



Original Research Article

## **Glaucoma Screening in Patients with Pseudoexfoliation: A Hospital Based Study**

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### **ABSTRACT**

**Introduction:** Pseudoexfoliation syndrome is a condition in which exfoliative material is deposited on the iris, ciliary region and capsule of the lens. Patients with pseudoexfoliation of the lens capsule have a high chance of developing glaucoma.

**Purpose of the Study:** Screening of glaucoma in patients with pseudoexfoliation.

**Materials and Methods:** Settings and design: Prospective study.

This study was carried out in the Eye Outpatient Department, K.R. Hospital, attached to Mysore Medical College and Research Institute, Mysore between January 2012 to January 2013. Hundred patients diagnosed as pseudoexfoliation were included under the study. Informed and written consent was taken. Tonometry, gonioscopy, Fundus examination with Direct/ Indirect ophthalmoscopy, 90D lens and visual field testing was done to detect pseudoexfoliative glaucoma. Pseudoexfoliation glaucoma was diagnosed on the basis of pseudoexfoliation material on slit lamp examination, increased intraocular pressure >21 mm of Hg, glaucomatous optic nerve head damage, gonioscopy findings, with visual field defect.

**Results:** The frequency of glaucoma in 100 cases of pseudoexfoliation was 17 (17%). 10(10%) were male patients and 7(7%) female patients. 11(11%) patients had unilateral glaucoma and 6(6%) patients had bilateral pseudoexfoliative glaucoma. 12(12%) patients had open angle and the 5(5%) had occludable angle on gonioscopy. All pseudoexfoliative glaucoma patients had trabecular hyperpigmentation on gonioscopy. On fundus examination these patients had cup disc ratio of >0.6. Visual field testing revealed arcuate scotoma.

**Conclusion:** There is increased frequency of secondary glaucoma in patients with pseudoexfoliation. Hence all patients with pseudoexfoliation syndrome should be screened for glaucoma in early stages to start effective treatment and prevention of blindness due to optic nerve damage.

**Keywords:** Applanation tonometry, Gonioscopy, Ophthalmoscopy, Pseudoexfoliative glaucoma, Pseudoexfoliation syndrome.

### **INTRODUCTION**

Pseudoexfoliation syndrome is a condition in which exfoliative material is deposited on the iris, ciliary region and

capsule of the lens. Clinically these appear as flakes on the anterior capsule of the lens and the edge of the iris and are particularly evident in the mid peripheral region where

the anterior capsule is rubbed upon by the iris. The axial region is usually free. These flakes tend to collect in the angle of the anterior chamber and may obstruct the drainage of aqueous humour. This material is evidence of a widespread degenerative change in the anterior uvea, particularly the ciliary region. Patients with pseudoexfoliation of the lens capsule have a high chance of developing glaucoma.

Dvorak-The bold suggested the term pseudoexfoliation to differentiate it from true exfoliation or lamellar delamination of the lens capsule found in glassblowers. True exfoliation syndrome is due to heat or infrared-related changes in the anterior lens capsule.

Pseudoexfoliation material is associated with abnormalities of the basement membrane in epithelial cells and has a wide distribution throughout the body. Pseudoexfoliative material has been found in the walls of the vortex veins and the central retinal artery. Extraocular tissues involved include lung, skin, liver, heart, kidney, gallbladder, blood vessels, extraocular muscle, connective tissue in the orbit, and meninges.

Pseudoexfoliation is seen in all populations and races but incidence varies widely. The incidence reported in Inuit Eskimo population is close to zero, <sup>[1]</sup> in Navajo Indians it is about 38%. <sup>[2]</sup> The incidence in Italy varies between 0.8% <sup>[3]</sup> to 2.5%. <sup>[4]</sup>

Pseudoexfoliation is the most common cause of secondary glaucoma worldwide, and the most frequent cause of unilateral glaucoma. Pseudoexfoliation glaucoma responds poorly to medical therapy compared with other types of glaucoma and can lead to rapid progression of optic nerve damage. Owing to pseudoexfoliation glaucoma prevalence and severity, ophthalmologists should examine the eye for signs of pseudoexfoliation

syndrome, as it is a major risk factor for glaucoma development.

Hence in our study patients with pseudoexfoliation were screened for secondary glaucoma to diagnose glaucoma in early stages to effectively start the treatment and prevent the progression of optic nerve damage.

## **MATERIALS AND METHODS**

This descriptive study was carried out in the Eye Outpatient Department, K.R. Hospital, attached to Mysore Medical College and Research Institute, Mysore between January 2012 to January 2013. Hundred patients diagnosed as pseudoexfoliation on slit lamp were included under the study. After taking informed and written consent patients attending the eye OPD were examined at slit lamp for presence of pseudoexfoliation. The anterior lens capsule, pupillary margin and other structures of the anterior chamber were examined on slit lamp for any evidence of pseudoexfoliation material. Intraocular pressure was recorded by Applanation tonometry. Gonioscopy was done to assess for pigment deposition and a Sampaolesi's line. Fundus examination was done with Direct/ Indirect ophthalmoscopy and 90D lens to see for glaucomatous nerve damage. In patients with secondary glaucoma visual field testing was done to check for any characteristic visual field loss and to ascertain the potential stage of glaucoma.

Pseudoexfoliation glaucoma was diagnosed on the basis pseudoexfoliation material on slit lamp examination, increased intraocular pressure >21 mm of Hg, glaucomatous optic nerve head damage, gonioscopy findings, with corroborative visual field changes when a reliable visual field was obtained. Frequencies and percentages were calculated for demographic status, glaucoma status and position of glaucoma.

