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RESEARCH ARTICLE

STATUS OF IOP IN PSEUDOEXFOLIATION SYNDROME AND ASSOCIATION OF THIS SYNDROME WITH AGE FACTOR

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ABSTRACT

Purpose: To evaluate the status of intraocular pressure in patients having pseudo exfoliation syndrome. **Study Design:** Descriptive cross-sectional study. **Duration and Place of Study:** Department of ophthalmology, Mayo hospital LAHORE from November to March 2019. **Methods and materials:** This was a comparative cross-sectional study that included 25 patients having pseudo exfoliation syndrome. Out of 25, the 9 were males subjects, and 16 were female. The mean age was 43 ± 20.2 years. A retrospective plan review was performed on patients with the diagnosis of pseudo exfoliation syndrome who were diagnosed after slit-lamp examination and intraocular pressure was measured by air-puff tonometer and confirmed by Goldmann applanation tonometer. **Results:** Results showed the male and female ratio, in which females are more prevalent than males i.e. 64% and 36%. It is shown that patients had age 45-60 years were taken. Patients between the age 45-47 years had 12%, patients with the age range of 48-50 years had 12% and the age group of 51-53 years had 36%, 54-57 years had 16 % and 58-60 years had 24%. Results showed that the intraocular pressure (IOP) in diagnosed pseudo exfoliation syndrome and it explains the maximum of 17mmhg-19mmhg intraocular pressure in 72% of the patients while 20% patients had 20mmhg-23mmhg and only 08% of the patient had intraocular pressure 14mmhg-16mmhg. **Conclusions:** It is concluded that pseudo exfoliation syndrome is more common in females as compared to males. Most of the pseudo exfoliation population of my sample size showed intraocular pressure from 17mmhg to 19mmhg. The high iop is seen in patients having age greater than 53 years. Therefore it is also associated with age factor.

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INTRODUCTION

Pseudo exfoliation syndrome is a systemic disorder in which a fibrillar, protein substance is produced irregularly in high concentrations inside ocular tissues. It is the most prevalent cause of secondary glaucoma globally, and the most common cause of unilateral glaucoma.¹ In a U.S. population, the Framingham Eye Study showed that the complete prevalence of pseudo exfoliation syndrome is to be 0.6percent in 52-64years old, increasing to 5percent in 75-85years old.² Furthermore, the subsequent pseudo exfoliation glaucoma reacts poorly to medical treatment as compared to glaucoma that can lead to prompt progression of optic nerve damage.³ Pseudo exfoliation syndrome is a systemic disease with primary ocular manifestations characterized by deposition of whitish-grey protein on the lens, iris, ciliary epithelium, corneal endothelium, and trabecular meshwork.⁴

It is the most significant that not every person with pseudo exfoliation syndrome will develop pseudo exfoliation glaucoma. Signs of pseudo exfoliation syndrome can generally be identified during slit-lamp examination. Clinical examination using biomicroscopy has a sensitivity of 85percent and specificity of 100percent.⁵ A simply identified sign of pseudoexfoliation is white, flaky substance on the pupillary margin of the iris and front surface of lens.⁶ The lens often shows a "three-ring sign" on the anterior capsule of the lens, which contains a central zone of visible exfoliation material measuring 1-3millimeters in diameter, combined with central clear zone and peripheral cloudy ring.⁸ The central area is commonly well determined and can have curled edges. The central clear area is supposed to be formed by the posterior surface of the iris rubbing off the pseudoexfoliative substance form of lens. This results in the loss of iris pigment, which can lead to transillumination defects.⁹ The pigment granules can often be seen to accumulate in the trabecular meshwork. The peripheral cloudy ring of the lens is normally visible after dilation.

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It should be noted that more than 20percent of patients with pseudoexfoliation syndrome connected with narrow angles; hence, the anterior chamber depth of these patients should be evaluated before dilation to avoid precipitation acute angle-closure glaucoma.¹⁰ Gonioscopy exposes pigment accumulated on the trabecular meshwork, usually marked inferiorly, along with pigment about the Schwalbe's line. Furthermore, pseudoexfoliation substance has been known on the iris surface, corneal endothelium and zonules.¹¹ Pseudoexfoliation glaucoma normally presents unilaterally with intraocular pressure that tends to increase than patients with primary open-angle glaucoma. The higher Intraocular pressure perceived in pseudoexfoliation glaucoma may lead to rapid optic nerve damage and visual field loss.¹² When symptoms occur in one eye, the contralateral eye must be observed and monitored, meanwhile, pseudoexfoliation glaucoma will develop in the other eye in more than 40percent of these patients.¹³

