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## RESEARCH ARTICLE

### THE INCIDENCE OF CENTRAL RETINAL VEIN OCCLUSION WITH PRIMARY OPEN-ANGLE GLAUCOMA IN PATIENTS

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#### ABSTRACT

A prospective study of The incidence of central retinal vein occlusion associated with primary open-angle glaucoma conducted at Govt. Regional Eye Hospital Visakhapatnam. **Materials and Methods:** 32 cases central retinal vein occlusion with primary open-angle glaucoma are documented in patients during one and half years period. **Results:** the incidence of CRVO in POAG more as the age advanced, and equal in both sexes. **Conclusions:** incidence of CRVO in POAG is almost 10%. Proper control of IOP within normal limits may prevent the onset of CRVO.

## INTRODUCTION

Glaucoma is an ancient disease since Hippocrates era. The term glaucoma refers to a group of diseases that have in common a characteristic optic neuropathy with associated visual field loss for which elevated intraocular pressure is one of the primary risk factors. Glaucoma is the second most common cause of blindness worldwide. WHO has estimated that 4.5 million people are blind due to glaucoma. In India, glaucoma is the leading cause of irreversible blindness with at least 12 million people affected and nearly 1.2 million people blind from the disease. More than 90 percent of cases of glaucoma remain undiagnosed in the community. Glaucoma prevalence increases with age. The most common types of glaucoma are Primary Open Angle Glaucoma (POAG) and Primary Angle Closure Glaucoma (PACG). It has been estimated that by 2020 there will be approximately 80 million people with glaucoma, an increase of about 20 million since 2010. Furthermore, it is thought that at present over 3 million people are blind due to glaucoma, a figure that is set to rise to 3.2 million by 2020 with the increasing prevalence. The pathogenetic correlation between central retinal vein occlusion (CRVO) and open angle glaucoma (OAG) is complex. Diffuse senile arteriosclerosis and the senescent involution of collagen (lesions within the trabecular meshwork, lamina cribrosa, and common adventitial sheath of retinal vessels) are the main causes in most patients with retinal vein occlusions (RVO), but these phenomena are also involved in the pathogenesis of primary open angle glaucoma (POAG), representing a

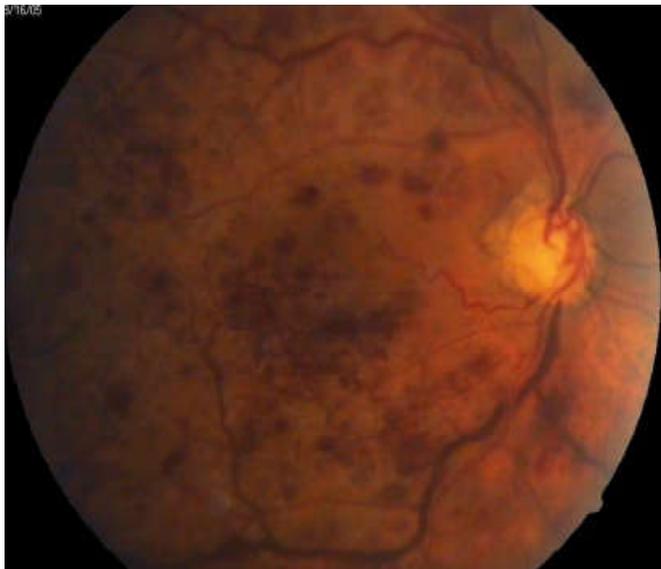
common ground for the both diseases POAG is a predictive, independent risk factor that is essential for the appearance of CRVO. POAG precedes and promotes the occurrence of CRVO by deforming the lamina cribrosa and secondarily distorting the vein as it passes through the optic nerve head. 1. Central retinal vein occlusion (CRVO) is a common retinal vascular disorder. Clinically, CRVO presents with variable visual loss, with a clinical picture of retinal haemorrhages, in the posterior pole and giving the "blood and thunder appearance." CRVO can be divided into 2 clinical types, ischemic and nonischemic. A number of ocular and systemic conditions are the aetiology for CRVO. Several clinical features are taken into account for classifying CRVO, including vision at presentation, presence of relative afferent papillary defect (RAPD), extent of retinal haemorrhages, cotton spots, assessment of retinal perfusion by fluorescein angiography, and electro retinographic changes. It is important to differentiate non ischemic and ischemic in prognostic point. Proper follow up required for good visual. 2. 3. 4. 5. 6. 7. The Beaver Dam Eye Study Group reported the 15-year cumulative incidence of CRVO to be 0.5%.

**AIM:** The aim of this study is to prospectively evaluate the incidence and cumulative prevalence of CRVO, in patients with including POAG and pseudoexfoliative glaucoma (PEXG), over one and half-years follow-up period.

