

A Comparative Study of Branch Retinal Vein Occlusion and Central Vein Occlusion Amongst Malaysian Patients

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Summary

A retrospective study of 95 patients with retinal vein occlusion was carried out to determine the clinical presentation and pattern of distribution in the local Malaysian population. There was no significant difference found in its distribution with regards to sex. In comparing branch retinal vein occlusion with central retinal vein occlusion, no significant differences were found in its racial distribution. Branch retinal vein occlusion occurred more commonly among the older patients whereas the converse is true for central retinal vein occlusion. Reduced vision represents the commonest mode of presentation. Hypertension, diabetes mellitus, hyperlipidaemia and haematological disorders are important associated systemic conditions.

Key words: Central retinal vein occlusion, Branch retinal vein occlusion.

Introduction

Retinal vein occlusion is the most common retinal vascular disorder encountered in clinical practice after diabetic retinopathy. Several studies have provided evidence supporting an association between retinal vein occlusion and systemic medical conditions like hypertension, diabetes mellitus, hyperlipidaemia, atherosclerosis and hyperviscosity syndromes¹⁻⁷. A strong association between glaucoma and central vein occlusion has also been shown⁸. In younger adults, however, associated conditions are seldom encountered and the aetiology may be inflammatory in origin.

Ethnic difference in the incidence of retinal vein occlusion has been reported⁸. However, the incidence amongst the different races and the associated risk factors in the Malaysian population has not been studied.

This study was therefore carried out to determine the racial, sex and age distribution as well as the clinical presentation of patients with central retinal vein occlusion (CRVO) and branch retinal vein occlusion (BRVO) in the Malaysian population.

Materials and Methods

This study was a retrospective study of consecutive patients diagnosed to have retinal vein occlusion in the ophthalmology clinic, Universiti Kebangsaan Malaysia. Patients were diagnosed to have CRVO

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or BRVO after careful fundoscopic examination of the eye. CRVO was diagnosed when there were flame-shaped haemorrhages throughout the fundus with tortuous and dilated veins and soft exudates. BRVO was diagnosed when similar changes were noted but which were confined to a limited area of the fundus drained by a specific retinal vein. A complete medical history and a thorough physical examination including a full ophthalmological examination was carried out on all patients. Smoking habits, alcohol intake and drug history especially the use of oral contraceptives and the presence of hypertension, diabetes mellitus and glaucoma were specifically asked or looked for. Fundal fluorescein angiography was performed on all patients. Twenty two patients were investigated for hyperlipidaemia and 32 patients had haematological investigations. Fundal fluorescein angiography was performed, at least once, on all patients in the study. Patients were followed up for a period of two months to six years, with a mean follow-up period of 11.5 months.

Analysis of the results were made using the Chi-squared test.

Results

Over a six year period from 1983 to 1988, 95 patients with retinal vein occlusion were seen. 55 patients (58.0%) were diagnosed to have BRVO and 40 (42.1%), had CRVO. The mean age of patients with BRVO and CRVO was 54.5 years (range 26-73 years) and 45.4 years (range 24-64 years) respectively. Table I gives the age distribution of BRVO and CRVO patients below and above 50 years of age. A higher frequency of BRVO was found in the older age group (above 50 years) compared to CRVO which occurred more frequently in the younger age group ($p < 0.05$).

TABLE I
Age distribution of patients with BRVO and CRVO

Age group	BRVO	CRVO
< 50 YRS	18 (33%)	22 (55%)
> 50 YRS	37 (67%)	18 (45%)
Total	55 (100%)	40 (100%)

$P < 0.05$

There were 35 males and 20 females in the BRVO group and 26 males and 14 females in the CRVO group. The male to female ratio in both groups were the same (Table II). There was no significant difference between the incidence of CRVO and BRVO in males and female patients ($p = 0.9364$).

In the group with BRVO, Indians appeared to be most commonly affected, followed by Chinese and Malays while in patients with CRVO, the distribution appeared to be reversed with the Indians being least commonly affected (Table III). However the differences in ethnic distribution did not achieve statistical significance.

Reduced vision was the most common presenting feature in patients with retinal vein occlusion. 82% of patients with BRVO and 95% of patients with CRVO presented with reduced vision (Table IV). Ocular pain, on the other hand, was an unusual presentation of both BRVO and CRVO and was

found in only 2% and 3% of patients respectively, who had neovascular glaucoma. 16% of patients with BRVO were diagnosed incidentally on routine ocular examination. However only a minority of patients with CRVO were detected in that fashion. Among the two groups of patients, incidental diagnosis of BRVO was more common than CRVO ($p < 0.05$).

