Study of Correlation between Axial Length and Retinal Vein Occlusion

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ABSTRACT

Introduction: To evaluate the correlation between axial length and retinal vein occlusion.

Material and methods: All the patients attending the OPD of RIO, RIMS Ranchi with history of diminution of vision were thoroughly evaluated. Patients diagnosed with retinal vein occlusion (RVO) were included in the study. 48 patients with unilateral RVO (35 patients of BRVO and 13 patients with CRVO) of mean age: 60±13 years, range: 47–73 years were enrolled in the study group. The control group consisted of 50 eyes of 50 randomly selected age matched volunteers (mean age: 60±13 years, range: 47–73 years). Detailed ophthalmologic examination (visual acuity, refraction, slit lamp biomicroscopy, gonioscopy, intraocular pressure measurement with applanation tonometry, indirect ophthalmoscopy following pupil dilation and fundus fluorescein angiography) was done in all RVO patients. Axial length of all 48 RVO patients and 50 controls were measured by A-scan ultrasonography. All RVO patients underwent detailed systemic examinations and investigations to find out other risk factors for development of RVO. Data was analysed using SPSS software All differences associated with chance probability of ≤0.05 was considered statistically significant.

Results: Total 48 patients (35 patients of BRVO and 13 patients of CRVO) and 50 controls of age group 47- 73 years (mean age group: 60±13 years) were included in the study. The mean axial length of BRVO patients was 21.76 ± 0.07 mm. Mean axial length of CRVO patients was 21.23 ± 0.04 mm. Mean axial length of control group was 23.53 ± 0.06 mm. The axial length of eyes of patients of RVO (BRVO and CRVO) were shorter than axial length of eyes of control group, the difference of which was statistically significant (p≤0.05).

Conclusion: This study shows that there is a significant correlation between shorter axial length and retinal vein occlusion (RVO).

Keywords: Axial Length, Retinal Vein Occlusion

INTRODUCTION

Retinal vein occlusion (RVO) is the most common form of retinal vascular disease following diabetic retinopathy, and may result in permanent vision loss [1]. It occurs as a result of obstruction of blood circulation of retinal vein due to an adjacent blood vessel, which results in stoppage of blood flow, causing retinal haemorrhages.[2]Depending on the site of involvement, venous occlusions in retina are classified into Central retinal vein occlusion (CRVO), Branched retinal vein occlusion (BRVO) and Hemicentral retinal vein occlusion (HCRVO). It is mostly a disease of older population of age 50-70 years. Many systemic and local factors can predispose to the development of RVO, including hypertension, diabetes mellitus, hyperviscosity, hyperlipidemia and primary open angle glaucoma [1,3,4,5,6]. Since the incidence of the disease is rising day by day, newer predisposing factors like short axial length, hyperlipidemia, systemic inflammatory diseases involving eyes, smoking, hyperhomocysteinaemia are being discovered. [5,7,8,9]

Aims and objectives

This study has been undertaken to evaluate the correlation between axial length and retinal vein occlusion.

MATERIAL AND METHODS

This observational hospital based study was performed in the Ophthalmology department of RIO, RIMS Ranchi between November 2018 to June 2019, after taking proper approval from the Institutional Ethics Committee.

All the patients attending the OPD of RIO, RIMS Ranchi with history of diminution of vision were thoroughly evaluated. Patients diagnosed with retinal vein occlusion (RVO) were included in the study.

Inclusion criteria included:

- All patients diagnosed with retinal vein occlusion (RVO)
- Patients who gave their consent for the study

Exclusion criteria included:

- Previous intraocular surgery
- Eye trauma
- Other retinal or neurological disease (e.g. multiple sclerosis)
- Intraocular inflammation or tumor
- Significant ocular media opacities (e.g. dense cataract)

48 patients with unilateral RVO (35 patients of BRVO and 13 patients with CRVO) of mean age: 60±13 years, range: 47–73 years were enrolled in the study group. The control group consisted of 50 eyes of 50 randomly selected age matched volunteers (mean age: 60±13 years, range: 47–73 years).

Detailed ophthalmologic examination (visual acuity, refraction, slit lamp biomicroscopy, gonioscopy, intraocular pressure measurement with applanation tonometry, indirect

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Sl no.	Axial length in mms	No. of BRVO patients	No. of CRVO patients	No. of controls	Statistical significance
01	≤ 20.00	01 (2.86%)	01 (7.69%)	1 (2%)	Not significant
02	20.00-20.99	04 (11.43%)	02 (15.38%)	3 (6%)	p≤0.05
03	21.00-21.99	12 (34.28%)	04 (30.77%)	6 (12%)	p≤0.05
04	22.00-22.99	15 (42.86%)	06 (46.15%)	18 (36%)	p≤0.05
05	23.00-23.99	03 (8.57%)	00 (0.00%)	15 (30%)	p≤0.05
06	≥ 24.00	00 (0.00%)	00 (0.00%)	7 (14%)	Not significant

