

Original Research Article

GLAUCOMA IN PSEUDOEXFOLIATION SYNDROME: A CLINICAL INVESTIGATION

Lakum Archana¹, Mididoddi Sri Vidhya², Savitha Palakurthy³, Kumbala Shilpa⁴

^{1,2,3}Assistant Professor, Department of Ophthalmology, REH, Kakatiya Medical College, Warangal, Telangana, India.

⁴Assistant Professor, Department of Ophthalmology, Government Medical College, Mancherial, Telangana, India.

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Corresponding Author:

Dr. Kumbala Shilpa
Assistant Professor, Department of
Ophthalmology, Government Medical
College, Mancherial, Telangana, India.
Email: shilpa.1631@gmail.com.

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ABSTRACT

Background: Pseudoexfoliation is an age related disease, a systemic disorder with characteristic deposition of abnormal fibrillary material throughout the human body. Clogging of trabecular meshwork with PXF material lead to raised intraocular pressure and secondary glaucoma. Intraocular pressure reduction helps to prevent glaucoma progression.

Material and Methods: 50 patients with pseudoexfoliation syndrome were recruited from September 2023 to February 2024 at the Department of Ophthalmology, government general hospital, Mancherial, Telangana, India. Pseudoexfoliation material on the pupillary border and/or lens was a requirement for inclusion in the study. Glaucoma work up done for all cases including visual acuity, tonometry, gonioscopy with Goldmann four mirror lens, perimetry with Bjerrum screen.

Conclusion: Bilateral pseudoexfoliation was shown to be more common than unilateral pseudoexfoliation in this study. Unilateral and bilateral pseudoexfoliation were most common between the ages of 61 and 70.

Keywords: Intra ocular pressure (IOP), Pseudoexfoliation (PXF), Primary open angle glaucoma (POAG), Nuclear sclerosis (NS).

INTRODUCTION

Pseudoexfoliation (PXF) syndrome is an age-related systemic disease with primarily ocular manifestations characterized by deposition of whitish grey, fibrogranular amyloid like material on the anterior lens capsule, zonules, ciliary body, pupillary margin of the iris, corneal endothelium, anterior vitreous and trabecular meshwork.^[1] Deposition of this material in angle of anterior chamber is cause for development of Pseudoexfoliation glaucoma. PXF is often associated with cataract and Glaucoma. The prevalence rates of pseudoexfoliation are highly variable across geographic region.^[2] Results may vary depending on study population age, racial and ethnic make-up, patient selection, diagnostic criteria, examination depth, and whether data is collected prospectively or retrospectively.

Lysyl Oxidase Like Protein 1 gene is important for elastin metabolism, which is component of extracellular matrix. Mutations of LOXL-1 gene at loci 15q22 coding for elastin are strongly associated with development of PXF and secondary glaucoma.^[3]

As prevalence of Glaucoma high in pseudoexfoliation, clinicians must exercise caution while treating patients with this disorder. Baseline optic disc drawings or images should be taken at the beginning of each test cycle. In patients with borderline or abnormal readings, more frequent follow up, tonography may provide an indicator of the functionality of outflow channels.

The purpose of this research was to examine the prevalence and type of glaucoma in people with pseudoexfoliation syndrome, as well as their demographics, lens morphology.

MATERIAL AND METHODS

50 patients with pseudoexfoliation syndrome were recruited from September 2023 to February 2024 at the Department of Ophthalmology, Government general hospital, Mancherial, Telangana, India. Fifty patients who fulfilled the inclusion criteria were included in the study.

Inclusion Criteria

- Patients diagnosed with pseudoexfoliation with cataract.

Exclusion Criteria

- Traumatic cataract
- Ocular disorders other than Pseudoexfoliation.
- Patients already on antiglaucoma medication.