TABLE II
Sex distribution of patients with BRVO & CRVO

Sex	BRVO	CRVO
Male	35(64%)	26(65%)
Female	20(36%)	14(35%)
Total	55(100%)	40(100%)

$P > 0.1$

TABLE III
Racial distribution of patients with BRVO and CRVO

Race	BRVO	CRVO
Malays	16(29%)	15(38%)
Chinese	17(31%)	17(43%)
Indians	22(40%)	8(20%)
Total	55(100%)	40(100%)

$P > 0.1$

TABLE IV
Presenting features of patients with BRVO and CRVO

Presentation	BRVO	CRVO	X^2	P value
Reduced vision	45(82%)	38(95%)	3.646	$P > 0.1$
Pain	1(2%)	1(3%)	0.0522	$P > 0.8$
Incidental finding	9(16%)	1(3%)	4.7258	$P < 0.05$
Total	55(100%)	40(100%)		

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Table V gives the prevalence of underlying medical and ocular conditions in patients with retinal vein occlusion. 53% of patients with BRVO had hypertension compared to 33% of patients with CRVO. Diabetes mellitus was found in 24% and 38% of patients with BRVO and CRVO respectively. However there was no statistically significant difference between the BRVO and CRVO group. Glaucoma was found in three patients with CRVO; none of the patients with BRVO had glaucoma. 22 patients with retinal vein occlusion were investigated for hyperlipidaemia. Four were found to be hyperlipidaemic (18%). Four out of 32 patients had haematological disorders (12.5%).

Complications of retinal vein occlusion are as shown in Table VI. Some patients may have no complications whereas others may have one or more complications. By far, the common complications are macular oedema and complications related to retinal neovascularizations (disc and retinal new vessels, vitreous haemorrhage and neovascular glaucoma). In our study, shunt vessels were noted in 25% of cases with BRVO and 12% of cases with CRVO. No complications were detected in 17 (31%) patients with BRVO and nine (22.5%) of patients with CRVO.

TABLE V
Prevalence of underlying medical and ocular conditions in patients with BRVO and CRVO

Underlying conditions	BRVO (n=55)	CRVO (n=40)	χ^2	P value
Hypertension	29	13	3.841	P : 0.05
Diabetes mellitus	13	15	2.141	P > 0.1
Glaucoma	0	3	4.259	P < 0.05

TABLE VI
Prevalence of complications in retinal vein occlusion

Complication	BRVO	CRVO	TOTAL
Macular oedema	12	9	21
Macular hole	1	1	2
Disc new vessels	3	11	14
Retinal new vessels	7	4	11
Vitreous haemorrhage	9	6	15
Neovascular glaucoma	4	6	10
Retinal detachment	3	3	6
TOTAL	39	40	79

Discussion

Retinal vein occlusion is considered the second most common retinal disorder following diabetic retinopathy. It can be divided into BRVO and CRVO. BRVO occurs when a segmental retinal vein is occluded while CRVO occurs when the central retinal vein is occluded.

Central retinal vein occlusion is a retinal disorder typically affecting older people. Occurrence in young adults is quite rare because of their healthy retinal vasculature. Hayreh classifies CRVO into two types; the venous stasis retinopathy (non-ischaemic type) and the haemorrhagic retinopathy (ischaemic type)^{9,10}. These two types differ in their natural progression, complications and management. Our study suggests that BRVO occurred more commonly in the older patients and this may be related to the underlying medical conditions that are associated with retinal vein occlusion. Hypertension appeared to be the most common medical problem in patients with BRVO and this may explain why BRVO is more common in the older age group. Arteriosclerotic arteries, hardened after years of hypertension, can occlude the veins especially at arteriovenous crossings. In CRVO, both diabetes mellitus and hypertension were equally important associated medical problems.

In this study, glaucoma is an important associated ocular factor in CRVO. It is this imbalance between a high intraocular pressure and a lower blood pressure that results in venous stasis and ischaemia¹¹. Hayreh postulates that the pathogenesis of CRVO with haemorrhages and exudates is due to the concomitant presence of arterial insufficiency. It is this arterial occlusion that results in a slow down of retinal circulation including venous stasis¹¹.

Shunt vessels are abnormal vessels that develop in an attempt to overcome the retinal vein obstruction by draining into the ciliary circulation at the optic disc. Formation of shunt vessels was more common in BRVO than in CRVO. This may be related to the fact that in CRVO, most of the vessels are affected making it more difficult to form shunt vessels.

The ethnic distribution of retinal vein occlusion is most interesting although the differences did not achieve statistical significance. In the group of patients with BRVO, 40% were Indians, with Malays at 29% and Chinese at 31%. In CRVO, the Indians made up only 20% of the cases with the Malays at 38% and the Chinese at 43%. In comparing BRVO to CRVO, the Indians were most commonly affected in BRVO but the least in CRVO.

The reason for this racial distribution is not clear but may be related to the prevalence of various underlying medical conditions that predispose to vein occlusion including hypertension, diabetes mellitus, hyperlipidaemia, hyperviscosity syndromes, smoking and drinking. It may well be that different conditions have differing effects on vessels in different races. In a prevalence study of diabetes mellitus in Peninsular Malaysia, it was found that diabetes was most common in Indians especially males and least common in Chinese¹². Diabetes, however, can predispose to both central and branch retinal vein occlusion. This study is not based on a fair representation of the Malaysian population as it was a hospital based study. Further epidemiological studies must be carried out on the ethnic races in Malaysia in order to better understand the racial distribution of retinal vein occlusion.

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