerve, structural abnormalities of the orbit, or alterations to the lamina cribrosa are some of the initial lesions that cause central retinal vein thrombosis, which is an end-stage condition.

The Guinness Eye Center treated any ocular or systemic conditions that were known to predispose to retinal vein occlusion in addition to providing low doses of aspirin in the hopes of reducing blood platelet aggregation. As the center's laboratory at the time lacked the capacity to quantify serum lipids and cholesterol, laboratory examinations were restricted to packed cell volume and platelet counts. There were no laser therapy or fluorescein angiography facilities available.[17] Branch retinal vein occlusion (BRVO) and central retinal vein occlusion (CRVO) are quite common in Caucasian adults aged 40 and older, with prevalence ranging between 0.6% and 1.1% and 0.1-0.4%, respectively.[18,19] RVO treatment continues to be difficult because of its complex character. The number of therapies that have been evaluated in the treatment of RVO (laser photocoagulation, intravitreal steroids, and anti-VEGF agents, surgical procedures—pars plana vitrectomy, and systemic treatments—hemodilution, anticoagulation therapy, and fibrinolysis) have not yet been

demonstrated in large randomized studies to be the most effective causal treatment.[20]

MATERIAL AND METHODS

This cross-sectional observational study was conducted in the department of ophthalmology. Prior to the assessment, all subjects provided their written, informed consent. They were informed of and given an explanation of the study's purpose. The patient's name, age, and gender were documented. The questioner inquired about the illness's past. The question of any prior ocular trauma was raised. It was asked if there had ever been any eye surgeries. A systemic illness history was gathered. A comprehensive ophthalmologic examination was performed on all individuals. A Snellen's Chart that was lit was used to evaluate the vision. There was a thorough slit lamp assessment. A direct ophthalmoscope, an indirect ophthalmoscope, and slit lamp biomicroscopy were used for dilated fundoscopy.

An applanation tonometer was used to measure the intraocular pressure. A fundus camera was used to take pictures of the fundus. When necessary, an optical coherence test was performed to confirm the existence of macular edema. Blindness was defined as visual acuity >6/18, while acuity <6/18 – 6/60 was regarded as visual impairment.

Inclusion criteria

- Patients diagnosed with CRVO, BRVO, and HRVO

Exclusion criteria

- Cataract and other media opacities (fundus details not seen).
- Other associated acute ocular morbidity like uveitis.
- Diagnosed cases of RVOs were then looked for the following complications:
- Macular Edema (ME).
- Vitreous Hemorrhage (VH).
- Iris Neovascularization (INV).
- Disc Neovascularization (DNV)

A standard questionnaire was used to get a thorough history. Each patient had their blood tested for non-fasting blood sugar levels, and conventional techniques were used to evaluate each subject's blood pressure, height, weight, and belly circumference. The self-reported history was used to gather information about age, gender, education level, occupation, use of tobacco and alcohol, exposure to sunlight, intake of antioxidant vitamins, and the existence of systemic issues such diabetes mellitus, hypertension, hyperlipidemia, and other heart illnesses. Weight in kilograms divided by the square of height in meters (Kg/m^2) is the formula used to determine body mass index (BMI). Blood samples from the veins were collected to measure non-fasting blood sugar. The use of diabetic drugs or a chance blood sugar level of 200 mg/dl or above were both used to make the diagnosis of diabetes mellitus. All participants with systolic blood pressure greater than 140 mmHg, diastolic blood pressure greater than 90 mmHg, or antihypertensive drug use had their blood pressure (BP) tested. Written in plain language and read aloud for those unable to read, informed consent was provided. Before being included in the study, subjects were requested to sign a consent form. For those who were unable to do so, thumb imprints were collected instead. A common proforma was used to collect and analyze data on visual acuity, clinical diagnosis, including the kind of venous blockage, ocular complications, and systemic and ocular risk factors.

STATISTICAL ANALYSIS

For quantitative and qualitative analysis, mean and standard deviation, frequency, and percentage tables were used. Fisher, Student, and Chi-Square tests were used to see whether there was any association between the research groups. A p-value of 0.05 or less was regarded as significant. For statistical analysis, SPSS ver. 20 and MS Excel were both used. MS Excel 2010 was used for the graphic representation.

RESULT: -

BRVO was found in 54(54%) patients, CRVO in 38 (38%) patients, and HRVO in 8 (8%) patients.

Table 1: Association of BCVA and RVO

Type of Occlusion	>6/18		BCVA 6/18 - 6/60		< 6/60		Total	
	N	%	N	%	N	%	N	%
BRVO	5	5%	12	12%	37	37%	54	54%
CRVO	2	2%	7	7%	29	29%	38	38%
HRVO	1	1%	1	1%	6	6%	8	8%
Total	8	8%	20	20%	72	72%	100	100%

5 (5%) patients with BRVO had the best corrected visual acuity (BCVA) of >6/18 while 12 (12%) and 37 (37%) patients had BCVA in the range of 6/18 – 6/60 and <6/60 respectively. 2 (2%) patients with CRVO had BCVA of >6/18 while 7 (7%) and 29 (29%) patients had BCVA in the range of 6/18 – 6/60 and <6/60 respectively. 1 (1%) patient each with HRVO had BCVA of >6/18 and 6/18 – 6/60 while 6 (6%) patients had BCVA in the range of <6/60. The association between BCVA and RVO was statistically not significant.

