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Original Research Article

Clinical study of branch retinal vein occlusion

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ABSTRACT

Background: Many large case series about demographic characteristics and association of branch retinal vein occlusion (BRVO) with systemic diseases have been published in the western population. However this pattern of demographic characteristics in the developed countries may not be representative of epidemiology of disease in the developing countries because of the real paucity of reports from these areas. The study is therefore aimed at evaluating demographic characteristics, to identify the common systemic or ocular risk factors and common clinical presentation of BRVO patients.
Methods: Hundred consecutive newly diagnosed cases of BRVO were included in this study. A complete ophthalmic evaluation was done after obtaining informed consent. A complete history both ocular and medical with emphasis on hypertension, diabetes and symptoms concerning glaucoma were taken.
Results: Out of 100 patients 80 were males and 20 were females. Average age of total patients was 62. Commonest mode of presentation was diminution of vision in 80 patients followed by floaters in 10 patients. About 10 patients were asymptomatic at the time of presentation. Out of 100 patient 80 were hypertensives, 10 were diabetics and deranged lipid level was found in 38 patients. Raised imtraocular pressure (IOP) was found in 10 patients, shorter axial length in 40 and no other ocular association was found in 50 patients.
Conclusions: From this study we conclude that it is a disease of elderly age group and hypertension, hyperlipidaemia, shorter axial length are associated risk factors in patients with BRVO and must be looked for in such cases.

Keywords: BRVO, Diminution of vision, Ophthalmic evaluation

INTRODUCTION

RVO has been recognized as a distinct entity described as "retinal apoplexy, by Leibreich in 1854 and "haemorrhagic retinitis" by Leber in 1877.[1] Retinal vein occlusions (RVO) are the second commonest cause of reduced vision amongst retinal vascular diseases. Branch retinal vein occlusion (BRVO) is around three times more prevalent than central retinal vein occlusion and the fifth most frequent cause of blindness.[2-4] A western Australian report estimates that annual incidence of blindness due to BRVO is 0.41 %.[5]

RVO is an obstruction of the retinal venous system by a thrombus, vasculitis or by the external compression of the vein wall and the most common region of BRVO is at the arteriovenous crossing where the artery and vein share a common adventitial sheath.[6,7]

BRVO typically occurs in the middle aged and elderly patients (>50 yrs) with male predominance.[8-12] The predominant risk factors are cardiovascular diseases, diabetes, primary glaucoma and hyperlipidaemia.[7-11] Hypertension being the predominant risk factor among cardiovascular diseases. Neither high body mass index nor use of oestrogen or birth control pills showed any significant association with BRVO.[13,14]

On Pubmed search it was found that there is paucity of Indian data regarding demographic characteristics,

systemic and ocular risk factors associated with BRVO. Hence the present study was initiated to find out clinical presentation, demographic characteristics and common systemic and ocular risk factors associated with BRVO among the Indian population.

METHODS

It was a retrospective study where a total of 100 newly diagnosed cases of BRVO were included in this study after obtaining approval from the ethical committee. The study was done at a tertiary care hospital of Indian Air Force located at Bangalore, Karnataka from January 2016–December 2016. After excluding conditions like cataract, vitreous haemorrhage secondary to other causes and patients with history of allergy to sodium fluorescein dye, we enrolled total 100 patients.

A detailed history of ocular and medical illness with emphasis on hypertension, diabetes and symptoms concerning glaucoma were undertaken to identify the possible risk factors.

Following this a complete ophthalmic evaluation which includes external eye examination, visual acuity, refraction testing, anterior segment, intraocular pressure (IOP) and axial length measurement were done.

A detailed fundoscopic examination using direct, indirect and 90 D was done. Fundus fluorescein angiography (FFA) and its photographs were captured wherever applicable. Optical coherence tomography was recommended for patients in whom we suspected macular oedema as the cause of diminished vision.

Patients with history of systemic diseases were sent to physician for further evaluation. Necessary laboratory investigations were carried out to check for the risk factors.

Statistical analysis

Results on categorical measurements are presented in number and percentage. 90% confidence interval has been computed where required to find the incidence of significant study characteristics

RESULTS

In the present study, out of total 100 patients enrolled majority of patients were in the age group of 61- 70 yrs (60%) with male preponderance (80%) (Figure 1). Age wise and sex wise distribution also showed that patients in the age group of 61-70 were most affected as shown in Figure 1.

The most common clinical presentation was reduced vision (80%) and floaters (10%) (Figure 2).The causes of diminished vision were identified to be macular oedema (68%), other macular changes like macular ischaemia, pigment clumping and haemorrhage in the fovea (7%), vitreous haemorrhage (18.8%) and other causes (6.2%).