**Statistical Analysis:** Descriptive statistics.

**RESULTS**

Hundred confirmed cases of pseudoexfoliation were selected from ophthalmology outpatient department, K.R. Hospital attached to Mysore Medical College and Research Institute, Mysore. The patients age ranged from 40 to 75years (Table 1) with a mean value of  $61.7 \pm 7.0$  years. There were 33(33%) males and 67(67%) females (Table 2). Best corrected visual acuity of pseudoexfoliation cases ranged from 6/12 to 6/60. Intraocular pressure ranged between 15-40mmHg. Intraocular pressure  $>21$ mm Hg was found in 31(31%) out of 100 cases(Table 3). Cup disc ratio varied from 0.3 to 0.8.

Table 1: Age Distribution

Range in years	Number	Percentage
40-50	20	20
51-60	22	22
61-70	43	43
71-80	15	15

Table 2: Sex Distribution In Pseudoexfoliation

Sex	Number	Percentage
Male	33	33
Female	67	67

Table 3: Intraocular Pressure Recording By Applanation Tonometry

Intraocular pressure	Number	Percentage
$<21$ mmHg	69	69
$>21$ mmHg	31	31

The frequency of glaucoma in 100 cases of pseudoexfoliation was 17 (17%). Ten of the 17 were males and seven out of 17 were females (Table 4). 11(11%) patients had unilateral glaucoma and 6(6%) patients had bilateral pseudoexfoliative glaucoma (Table 5).12(12%) patients had open angle and the remaining 5(5%) had occludable angle on gonioscopy (Table 6).All pseudoexfoliative glaucoma patients had trabecular hyperpigmentation on gonioscopy. On fundus examination these patients had cup disc ratio of  $>0.6$ .Visual field testing revealed arcuate scotoma.

Table 4: Sex Distribution in Patients With Pseudoexfoliation Glaucoma

Sex	Number	Percentage
Male	10	10
Female	7	7

Table 5: Laterality Of Pseudoexfoliative Glaucoma

Laterality	Number	Percentage
Unilateral	11	11
Bilateral	6	6

Table 6: Type Of Glaucoma On Gonioscopy

Type	Number	Percentage
Open angle	12	12
Occludable angle	5	5

**DISCUSSION**

The pseudoexfoliation syndrome (PXF), sometimes known as exfoliation syndrome, is a relatively common cause of open-angle glaucoma, though subtle signs are easily overlooked. When an eye with PXF develops secondary open-angle glaucoma the condition is referred to as pseudoexfoliation glaucoma (PXG). PXF is more common in females but males appear to be at higher risk of developing glaucoma. The condition is particularly common in Scandinavia. A high risk of developing PXF and PXG is conferred by mutations in the LOXL1 gene at locus 15q22, coding for elastic fibre components of the extracellular matrix. The cumulative risk of glaucoma in eyes with PXF is 5% at 5 years and 15% at 10 years.

The prognosis is worse than in POAG; the IOP is often significantly elevated and may also exhibit great fluctuation. Severe damage may develop rapidly. It is therefore important to monitor patients closely, and some practitioners feel that review should take place at intervals of no more than 6 months for patients with PXF. A patient with unilateral PXG and only PXF in the fellow eye is at high risk (50% in 5 years) of developing glaucoma in the fellow eye. A patient with unilateral PXG who does not have PXF in the fellow eye has only a low risk of developing glaucoma in the normal eye.

In our study we found that Intraocular pressure >21mm Hg was found in 31(31%)out of 100 cases. Cup disc ratio varied from 0.3 to 0.8. The frequency of glaucoma in 100 cases of pseudoexfoliation was 17 (17%). Ten of the 17 were males and seven out of 17 were females. 11(11%) patients had unilateral glaucoma and 6(6%) patients had bilateral pseudoexfoliative glaucoma.12(12%) patients had open angle and the remaining 5(5%) had occludable angle on gonioscopy. All pseudoexfoliative glaucoma patients had trabecular hyperpigmentation on gonioscopy. On fundus examination these patients had cup disc ratio of >0.6. Visual field testing revealed arcuate scotoma.

Prevalence of pseudoexfoliation in different populations shows extensive variations from 0% to 38%. [5] These variations arise from racial, genetic, and/or geographical differences. As per different studies exfoliation syndrome is age-dependent and a significant proportion of the elderly population was affected. In certain countries such as Greece, Finland, Norway and Iceland, that 12-30% of the population over the age of 70 years showed evidence of exfoliation material on clinical examination. [6,7] Preponderance of maternal transmission of pseudoexfoliation syndrome in families reported the possibility of mitochondrial inheritance. [8]

Glaucoma occurs more commonly in eyes with exfoliation syndrome than in those without it. Elevated intraocular pressure with or without glaucomatous damage occurs in approximately 25% of persons with exfoliation syndrome, or about 6 to 10 times the rate in eyes without pseudoexfoliation syndrome. In a study done by Arvind et al [9] in South India ocular hypertension, that is, high intraocular pressure without glaucomatous optic neuropathy was found in 9.3% of cases with exfoliation syndrome. The percentage of

patients with exfoliation syndrome who have pseudoexfoliation syndrome, or ocular hypertension on initial examination ranged from 22 to 94% depending on the sampling method. [10,11] In The Blue Mountains Eye Study, a population based study pseudoexfoliative glaucoma was seen in 14.2% of patients. [12]

## CONCLUSION

There is increased frequency of secondary glaucoma in patients with pseudoexfoliation. Hence all patients with pseudoexfoliation syndrome should be screened for glaucoma in early stages to start effective treatment and prevention of blindness due to optic nerve damage.

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