Original Article

Retinal Vein Occlusion with Hypertension

Frequency of Retinal Vein Occlusion (RVO) and its Association with Hypertension by Variability of Retinal Hemorrhages at Fundoscopy after Retinal Vein Occlusion in Patients with Hypertension

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ABSTRACT

Objective: To find out the frequency of RVO and its association with hypertension by variability of retinal hemorrhages at fundoscopy after retinal vein occlusion in patients with hypertension.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Sindh Institute of Eye Hospital, Hyderabad from 28 December 2019 to 15 May 2019.

Materials and Methods: This study was performed on 89 patients in the age of >30 years < 70 years, and recently diagnosed central retinal occlusion cases were included. Hypertension diagnosis was confirmed and 89 patients were treated at the age of 35 years. By careful exam of the fundus of 90 D Volk Lens on Slit Lamp and fundus photography. The researchers initiated their work and an experienced ophthalmologist verified their final diagnosis. Statistical package for social science version 20 was used to analyze data.

Results: A total of 89 patients who have hypertension with retinal vein occlusion (RVO) have received fundoscopy. We discovered that age (OR =1.72, 95 percent CI: 1.27–2.34), hypertension (OR =2.56, 95 percent CI: 1.31–5.08), stroke history (OR =2.08, 95 percent CI: 1.01–4.45), and hypercholesterolemia (OR =1.84, 95 percent CI: 1.01–3.35) were significantly associated with RVO. Uncontrolled hypertension (OR =3.46, 95 percent CI: 1.72–6.94) and un-medicated hypertension (OR = 4.12, 95 percent CI: 2.01–8.46) were significantly linked with RVO in a sample of hypertensive patients.

Conclusion: Hypertension, a particularly modifiable risk factor, was the most strongly associated factor for RVO in our study.

Key Words: Fundoscopy, Retinal vein occlusion, Hypertension.

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INTRODUCTION

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The second most common vision-threatening retinal vascular disease, which results in blindness following hypertensive retinopathy, is retinal vine occlusion.[1] Retinal occlusion incidence is between 1.6% and 1.9%.[2,3] U.S., European, Asian and Australian population-based studies have shown that retinal occlusion (aged 30 or older) has been estimated at around 16,4 million by 2008,[4] a rise suspected of up to 16 million by 2020, and in Asia, just 21 billion by 2040.[5] Increasing age, systemic hypertension, and glaucoma 6 and hypermetropia are major risk factors.[6] Typically, retinal occlusion patients suffer from acute loss of one eye, with few patients having bilateral vision loss with visual field failures.[1,7]

As a result of the prevalence of diabetic retinopathy, retinal vein occlusion (RVO) ranks second. As a result of RVO, the macular edema or vitreous hemorrhage might induce visual impairment.[1,8] Pathogenesis of RVO is generally related to venous lumen compression caused by arterial hemodynamic changes or

inflammation.[9] According to numerous investigations, including cohort studies, the prevalence of RVO ranges from 0.3 percent to 1.6 percent, however few studies revealed that that RVO is connected with hypertension or diabetes and ophthalmic problems.[4,5,10–15]

The common fundus findings of the retinal vein occlusion are expansion and tortuosity of the retinal veins, hemorrhages in the form of dots and Flamm, swollen optic discs, spots of cotton, and macular edema and exudates of lipids.[16,17]

The findings of this research will assist clinicians in determining the frequency of RVO and its association with hypertension by the variability of retinal hemorrhages at fundoscopy after retinal vein occlusion in patients with hypertension.

MATERIALS AND METHODS

This cross-sectional research was done for six months from 28 December 2019 to 15 May 2019 with 89 patients in the Sindh Institute of Ophthalmology and Visual Studies at the Eye Hospital in Hyderabad. Those were >30 years of age <70 years, both male and female, recently case of hypertension for central retinal vein occlusion was diagnosed and the diagnosis confirmed by an occluding ophthalmologist consultant. Those with old Central Retinal Vein occlusion for 3 months, Hypertension patients, Central Retinal Vein occlusion, Hypermetropia in younger age below 30 years, conditions under which fundus findings are hard to judge because of media opacity (corneal dullness, vitreous haemorrhage, dense catarack)

Patients were enrolled for the study after approval of Synopsis, using a meticulous fundus test by 90 D Volk Lens on Slit Lamp and a Fundus Photography by means of the inclusion and exclusion criteria of the Sindh Ophthalmology and Visual Sciences Department in Eye Hospital Hyderabad. The initial testing work was done and an experienced ophthalmologist verified his final diagnosis.