## MATERIALS AND METHODS

This study conducted in Glaucoma Services, Govt. Regional Eye Hospital Visakhapatnam from 2018 January to June 2019. 32 cases POAG cases are presented with CRVO. (22 males and 10 females) are included in the study, the age groups are between 41 years to 73 years. Aetiological factors are evaluated. Complete ophthalmic examination and systemic, ocular investigations Visual acuity, Anterior segment Examination, Intraocular pressure, Gonioscopy, central corneal thickness Optic nerve head evaluation, Humphry visual fields Fundus Fluorescence angiography are carried out. All these cases are treated with fixed combination of 0.004% Travoprost 0.5% timolol eye drops in all glaucoma patients and achieved 30% reduction from the baseline IOP.

All the cases followed up to one and half years. The fellow eye completely investigated for Glaucoma. Exclusion criteria consisted of, prior ocular surgery, aphakia and pseudophakia, presence of diabetic retinopathy in either eye, other retinal vascular diseases in the study eye or age-related macular degeneration in either eye.



CRVO with POAG. Note the CD ratio 0.9:1

### Diagnostic Criteria

#### CRVO associated with POAG (Examination of the uninvolved fellow eye)

Structural and/or functional glaucomatous lesion: Structural lesion includes acquired characteristic progressive optic neuropathy (cupping/saucerization of the optic disc, diffuse or localized thinning of the neuroretinal rim area, and/or retinal nerve fiber layer changes with diffuse or localized defects).

Functional damage encompasses characteristic visual field defects, corresponding to optic disc lesions;

- IOP with increased values  $>21$  mm Hg;
- Open anterior chamber angle open angle
- No obvious evidence of an ocular or systemic possible cause of IOP increase (pseudo exfoliation, ocular trauma, pigment dispersion, use of steroids);
- Clear ocular media.

Table 1. Characteristics of the 57 CRVO patients with POAG  
Parameters CRVO / POAG

Age	58.5 (41-73)
Sex	Male 20 Female 12
Occlusion	Non Ischemic 29 Ischemic 3
Central corneal thickness	532.5 (509-552)
POAG/PEX	284

## RESULTS

There was significant differences between the venous occlusions with OAG with regard to age, association of CRVO with POAG is more in elderly age group. More common in males in our study. Nonischemic CRVO is more common presentation with POAG. Central corneal thickness (CCT) was lower in venous occlusions with OAG patients. POAG was observed in 2 clinical forms, namely, POAG with increased IOP, with PEX. Incidence of POAG in Fellow eye 32 cases Noticed. Normal or subnormal IOP with CRVO in 3 cases, with POAG in fellow eye may be due to low perfusion pressure that occurred after CRVO before compensating the perfusion.

## DISCUSSION

Venous occlusions may appear during the early or late stages of glaucoma. Incidence of CRVO 10.9% in the POAG group. 9. Hayreh reported that the global prevalence of OAG was 9.9% in central/hemicentral RVO patients. 10. A significant association of CRVO with a history of OAG and have highlighted that glaucoma is one of the major risk factors that is independent and predictive for CRVO occurrence. 11. 12. In our study, CRVO, including ischemic and non ischemic, had been already diagnosed and referred to for Glaucoma evaluation. Increased IOP and glaucomatous cupping may be causally associated with CRVO produced at the level of optic disc excavation 13. Elevated IOP results in a retrodisplacement of the lamina cribrosa with deformation of the channels that pass through it, exerting an adverse local hemodynamic influence. These events can compress the vein, predisposing patients to occlusions at the level of the lamina cribrosa. Glaucomatous cupping presumably causes a loss of the support tissue of the retinal vein, exposing the tissue to IOP changes. In addition, the vein is distorted as it bends around the high-pitched rim of the cupping. Klein BE, Meuer SM, Knudtson MD, Klein R. The relationship of optic disk cupping to retinal vein occlusion: the Beaver Dam Eye Study. *Am J Ophthalmol.* 2006;141(5): 859–862. The progression of OAG is the risk factors for CRVO namely, higher IOP (patients 32); age  $\geq 60$ y (patients 16); pseudo exfoliation (patients 4); optic disc hemorrhages in the fellow eye reveals the severity of POAG. cardiovascular disease history (patients 7) thinner CCT ( $<550$   $\mu$ m; 19); and history of migraine linked to sex (patients 5). Conclusion: The incidence of central retinal vein occlusion with primary open-angle glaucoma in patients denotes that OAG is a risk factor for the appearance of venous occlusions. The treatment of glaucoma, which achieved an IOP reduction of 30% with medical treatment compared with the initial values, prevented the progression of OAG over the one and half follow-up period.

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