Table-1:

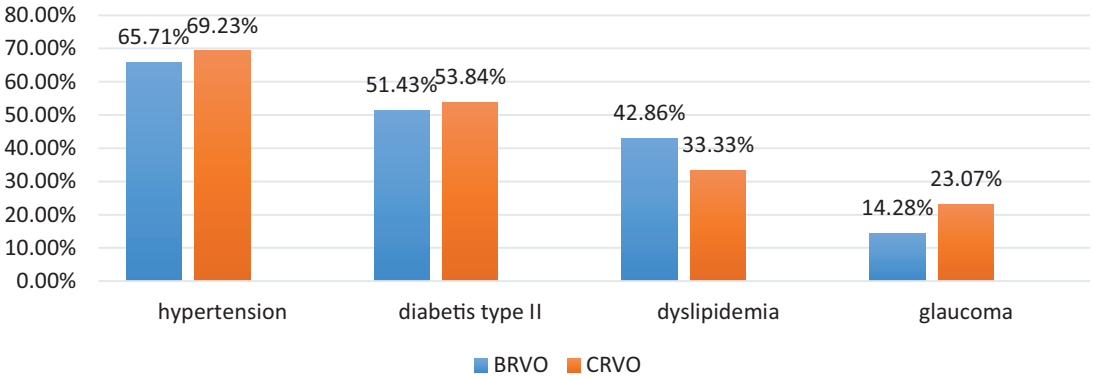

Figure-1:

ophthalmoscopy following pupil dilation and fundus fluorescein angiography) was done in all RVO patients. Axial length of all 48 RVO patients and 50 controls were measured by A-scan ultrasonography.

All RVO patients underwent detailed systemic (cardiological and hematological) examinations and investigationsincluding blood sugar, blood pressure measurement, lipid profile, complete haemogram etc. to find out other risk factors for development of RVO.

Data was analysed using SPSS software (Statistical Package for Social Sciences, SPSS version 22.0; SPSS Inc., Chicago, IL, USA). All differences associated with chance probability of ≤0.05 was considered statistically significant.

RESULTS

Total 48 patients (35 patients of BRVO and 13 patients of CRVO) and 50 controls of age group 47- 73 years (mean age group: 60±13 years) were included in the study.

Association of other risk factors (hypertension, diabetes, dyslipidemia, glaucoma) and RVO is given in the figure 1

Comparision of axial length in patients of RVO (CRVO and BRVO) and control group is given in table 1

The mean axial length of BRVO patients was 21.76 ± 0.07 mm. Mean axial length of CRVO patients was 21.23 ± 0.04 mm. Mean axial length of control group was 23.53 ± 0.06 mm. The axial length of eyes of patients of RVO (BRVO and CRVO) were shorter than axial length of eyes of control group, the difference of which was statistically significant (p≤0.05).

DISCUSSION

This study showed that axial length of eyes of patients with retinal vein occlusion (BRVO and CRVO) was significantly lesser as compared to those of control groups. Proportion of well-known risk factors (i.e. hypertension, diabetes mellitus, dyslipidemia, glaucoma) in the RVO patients were consistent with the previous studies [3-6].

Our findings on axial length of RVO patients were consistent with studies published by Andrea Szigeti et al which showed that shorter Axial Length and Vitreous Chamber Depth might be a potential anatomical predisposing factor for development either of CRVO or BRVO.[10]

Another study published by Ariturk et al also showed that axial lengths in CRVO and BRVO were significantly shorter than in the controls, which may be a risk factor in the development of CRVO and BRVO.[11]

However, our findings were in contrast to studies published by Simmons B et al, Bandello F et al and Moghimi et alwhich showed thathyperopia as measured by axial length is not a risk factor for retinal vein occlusion.[12, 13, 14]

Study published by Cekic et al showed that eyes with shorter Axial Length may be predisposed to greater crowding of the central retinal vein and artery at the lamina cribrosa, and are therefore more likely to develop CRVO.[15] Other studies by Kir E et al and Gupta RC et al postulated that shorter eyes have a smaller disc and a narrower scleral canal through which the retinal vessels are more tightly confined. This may reduce the blood flow in the vein and may lead to increased blood flow turbulence that could cause endothelial damage and thrombus formation at the lamina cribrosa and at further arteriovenous crossings. [16, 17]

Our study had several limitations. Firstly, we did not take demographic profile of patients and controls into consideration. Secondly, we only evaluated axial length, hypertension, diabetes, dyslipidemia and glaucoma as risk factors in development of RVO and left out other important risk factors like hypercoagulable states, neurological and other systemic conditions etc. due to lack of resources and time constraint.

CONCLUSION

This study shows that there is a significant correlation between shorter axial length and retinal vein occlusion (RVO). Thus, it can be postulated that shorter axial length can be an important predisposing factor for development of retinal vein occlusion (RVO).

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