The statistical package for the social sciences version 20 has been entered and analyzed. For continuous variables like age, mean and standard deviations were measured. In hypertensive, frequency and percentage were measured for clinical retinal hemorrhages following retinal vein occlusion. The logistic regression analysis was used and p <0.05 was found to be a significant level.

RESULTS

A total of 89 patients with the diagnosis of retinal vein occlusion (RVO) with hypertension were seen in the Sindh Institute of Ophthalmology and Visual Sciences Hyderabad to compare the variability in retinal hemorrhage after retinal vein occlusion in patients with hypertension. The minimum age was 33 years and the maximum age was 70 years with mean age + SD (range) 54.93 + 8.854 years.

In this research, females were 46 (51.6 percent) and males were 43. Patients were divided into three classes by age. The majority of patients (67.4%) were in the 51-70 age groups; 21(23.6%) were in the 41 to 50 years' age group and 8(9.0%) were in the 31 to 40 years age group.

There was a 0.6 0.1 percent prevalence of RVO in the Korean population over the age of 19. In both genders, the prevalence of RVO was similar (0.6 0.1 percent). 1.0 0.1% of participants older than 40 years of age were included in our analysis. The prevalence of both subtypes was the same, at 0.6 0.1%, but the prevalence of CRVO was substantially lower, at 0.1 percent (3 male and 6 female participants). Participants younger than 40 years of age had a low incidence of RVO, while those younger than 60 years of age had no CRVO.

Table No.1:Baseline characteristics of the patients (n = 89)

	Frequency	**%**
Mean age ± SD (range)	54.932 ± 8.854 (33 to70 years)	-
Gender		
Male	43	48.31%
Female	46	51.6%
Age (in groups)		
31-40 years	8	9%
41-50 years	21	23.6%
51-70 years	60	67.4%
Laterality of Eyes		
Right eye	56	63%
Left eye	33	37%
Risk factor		
Diabetes Mellitus	40	45%
Hypertension	49	55%
BCVA		
>6/18	6	6.74%
6/18 – 6/60	25	28%
<6/60	58	65%
Duration		
<1 Month	58	65.1%
1-2 Months	22	24.7%
2-3 Months	9	10.1%

Table No.2: Outcome of RVO patients for a different type of retinal hemorrhages in hypertension (n= 89)

Outcome	**Retinal Hemorrhages**		**Total**
	Yes	No	**n = 89**
Dot blot hemorrhages			
Hypertension (n = 49)	46(90.5%)	3 (7.5%)	49(55%)
Flame shaped hemorrhages			
Hypertension (n = 49)	29(65.5%)	20 (38.5%)	49(55%)

Table No.3: Comparison of characteristics between participants with and without retinal vein occlusion (n = 89)

	RVO(n=56)		Non RVO (n=33)	Standard error	P value
	Weighted estimated value	Standard error	Weighted estimated value		
Age, y	62.7	1.2	44.3	0.9	<0.0001
Sex, % female	52.5	4.3	50.5	0.3	0537
HbA1c,%	6.11	0.2	5.8	0.0	0.006
Diabetes, %	14.6	3.5	7.7	0.2	0.011
Pulse pressure	51.0	1.42	40.9	0.1	<0.0001
Systolic blood pressure, mm Hg	133.4	1.9	117.3	0.2	<0.0001
Diastolic blood pressure, mm Hg	82.5	1.3	76.5	0.1	<0.0001
Body mass index, kg/m2	24.4	0.2	23.6	0.0	0.006
Fasting glucose, mg/dL	103.1	1.9	96.4	0.2	0.015
Hypertension, %	70.2	3.8	25.6	0.4	0.009
History of stroke (%)	7.5	1.8	1.2	0.1	
History of cataract operation, %	2.1	0.9	0.8	0.1	0.017
Refractive errors (SE) _	0.9	0.2	0.4	0.2	<0.0001

Table No.4: Logistic regression analyses of associations between potential risk factors and retinal vein occlusion (n = 89)