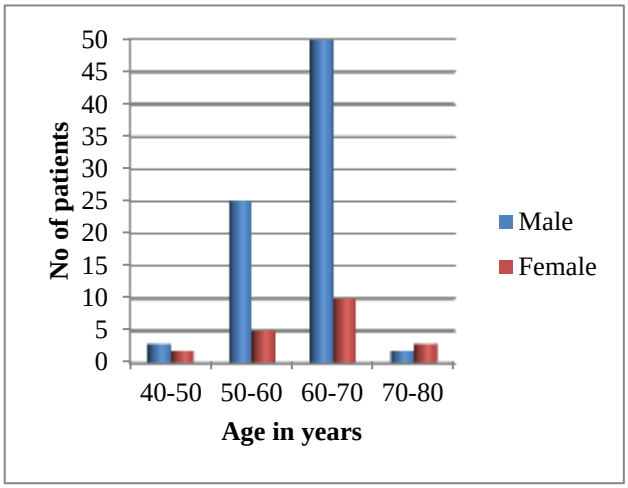

Figure 1: Age and sex wise distribution of study participants.

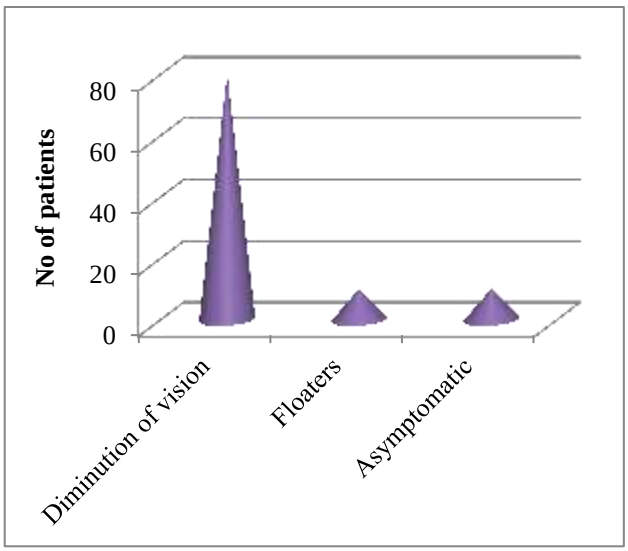

Figure 2: Clinical presentation of BRVO.

In this study 71 patients had BRVO in the left eye and 21 patients in the right eye (71% vs 29%) and both eyes were not affected in any case (Table 1).

Table 1: Characteristics of BRVO.

Characteristics	No. of patients	Percentage (%)
Laterality		
Left eye	71	71
Right eye	29	29
Both eyes	Nil	0
Nature of BRVO		
Multifactorial	62	62
Isolated	38	38

Superotemporal vein (ST) was involved in majority of patients (63%). The other veins involved were inferotemporal vein (IT) (29%), macular branch (5%) and nasal vessels (3%) (Figure 3). Ocular hypertension and short axial length were found in 10% and 40% respectively and 50% had no ocular association (Figure 4). There were multiple associations in 62% of patients and single cause in 38% patients (Table 1).

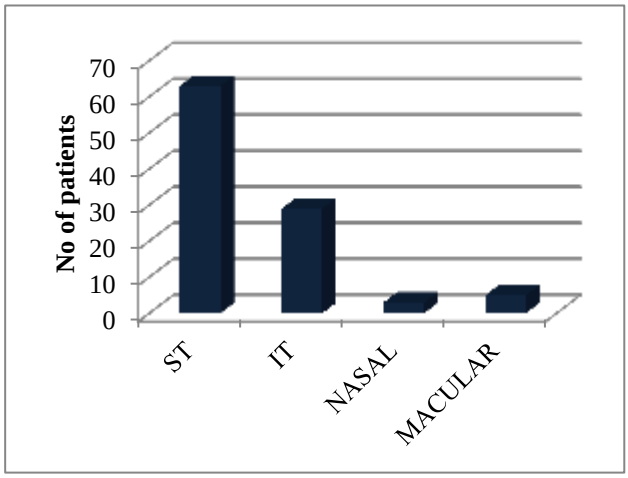

Figure 3: Quandrantic distribution of BRVO.

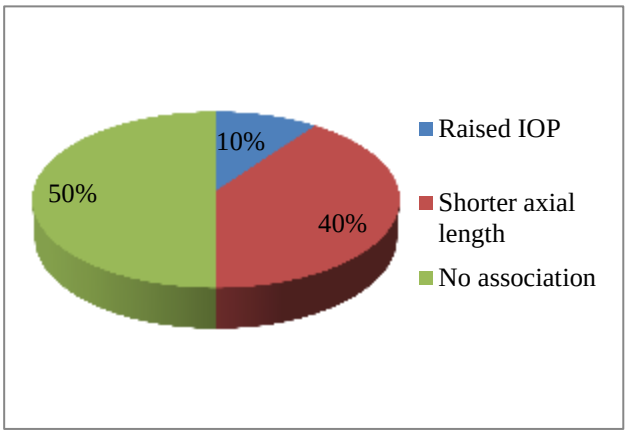

Figure 4: Ocular risk factors.

When assessed for the systemic diseases in our study, it was found that 80% had hypertension which includes both old and newly detected cases. Diabetes (10%) and dyslipidaemia (38%) were the other systemic diseases (Table 2).

