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Study Of Axial Length In Retinal Vein Occlusions

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Abstract: *Retinal vein occlusion is the most common retinal occlusive disorder encountered by ophthalmologists and is usually associated with a variable amount of visual loss.RVO most commonly affects the venous blood supply of the entire retina, central retinal vein occlusion (CRVO) or a quadrant by one of the branches, Branch retinal vein occlusion (BRVO). Less commonly the superior or inferior half of the retina alone is affected, Hemi retinal vein occlusion.*

Keywords: CRVO,BRVO,hyper viscosity

1. Introduction

Pre disposing factors for CRVO and BRVO include hyper tension, diabetes mellitus, hyper viscosity, POAG and hyperopia.
The association between hyperopia refractive error and retinal venous occlusion had been demonstrated. In most of the studies, hyperopia was measured in terms of refractive errors. As age related lens chnages may interfere with refractive error, recent studies have focuses on the relation of axial length measurement of hyperopia with retinal venous occlusion.
At present the efforts to improve visual activity in central vein occlusion and branch retina vein occlusion have been disappointing and better understanding of various predisposing factors and patho-physiology of retinal vein occlusions assumes a lot of importance in the development of newer treatment modalities[1].

2. Materials and Methods

It is a clinical study of pateints attending retina department of Sarojini Devi Eye Hospital Hyderabad, India and diagnosed as CRVO/BRVO between June 2013 to September 2014.
It includes 30 patients of CRVO and 30 patients of BRVO diagnosed at retinal department, Sarojini Devi Eye Hospital, Hyderabad measuring their axial lengths (both affected and unaffected eyes using A-Scan ultrasonography).
Comparing them with the axial length of 30 controls (right eyes) who are matched with respect to age, sex, hypertension and diabetes mellitus[2].

Inclusion criteria

Cases attending or referred to Retina department at Sarojini Devi Eye Hospital, Hyderabad and diagnosed as CRVO / BRVO are included[3].

Exclusion criteria

Any history of previous ocular trauma or previous ocular surgery.

Control Group

30 pateints attending Sarojini Devi Eye Hospital, Hyderabad with early cataracts with vsible fundus details who are matched with the cases in relation to age, sex, HTN, diabetes status without any retinal vein occlusions and without any history of previous ocular trauma or previous ocular surgery were included.
A complete ophthalmic examination of all patients was done including visual acuity, anterior segment evaluation by slitlamp biomicroscopy, post dilated examination of fundus using indirect ophthlamoloscopy. Fundus fluorescein angiography was done as and when required.
Every patient who was included in the study was subjected to axial length measurement of both the eyes using A-Scan ultrasonography by using contact method. Post dilated AR readings were taken by autorefractometer. Every patient who was included In the study group was subjected to investigations like blood pressure, random blood sugar, CBP, ESR, lipid profile and cardiac evaluation.
The axial lengths of right eyes of control group were taken using A- Scan, ultrasonography by using contact method in the same manner of cases.
The A-Scan was calibrated periodically the measurements of both cases and controls were taken by a single person.
The data thus collected was analyzed.
The axial lengths of patients affected and unaffected eyes compared using paired T-test. The axial lengths of the patients and that of the controls are compared by using unpaired T-Test. The mean of the axial lengths and standard deviation and standard error of mean was calculated by using computer software, p- value is drawn, p- value is set < 0-005 for statistical significance. The means were given with their standard error (SEM) and differences between the two means were compared with in the 95% confidence interval[4]..

3. OBSERVATIONS AND DISCUSSION

The total number of patients in the study was 60. These patients were divided into two groups.

1. 30 patients central retinal vein occlusion.
2. 30 patients branch retinal vein occlusion.

CONTROL GROUP:

It includes 30 patients attending Sarojini Devi Eye Hospital, Hyderabad with early cataracts who are matched with the cases in relation to age, sex, hypertension, diabetes mellitus status and with out any retinal vein occlusions and with out any previous ocular trauma or surgery.

DEMOGRAPHIC PROFILE:

Our study included 22 males and 8 females in central retinal vein occlusion group and 15males and 15 females in branch retinal vein occlusion group. 16 males and 14 females in control group.

Table -1: Distribution of age group in the study population

Age group	no.of patients of CRVO	Percentage	no.of patients of BRVO	Percentage	No.of controls
20-25	1	3.30%		3.30%	1
26-30	1	3.30%		3.30%	1
31-35	-		2	6.66%	1
36-40	2	6.66%	3	10%	3
41-45	2	6.66%	5	16.66%	3
46-50	2	6.66%	1	3.30%	2
51-55	6	20%	6	20%	3
56-60	5	16.66%	9	30%	7
61-65	4	13.33%	2	6.66%	4
66-70	4	13.33%	1	3.30%	2
71-75	-	-	1	3.30%	2
76-80	2	6.60%	-	-	-
81-85	1	3.30%	-	-	1
total	30		30		30

Table-2: Distribution of gender group in the study population.