	Univariate analysis			Age-adjusted multivariate analysis			All-adjusted multivariate analysis		
	OR	95%CI	P	OR	95%CI	P	OR	95%CI	P
Age (per 10 y)	2.07	1.86–2.30	<0.001				1.72	1.27–2.34	<0.001
HbA1c (per 1%)	1.24	1.06–1.46	0.009	1.00	0.72–1.38	0.975	0.98	0.54–1.79	0.994
Diabetes	2.03	1.17–3.54	0.012	0.88	0.50–1.57	0.675	0.54	0.20–1.50	0.216
Pulse pressure (per 1mm Hg)	1.05	1.04–1.06	<0.001	1.01	0.99–1.02	0.171	0.99	0.97–1.02	0.480
Body mass index (per 1 kg/m2)	1.06	1.02–1.10	0.002	1.05	1.01–1.10	0.019	1.01	0.94–1.09	0.876
Fasting glucose (per 1 mg/dL)	1.01	1.00–1.01	<0.001	1.00	0.99–1.01	0.659	1.01	0.99–1.02	0.445
Hypertension	6.86	4.80–9.80	<0.001	2.99	1.94–4.60	<0.001	2.58	1.31–5.08	0.004

RVO is linked by Hypertension and antihypertensive medication. Participants with managed hypertension were not more likely to have RVO than those without (a OR = 2.03, 95 percent CI: 0.94–4.41). In contrast, persons with uncontrolled hypertension, including those in stages 1 and 2, had significantly greater RVO than those without hypertension (stage 1 hypertension, a OR = 2.76, 95 percent CI:1.14–5.51) and stage 2 hypertension, a OR = 6.84, 95 percent CI: 2.36–19.83).

For example, hypertension management and antihypertensive medication are associated with RVO in Table 4. Patients with hypertension controlled by medication had a risk of RVO of 1.51 (95 percent confidence interval: 0.72–3.17; patients with hypertension uncontrolled had a risk of 1.02 (95 percent confidence interval: 0.35–3.00). The frequency of RVO was present in 56 (63%) in this study out of 89 patients.

In this study, the majority of RVO patients were found to be more commonly affected i.e. 49 (65%). The study consists of one type, i.e. one group of hypertension RVO is hemorrhagic in flame form, with 29 (55% of total patients) being hypertensive.

While the HTN as a risk factor indicated a hemorrhage of 37 (92.5%) dot-blots and 29 (72.5%) flammable bleeding among 40(45% of total patients) patients with HTN.

This study compared different types of retinal hemorrhaging with the test chi square, X2 tab value for two samples = 5,991 and p< 0,05 which i s considered significant in patients with retinal vascular occlusion (RVO) with hypertension.

In 49 hypertensive patients, the blot hemorrhage was measured as 1.7 in chi-square, flame-shaping hemorrhages in 29 hypertensive patients, and 43 high-patients and the calculated value was 4.26 in a chi-square examination. The best correction of the RVO patients' visual acuity BCVA on the 1st visit in this study is 6/18 in 6.74%, 6/18/60 in 28%, and 6/60% in 65%.

The symptoms in RVO patients were 65.1% less than one month, 24.7% within one to two months, and 10.1% between two and three months. In this study, 65.1% were seen.

DISCUSSION

In a study in Korea, Joo Yong Lee et al,[18] identified RVO patients in several age groups on 557 patients. 4.1% of people were younger than 40 years, 16% were between the ages of 40 and 49, 60% were between the ages of 50 and 70 and 18.3% were 70 years and older. In our sample, 9% were between the ages of 31 and 40 years, while 23,6% were between the ages of 41 and 50 years and 67,4% between the ages of 51 and 70 years. The findings of both studies were similar in some way, except that the research of Joo Yong Lee also included patients under the age of 30.