Table 2: Systemic association of BRVO.

Systemic association of BRVO	No. of patients	Percentage (%)
Hypertension	80	80
Diabetes	10	10
Hperlipidaemia	38	38
No systemic association	10	10

DISCUSSION

The results from our study show that the BRVO pattern observed in India closely matches with the available reports on BRVO in western world. Although the incidence of BRVO in general population worldwide is 0.6% but it's complications are a cause of significant visual morbidity.[15] BRVO is frequently associated with various systemic medical conditions and improved understanding of these conditions could be a useful strategy in preventing these diseases.

In our study we noted that BRVO was common in the age group 61-70 yrs with an average age of 64 years in males and 60 years in females. Minimum and maximum age of presentation in males was 45 and 76 whereas in females it was 43 and 70 respectively, which indicates that incidence of BRVO seems to increase with increasing age. These findings are in conformity with study done by many authors.[3,5,9,16-19]

In our study we noted that out of 100 patients 80 were males (80%) and 20 (20%) were female patients. Our study on BRVO showed male preponderance which is in concordance with the study done by Jhonson et al, Rath et al as they reported higher rates in males.[20,21] However, these findings are in discordance with Blue mountain, Beaver Dam and eye disease case-control study group which found no significant differences in its distribution with regards to sex.[5,15,22] Hayrey et al reported that major BRVO is more common in females whereas macular BRVO is more common in males.[13] Simsek et al suggested that females have a higher risk than males because of high arterial overcrossings ratio.[23] Our study however clearly showed male predominance which needs to be confirmed by a large group study.

In our study we found that diminished vision was the prevalent clinical symptom and macular oedema the commonest cause of visual impairment which is in concordance with Hayrey et al.[2,13,17]

In our study left eye was involved of left eye (71%) more compared to right eye (29%) which is significant with actual 90% CI and bilateral BRVO was not found in any case. This is in conformity with Blue mountain study which reported BRVO was more frequent in the left eye (21 of 33 eyes than in the right eye (12 of 33 eyes) and is usually unilateral with 9% of patients having bilateral involvement.[5] Mandel et al also revealed BRVO was bilateral in 5% of cases.[14]

In the present study superotemporal vein involvement is more frequent (63%) compared to inferotemporal vein (29%) and nasal side of retinal vessels.[12] The arterio-venous crossings have been shown to be more frequent in the superotemporal quadrant than elsewhere and situated closer to the optic disc in the superotemporal than inferotemporal quadrant.[13,17] However, Blue mountain study reported BRVO occurred equally in the

superotemporal and inferotemporal quadrants and was infrequent outside the temporal quadrant.[5]

We also analyzed the association of various systemic (hypertension, diabetes) and ocular risk factors (ocular hypertension and shorter axial length) with BRVO.

Hypertension was significantly higher in the present study (80%) when compared to 18% in study carried out by Kutty et al in rural Kerala, 54% reported by Shrestha et al and 69% by Zachariah et al.[25-27] Hence it was concluded that there is a significant (with actual 90% CI) association of BRVO patients with hypertension.[5,13,17,20-24]

Association of diabetes and BRVO was observed in 10% which is similar to other studies conducted elsewhere.[2,3,5,9,12,28] It was noted that 38% of patients in the study group had a deranged lipid profile which is significant with actual 90% CI. This is in accordance with Blue mountain eye study which had reported hyperlipidaemia was an important associated systemic condition contributing 35% of cases. Zhou et al, Kolar et al, Fleibai et al, Shih et al also reported increased prevalence of hyperlipidaemia in patients with BRVO.[2,9,12,28]

In our study group, about 10% patients had ocular hypertension which is not significant with actual 90% CI and considered it not to be a risk factor.[3,9,11,12]

In our study group in 40% shorter axial length was found with a mean axial length of 22.41 mm.[29] Various studies have suggested that eyes with shorter axial length have a smaller disc and a narrower sclera canal, hence retinal vessels are enclosed within a limited space. As a result the blood flow in the vein disrupts that could cause endothelial damage and thrombus formation at the lamina cribrosa resulting in BRVO.[29,30] This theory of crowding of vessels within the disc in shorter eyes is in accordance with our findings of shortened axial length in eyes with BRVO. Hence it was concluded that shorter axial length is a risk factor for BRVO.

Out of 100 patients multiple associations were found in 62 patients and single cause was found in 38 patients (Table 1). Several studies have suggested multifactorial aetiology along with some isolated cases.[7,16,21,26]

The limitation of this study is that data from larger population are needed to further assess association between risk factors and the incidence of BRVO.

CONCLUSION

BRVO is commonly seen in the age group between 61-70 yrs with male predominance and the commonest mode of presentation was diminution of vision in the left eye. Hypertension and hyperlipidaemia are the common associated medical condition in patients with BRVO which must be looked for seriously. Association was also found with shorter axial length. The high association of systemic disorder especially hypertension reinforces the need of early and periodic eye examination for those suffering from these disorders.

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