RESULTS

Every patient had a gonioscopy with a Goldmann four mirror lens, perimetry with a Bjerrum screen, and visual acuity test. Gonioscopy revealed the presence of pseudoexfoliation material and enhanced pigmentation on trabecular meshwork, pigmented Schwalbe's line of the angle in this study the highest prevalence of PXF was in 7th decade in cataract patients. [Table 1]

There were 28 males and 22 females among the 50 individuals diagnosed with pseudo exfoliation. [Table 2]. Most patients with unilateral and bilateral pseudo exfoliation worked in agriculture, and there was a little male majority in both groups. Pseudo exfoliation syndrome was linked to environmental variables and UV radiation exposure by TAYLOR and RESNIKOFF et al. Males in India are more likely to engage in outdoor activities than females, which may help to explain the results of this study

Nuclear sclerotic cataract with 65% of eyes was found to be predominant in this study in which 22% were NS Gr3. [Table 3]

This study agrees with others that find a higher rate of bilateral pseudoexfoliation. This might be because

it's not uncommon for initially unilateral cases to evolve into their bilateral counterparts. The risk of pseudoexfoliation occurring in the contralateral eye was estimated to be 6.8% after 5 years and 16.8% after 10 years by Henry et al.

45 of these individuals exhibited pseudoexfoliation on both sides, while the remaining 5 did so only on one side. The 5 patients in this study who have unilateral pseudo exfoliation were found to be at risk for acquiring pseudo exfoliation in the other eye. These people require regular follow up. [Table 4]

In unilateral cases, the right eye was typically more affected than the left. [Table 4] In this study it was observed that most of measured IOP is below 14. [Table 5]

Optic atrophy seen in 4 Glaucoma patients. [Table 6] The study found that glaucoma affected 52% of participants whereas 48% did not. [Table 7]

Pseudoexfoliation syndrome is associated more often with secondary open angle glaucoma than secondary angle closure glaucoma. In addition to the shared mechanism of outflow obstruction between pseudoexfoliation and POAG, other factors, such as the local production of pseudoexfoliation material, endothelial cell damage of the trabecular meshwork, and passive deposition of pseudoexfoliation material and pigment originating elsewhere in the anterior segment, may contribute to the elevation of intraocular pressure in pseudoexfoliation-associated open angle Glaucoma.

Table 1: Age Distribution

S.No	AGE GROUPS IN YEARS	NO OF PATIENTS
1	<50	2
2	51-60	16
3	61-70	32
4	TOTAL	50

Table 2: U Gender Distribution

S.No	GENDER	NO OF PATIENTS
	MALE	28
2	FEMALE	22
3	TOTAL	50

Table 3: Stage of Cataract in PXF Patients

S.NO	GRADES OF CATARCT	NO OF EYES
1	NS GR 1	14
2	NS GR 2	13
3	NS GR 3	22
4	NS GR 4	16
5	MATURE	14
6	HYPER MATURE	12
7	PSCO	3
8	MIXED	6
9	TOTAL	100

Table 4: Laterality of PXF in cataract patients

S. No.	LATERALITY	NO OF PATIENTS
1.	UNILATERAL	
	RIGHT EYE	3
	LEFT EYE	2
2.	BILATERAL	45
	TOTAL	

Table 5: IOP measurement in PXF with cataract eyes

S.NO	IOP RANGE(mm of Hg)	NO OF EYES
1	<14	58
2	14-21	28
3	>21	14
4	Total	100

Table 6: Disc Changes

S.NO	DISC CHANGES	NO OF EYES
1	NOTCH	22
2	EXCAVATION	14
3	RIM THINNING	12
4	OPTIC ATROPHY	4

Table 7: Type of Glaucoma in Pseudoexfoliation

S. No.	TYPE OF GLAUCOMA	No	NO OF EYES	PERCENTAGE
1.	Open angle	21	42	42
2.	Angle closure	5	10	10
	Total	26	52	52

DISCUSSION

PXF increase with increasing age. Males accounted for 28% of the pseudo exfoliation patients, while females made up 22%. The clear male preponderance may be explained in part by the fact that men are more likely to engage in outdoor activities than women. UV light is a potential factor connected to pseudo exfoliation syndrome

Differences in the prevalence according to gender have also been noted, with some studies showing a higher prevalence among women. A number of other studies, however, have shown no sex predilection.^[4] Our study showed a higher prevalence in males.