It has been reported that the prevalence of RVO is 1.6 percent in Australia's Blue Mountains Eye Study (BMES) and 0.8 percent in the Beaver Dam Eye Study (BDES) Several epidemiological research on RVO among non-white groups have been published in the last several years.[8,10] According to the Singapore Malay Eye Study (SiMES),[12] the Beijing Eye Study (BEES),[11] the Hisayama Study (HS),[13] CIEMS (Central India Eye and Medical Study),[14] and the Singapore Epidemiology of Eye Disease Study (SEEDS),[14] the prevalence of RVO in Asian populations older than 40 years was 0.7 percent (SEEDS).[5] There was no significant gender difference in the prevalence of RVO in adults 19 years of age, or in adults >40 years of age (0.6 percent of adults had BRVO, and 0.1 percent had CRVO). As compared to earlier studies, our prevalence estimates are modest.

A substantial association was found between RVO and hypertension, hypercholesterolemia, and stroke history, according to our studies. Except for the SiMES, hypertension has consistently been found as an RVO risk factor in numerous earlier research.[12] RVO patients have been found to have a greater stroke risk in recent research.

Tyler Hyungtaek Rim et al,[19] have stated, in a Korean analysis, that 83.2 percent of the risk factor for RVO was hypertension. Although 55% of patients with the risk factor hypertension and 45% of the risk factor for hypertension were identified in our study. The disparity between our research and Tyler H, who also selected hyperlipidemia, chronic renal failure, acute MI, stroke, is due to our selection of only two risk factors. But our research is well correlated with Tyler's study although there are few variations.

A research by Tyler Hyungtaek Rim et al,[19] concluded that 56.3% of all RVO patients involved in his study were female and 43.7% were males, with 51.7% being female and 48.3% being male. Both studies show a higher RVO incidence among women in comparison with men. This indicates a small gap in gender participation between the two studies.

E. Ramadevi et al,[20] in their retinal vein occlusions analysis - A clinical trial carried out in India showed that 51% of patients in the right and left eyes were affected by the right eye, compared to 47,000 in the left eye, in the left eye compared to 63,000 in the right eye and in the connection eye May be the sample size differs in laterality; in our case the sample size is greater than E. Ramadevi.[20]

In his research, Hayreh SS et al,[17] found that more than 60 percent of the eyes had moderate to no retinal haemorrhages, and 7 to 16 percent had serious retinal blood haemorrhage by splitting it into two classes i.e. non ischemic and ischemic RVO. Altogether 1% did not have retinal blocks, 42% had moderate retinal bleeding and 22% had serious retinal blooms, and 12% in the ischaemic RVO had mild retinal bleeding. 53% had serious bleeding. Although the occurrence or absence of retinal bleeding in RVO has been compared in our sample with two forms, namely 37% of the blotted bleeding in ic RVO and 46% of the blood in hypertensive RVO, 28% of the haemorrhage of the flame kind in ic RVO. The two experiments are similar in that both depict the appearance of retinal blemishes in RVO. Hayreh SS classified the retinal bleeding into mild, moderate and grave, as the retinal haemorrhages are split into three different forms seen in RVO.

Feibai B et al,[7] studied retinal vein occlusion in Nigeria and showed that the best correction of patients in the visual acuity was in patients >6/18 in three (8.82 percent), in patients 6/18-6/60 in 7(20.58), and in patients <6/60 in twelve(70.58) i.e. that most patients had BCVA less that 6/60 while BCVA was >6/18 in six(6.74%), in two patients (28 percent) and in one of them <10 in twelve (28%) Feibai B and al6 in one of them Despite the fact that our sample is greater than that study, this study corresponds well to our study.

E. Ramadevi et al[20] reported in their report that RVO symptoms were less than one month for 31,3%, 19,6% for 1-2 months, 25,5% for 3-5 months and 23,5% for 6-12 months, while RVO symptoms were less than one month for 65,1%, 24,7% for 1-2 months and 10,1% for 2-3 months. In the study, RVO and al[7] showed the period in 31, 3% of patients. Difference is that E. Ramadevi included patients who show symptoms for up to 1 year while patients with a period of symptoms for up to 3 months have been selected from our sample.

CONCLUSION

This research concluded that in patients with retinal vein occlusion (RVO) associated with Hypertension a large number of different forms of retinal hemorrhogen is present. It has been shown that dot blot haemorrhages are correlated with hypertension or high pressure in both the retinal vein occlusion, although in hypertensive patients they were significantly higher. Hypertension, a particularly modifiable risk factor, was the most strongly associated factor for RVO in our study.

Author's Contribution:

Concept & Design of Study: Muhammad Sibghatullah

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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