Poor pupillary dilation reaction is an indirect result that is observed frequently in patients with pseudoexfoliation syndrome and resultant glaucoma. This is thought to be associated with iris dilator muscle atrophy and may cause difficulties in cataract surgery. These eyes also have weak zonular attachments, and make problems in cataract surgery.¹⁴ A comprehensive record may show a family history of pseudoexfoliation syndrome. A slit-lamp examination with intraocular pressure measurement can manifest many results of pseudoexfoliation glaucoma. It is also necessary to examine the anterior chamber angle to make sure secure dilation, a dilated fundus examination with stereo disc images performed to detect any glaucomatous changes. Visual field testing may be essential to verify for any distinctive peripheral visual field loss and to determine the possible stage of glaucoma.¹⁵ It is possible to use different images of the fundus to identify and monitor glaucomatous modifications in the retinal nerve fiber layer and optic disc. Optical coherence tomography (OCT) enables the retinal nerve fiber layer to be evaluated for any changes. Heidelberg retina tomography (HRT) is a new imaging study that can give readings and images of the optic disc and retinal nerve fiber layer. Both OCT and HRT can be used to aid in the diagnosis and follow-up of patients with pseudoexfoliation glaucoma.¹⁶

Pigments accumulate on the trabecular meshwork and anterior segment structures also in pigmentary glaucoma. Pigmentary glaucoma is caused by pigment dispersion syndrome, an autosomal dominant disorder of pigment released from the iris epithelium.¹⁷ More than a few treatment options exist for pseudoexfoliation glaucoma, and every patient should be treated. Intraocular pressure lower medications to lower intraocular pressure are less useful in pseudoexfoliation glaucoma as compared to Primary open-angle glaucoma, but they are used commonly as first-line treatment. These medications include Beta Blockers, selective Alpha2 Receptor Agonists, topical and systemic Carbonic Anhydrase Inhibitors, Prostaglandin Agonists, and Sympathomimetics. After that, therapy comes is Argon Laser or Selective Laser Trabeculoplasty (ALT or SLT). Mainly researches have shown good response to Argon Laser or Selective Laser Trabeculoplasty. Some time ago, Laser Trabeculoplasty starts to put on; patients with pseudoexfoliation glaucoma tend to show a rise in intraocular pressure and the increase is more than primary open-angle glaucoma patients.

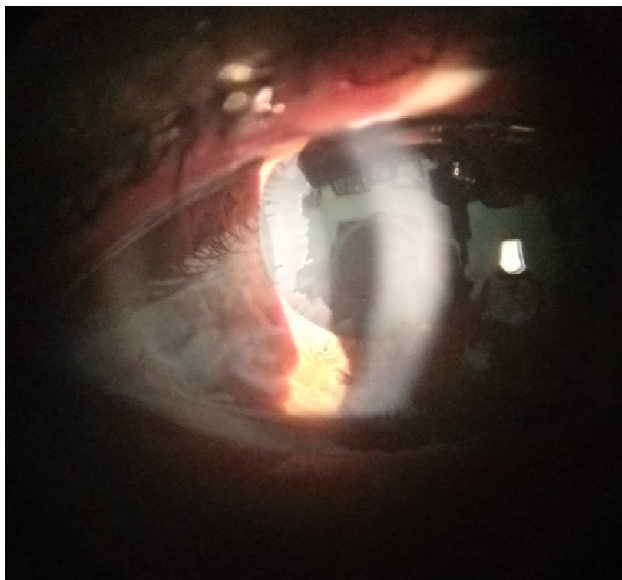
If medicine and laser treatment do not properly regulate Intraocular Pressure, a protected filtration process may be performed.¹⁹ Pseudoexfoliation glaucoma has a poorer prognosis than Primary Open Angle Glaucoma because the Intraocular Pressure is not that much high relative to POAG, but the poor response of pseudoexfoliation glaucoma to medication leads to the damaged optic nerve and visual field defects that progress more rapidly and more seriously.¹³ Patients with pseudoexfoliation syndrome are at higher risk of cataracts development and are more susceptible to complications at the time of cataract extraction. Poor pupil dilation damaged zonular fibers, and synechiae between the iris and peripheral anterior lens capsule, make the cataract surgery technically more complex. Additionally, there is a higher frequency of capsular rupture, vitreous loss, and zonular dehiscence through cataract extraction in patients with pseudoexfoliation syndrome. Postoperative complications of cataract extraction are also raised in pseudoexfoliation syndrome; including redness, posterior capsular opacification, and capsule phimosis syndrome and Intraocular lens decentered.²⁰