Exposure to solar radiation along with increased prevalence in outdoor occupations point toward the role of environmental factors in PXF. It seems to be more prevalent in the rural setting, a factor that may also support the solar radiation theory. Further, of the cases in our study were agricultural workers, a part of the population who are constantly exposed to solar radiation

In our data, the disease was predominantly bilateral and affected males. It caused mild or no visual impairment in the majority of the affected eyes. PXF material was more commonly lodged in the pupillary margin. Such evidence points to the fact that PXF is a predominantly bilateral disease with the most probable asymmetric presentation. Hence emphasizing the fact that patients with unilateral disease should be carefully examined bilaterally, after dilatation of the pupil.

The constant friction of the iris with the lens causes the loss of pupillary ruff along with iris transillumination defects with the presence of poorly dilating pupil or non-dilating pupils, the amount of dilatation corresponding to the amount of PXF. It has also been described as “moth eaten” appearance. In our patients, PXF material was found at the pupillary margin in 78% of eyes. On the lens, there is the presence of white flakes on the anterior capsule, most often having a bull’s eye or target appearance, more clearly seen after dilatation of the pupil. A clear

intermediate zone is seen, due to the rubbing of the iris on the anterior capsule, surrounded by a peripheral and central zone of deposition of fibrillar material. Changes in the lens were seen in 6.2% of cases. The type of cataract in these patients has been reported to mainly be either nuclear or subcapsular, with unilateral patients having a more advanced cataract in the involved eye compared to the contralateral eye. The higher rate of nuclear cataract observed in this study is consistent with previous observations.^[10,11,12,13]

The PXF fibrillar material has been demonstrated on the ciliary processes and zonules. Evidence of zonular weakness in the form of phacodonesis and subluxation/dislocation of the lens has been described in multiple papers, along with a few descriptions of anterior subluxation in the form of shallowing of the anterior chamber and/or angle closure glaucoma.⁶ Phacodonesis was seen in 1.03% of eyes, with crystalline lens subluxation in 0.91% of eye. In this study it was observed that most of measured IOP is below.^[14]

Gonioscopy is an important examination in all cases, as it helps to diagnose an occludable or narrow angle and reveals flaky white material, mostly in the inferior angle along with the patchy and increased pigmentation of the trabecular meshwork, at times with the presence of “Sampaolesi’s line”.^[7] A correlation has been seen between a higher amount of pigmentation in the angle and higher IOP. Therefore, there is a possibility to prognosticate cases according to the amount of pigmentation in the angle. Nearly half of those diagnosed with pseudoexfoliation also had glaucoma, while the other half did not. There were 26 glaucoma patients, with 21 suffering from secondary open angle glaucoma and 5 from secondary angle closure glaucoma. Pseudoexfoliation syndrome is associated with an increased risk of open angle glaucoma.

Most glaucoma cases are intractable, only responding to medical management. Most clinicians prefer using Prostaglandin Analogues,^[9] for their first line of

treatment due to their high efficacy and long duration of action, being quite suitable for the high spikes in IOP in PEX. A few studies have shown the efficacy of medical management in cases of PXF, with PGAs, beta blockers, and Carbonic anhydrase inhibitors (CAIs). The use of pilocarpine, however, is not without caution as it may precipitate pupillary block in the already anteriorly subluxated cataract scenarios, along with the added disadvantages of possible posterior synechiae formation and cataract formation. Nuclear sclerotic cataract with 65% of eyes was found to be predominant in this study in which 22% were NS Gr3.^[5] In 2005, Thomas R et al found a strong association of PXF with age and any type of cataract in particular, nuclear cataract.^[10,11,12,13]

According to this study there was no history of trauma among the five patients who presented with a subluxated lens; rather, the subluxation occurred likely as a result of the pseudoexfoliation material weakening the zonules.

CONCLUSION

The findings show that PEX syndrome and PEX glaucoma more commonly affect males presenting during the sixth and seventh decades of life from lower socio economic status and are predominantly bilateral. A half of the affected eyes were associated with glaucoma and the majority of the eyes had mild or no visual impairment. Most of eyes have shown IOP in normal range of 14-21 mm of Hg with 14 % of eyes showing raised IOP (more than > 21mm of Hg). Open angle status was the predominant type in observed eyes in this study.

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