Table 2: Association of ocular complications and RVO

	Ocular Complications							
Type of Occlusion	VH		ME		INV		DNV	
	N	%	N	%	N	%	N	%
BRVO	0	-	11	11%	0	-	0	-
CRVO	16	16%	9	9%	3	3%	4	4%
HRVO	1	1%	0	-	0	-	0	-

11 (11%) patients with BRVO had Macular Edema (ME). 16 (16%) patients with CRVO had Vitreous Hemorrhage (VH) while 9 (9%) and 3 (3%) patients had ME and Iris Neovascularization (INV) respectively. 4 (4%) patients had Disc Neovascularization (DNV). 1 (1%) patient with HRVO had VH. The incidence of ocular complications was higher in patients with CRVO as compared to patients with BRVO and HRVO.

Table 3. Age and sex distribution

Age (Years)	M	F	Total	%
41-50	5	13	18	14.6
51-60	18	9	27	22.6
61-70	16	20	36	41.9
≥71	4	15	19	20.9
Total	**43**	**57**	**100**	**100.0**

The age range of the patients was 41–77 years; with a median of 66 years and a mean of 58 years. There were 43 (39.5%) male and 57 (60.5%) female patients.

DISCUSSION

100 patients were participated in this hospital-based cross-sectional observational study to examine the ocular morbidity and risk factors for RVO. A total of 54 patients had BRVO. 38 individuals had CRVO, and 8 had hemi retinal vein occlusion (HRVO).

Sankar B et al 2016[21] reported that 9 of the 13 cases of CRVO had macular edema, 4 cases showed CNP. 4 out of 35 cases of BRVO, showed areas of capillary non-perfusion (CNP) alone, without neovascularization, out of which

1 had CNP more than 5 DD. Four instances exhibited NVD/NVE evidence, twenty cases had macular edema, and two cases had both neovascularization and macular edema. **Sankar B et al.2016**[21] reported that 4% of cases of CRVO and 50% of cases of HCRVO presented with less than 6/60 visual acuity. While among cases of BRVO, this number was 49%.

Fiebai B et al 2014[22] study assessing the incidence and risk factors of RVO, reported that macular edema, vitreous hemorrhage, and neovascularization (both iris and disc) were the ocular complications associated with RVO. Out of the 27 cases, 19 (70.4%) had these. VH (52.6%) was the most frequent consequence and it affected patients with CRVO the most (94.7%). **Prajapati VA et al.2014**[23] observed that vision loss was more in CRVO than in BRVO. The most frequent problem, reported by 43 (86%) individuals, was macular edema, followed by neovascular glaucoma in 10 (20%) patients.

Mitchell et al. 1996[24] reported bilateral involvement in 5.1% of subjects. The larger percentage in our population may be brought on by the presence of more old people and unchecked systemic disorders. For additional analysis, the lipid panel and glycosylated hemoglobin would be useful. The two studies' different sample sizes could be the cause of the different laterality. According to a study conducted in a significant teaching hospital in the United States, patients with retinal vein blockage also had increased rates of hypertension and diabetes mellitus.[25] Treatment options could alter how these ocular and systemic risk factors progress. In order to possibly avoid the development of the condition, aggressive treatment of the ocular and systemic risk factors is advised.

The recently published meta-analysis of **Jaulim et al.2013**[26] showed pooled data on main and subsidiary risk factors connected to BRVO. **Rogers et al.2010**[27] showed a 1.57 per 1,000 prevalence of BRVOs in 40-to-49-year-olds (4.58 per 1,000), in 50-to-59-year-olds (11.11 per 1,000), and in 60-to-69-year-olds, 12.76 per 1,000 in 70-to-79-year-olds, and 10.32 per 1,000 in those older than 80 years. The prevalence in subjects older than 80 is 7 times higher than in people from 40 to 49 years. **Glueck et al.2008**[28] in a case-control study identified elevated homocysteine and factor V Leiden mutation as risk factors but found no association of anticardiolipin antibodies or lupus anticoagulant with CRVO. **Di Capua et al.2010**[29] in a recent large case-control study found no association between CRVO and thrombophilic risk factors, including homocysteine levels and anticardiolipin antibodies.

The study's strength is the magnitude of the geriatric age group's sample. The main drawback of the study is that we are unable to make any generalizations about the prevalence and risk factors of RVO in the younger population. The inability to conduct lipid panel tests and testing for glycosylated hemoglobin in this population-based study prevented further investigation of risk factors. Patients with retinal vein occlusion may have experienced default issues as a result of a lack of facilities for appropriate treatment that has been demonstrated to work. However, retinal vein blockage as a cause of blindness and impaired vision is widely established. One prevalent retinal vascular condition in the elderly is retinal vein blockage. Ageing and hypertension were the main risk factors for RVO. Regular eye exams for those at high risk, along with early detection and treatment of retinal vascular occlusions, may help this older population from becoming blind.

CONCLUSION:

Complications that could endanger vision have been observed with RVOs. Therefore, it is crucial to diagnose the disease as soon as possible. The burden of blindness can then be considerably reduced by using a variety of treatment approaches to address these issues. In our hospital, central retinal vein occlusion is more typical compared to peripheral retinal vein occlusion. Women are more likely than men to be impacted. Based on visual acuity at presentation, the condition has a deleterious influence on vision, increasing low vision and blindness, though primarily uniocular. Therefore, it is important to inform patients

about the disease's characteristics, including known risk factors and its natural course. It is imperative to provide facilities for the study and efficient treatment of the condition.

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