Type of RVO	Males	Percentage	Females	Percentage	Total
CRVO	22	73%	8	27%	30
BRVO	15	50%	15	50%	30
No of controls	16	53.33%	14	46.66%	30

Table -3: distribution of axial length in the study population

S.No	Axial length range in mm	CRVO affected eye		CRVO fellow eye		BRVO Efected eye		BRVO fellow eye	
		RE	LE	RE	LE	RE	LE	RE	LE
1	19.00-19.99	0	1	0	0	0	0	0	0
2	20-00-20-99	1	0	1	1	0	1	0	0
3	21.00-21.99	4	7	5	2	2	2	3	3
4	22.00-22.99	4	8	8	5	14	5	5	11
5	23.00-23.99	3	1	3	4	4	2	1	5
6	24.00-24.99	1	0	0	1	0	0	1	1

Table -4: Distribution of axial length in the study population of CRVO

Axial length range in mm	19.00-19.99	20.00-20.99	21.00-21.99	22.00 - 22.99	23.00 - 23.99	24.00 - 24.99
CRVO affected eye	1	1	11	12	4	1
CRVO unaffectd eye	0	2	7	11	7	1
Control rigth eye	0	0	4	8	16	2

Table -5: Distribution of axial length in the study population of BRVO

Axial length range in mm	19.00-19.99	20.00-20.99	21.00 - 21.99	22.00 - 22.99	23.00 - 23.99	24.00 - 24.99
BRVO affected eye	0	1	4	19	6	0
BRVO unaffected eye	0	0	6	16	6	2
Control rigth eye	0	0	4	8	16	2

Table -6: laterality of the affected eye in CRVO group.

Affected eye	CRVO
RE	13
LE	16
BE	1

Table -7: laterality of the affected eye in BRVO group.

Affected eye	BRVO
RE	19
LE	10
BE	1

In our study we did not group CRVO and BRVO together because of the sites of blockage in each are anatomically different.

Gutman reported that 90% of retinal vein obstructions occur in the 50 year age group or older.

In our study group CRVO> 73.31% are above 50 years with mean age of 53.94 years. Out of 30 patients 22 are men and 8 are women. Most of the patients affected uniocularly 13 patients in the right eye (43.33%), 16 patients in the left eye (53.33%), 1 patient affected in both eyes.

In our study group of BRVO > 62.72% are above 50 years of age with a mean age of 52.56 years. Out of 30 patients 15 were women and 15 were men. Most of the patients uniocularly 19 patients affected in the right eye (63.33%) 10 patients affected in left eye (33.33%) and one patient in the both eyes (3.33%)[5].

AXIAL LENGTH:

In our study group of CRVO, the mean axial length of the affected eye is 22.16mm (SD 0.98) (SEM is 0.17mm) and the range is 19.89mm to 24.38mm. The mean axial length of unaffected eye is 22.44mm (SD 0.87) standard error of he mean is (SEM is 0.16) and the range is 20.15mm to 24.12mm. p-value is 0.0002 the difference between the two groups is statistically significant[6].

The mean axial length of right eye of the control group is 23.03mm (SD 0.76) the mean axial length of the affected eye of CRVO is 22.16mm (SD 0.98) 95% of confidence interval is -1.33 to -.41. The p-value 0.0004. The difference between CRVO affected eye control groups is statistically significant.

The mean axial length of the BRVO group affected eye is 22.49mm (SD 0.70) (SEM 0.12), the range is 20.95mm to 23.90mm. The mean axial length of unaffected eye was 22.63mm (SD0.73) (SEM 0.13), the range is 21.14mm to 24.28mm, the p-value is 0.0661. The difference between the two groups is not statistically significant.

The mean axial length of right eye of the control group is 23.03mm (SD 0.76) and the mean axial length of affected eye of BRVO group is 22.49mm (SD 0.12) 95% confidence interval of this group is -0.932 to -0.016. P-value is 0.0063. The difference between BRVO affected eye and control group is statistically significant.

CONCLUSION:

In many of the studies done previously and the present study there seems to be a relationship between axial length and retinal vein occlusion, with shorter axial length having a predisposition towards retinal vein occlusion.

It has been reported that incidence of hypermetropia is higher in CRVO and BRVO than in the normal population. In axial hypermetropia the ocular axial length is short. The scleral canal is smaller and the lamina cribrosa fenestrations are narrow. This creates crowding of the optic nerve fibres and CRV and CRA in the optic canal. This could be the causative factor for CRVO.

Although the association of hyperopia with increased risk of BRVO has been well established the exact role of shorter axial length as measure of hyperopia in BRVO is not clear. It is possible that in a shorter eye the retinal vein and artery are more tightly confined as they pass through the lamina cribrosa and this may impair the flow in the vein which could be reduced further at the arteriovenous crossing. Reduced blood flow may eventually cause thrombus formation at the crossing.

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