Pseudoexfoliation glaucoma tends to follow an impulsive course, as it may be comparatively benign or progress quickly to complete optic nerve damage. Due to the unstable condition of patients with pseudoexfoliation glaucoma who show increasing intraocular pressure should be examined every one to three months. If topical treatment is initiated, the patient's Intraocular Pressure should be reviewed in three to six weeks. Patients receiving laser trabeculoplasty should also be reviewed within three to six weeks. Patients with pseudoexfoliation syndrome have no confirmation of glaucoma so usually not treated, but they should be monitored every 6 to 12 months as they are at higher risk of developing glaucoma.²¹ The pseudoexfoliative substance blocks the trabecular meshwork, promoting the accumulation of pigment and cellular debris. This creates an obstruction of channels by which aqueous humor usually flows into the Schlemm's canal. This is held to be the causative factor for chronic elevations of Intraocular Pressure and the growth of pseudoexfoliation glaucoma.²²

Exfoliation fibers aggregates have been identified in the skin and autopsy specimens of heart, lung, liver, kidney, gall bladder and cerebral meninges in two patients with visual PXF.⁸ The deposits were concentrated in the interstitial fibrovascular connective tissue septa of these organs, commonly adjoining of elastic fibers, elastic microfibrils, collagen fibers, fibroblasts and the walls of small blood vessels.²³ In the Blue Mountains ocular Study (Australia), PXF connected certainly with a history of Hypertension, Angina, Myocardial Infarction, or Stroke, indicative of vascular effects of the disease. In other research, 50percent of persons with pseudoexfoliation had cardiovascular disease, three times the rate of the impassive subjects. Pseudoexfoliation was considerably related with Aneurysms of the abdominal aorta, but not the carotid artery occlusion.²⁴

METHODOLOGY

This was a comparative cross-sectional study; the sample size was determined by a randomized controlled method which included 25 patients having pseudoexfoliation syndrome; 9 were males subjects, and 16 were females.



Patients having other ocular pathologies were excluded from the study; Data was collected after informed consent; The mean age was 43 ± 20.2 years. A retrospective plan review was performed on patients with the diagnosis of pseudoexfoliation syndrome who were diagnosed after slit-lamp examination and intraocular pressure was measured by air-puff tonometer and confirmed by applanation tonometer.

RESULTS

Demographic Specification: Table 1 explains the male and female ratio, in which females are more prevalent than males i.e. 64% and 36%, respectively.

Table: 1 Gender wise distribution of the sample

Gender	Frequency
Male	9
Female	16
Total	25

Table 2: Age-wise distribution

Age	Frequency
45-47 Years	3
48-50 Years	3
51-53 Years	9
54-57 Years	4
58-60 Years	6
Total	25

Table: 3 Intraocular pressure in diagnosed pseudoexfoliation syndrome

Intraocular pressure	Frequency
14mmhg-16mmhg	8
17mmhg-19mmhg	72
20mmhg-23mmhg	20
Total	100

It is shown in the table above patients having age 45-60 years are taken. Patients between the age 45-47 years, patients with an age range of 48-50 years, and the age group of 51-53 years are having a population of 12%, 12%, 36% 16%, and 24% respectively.

Table 4. Intraocular pressure in diagnosed pseudoexfoliation syndrome association with Age

Intraocular pressure	Age
14mmhg-16mmhg	45-47
17mmhg-19mmhg	48-53
20mmhg-23mmhg	54-60
Total	100

Table 3 describes the intraocular pressure in diagnosed pseudoexfoliation syndrome and it explains the maximum of 17mmhg-19mmhg intraocular pressure in 72% of the patients while 20% of patients are having 20mmhg-23mmhg and only 08% of the patient is having intraocular pressure 14mmhg-16mmhg. Table 4 describes the intraocular pressure in diagnosed pseudoexfoliation syndrome and association with age it explains the maximum of 17mmhg-19mmhg intraocular pressure is seen in patients having age 48-53 years old while the patients having age 54-60 years old recorded high iop 20mmhg-23mmhg and patients having age 45-47 years old is having intraocular pressure 14mmhg-16mmhg.

DISCUSSION

Recent studies have shown that the lens epithelium, trabecular meshwork, iris, ciliary processes, conjunctiva, and pericocular tissue are useful reserve for pseudoexfoliative material. The substance is difficult to be removed and floats in the aqueous humor, in which it is filtered and deposited in the trabecular meshwork. All this collects in the trabecular vicinity and focally collapses in Schlemm's canal. This reduces aqueous humor outflow and increases Intraocular Pressure from 18mmHg-22mmHg. However, Pseudoexfoliation syndrome notably predisposes the ones to the increase of intraocular pressure, and its consequences glaucoma is 15percent-30percent of instances.

Pseudoexfoliation syndrome happens in all regions of the globe. Researchers were able to define pseudoexfoliation as a reason for more than fifty percent of cases of Open-Angle Glaucoma in Scandinavian nations. Furthermore, a few research show a higher incidence among women than men. An additional maximum threat is increasing age, as pseudoexfoliation syndrome may appear in people below 50 years of age and increases with age.²⁵ Moreover extreme uveitis may additionally cause a membrane on trabecular meshwork and causes intraocular pressure greater than 25mmHg.²⁶ Like, pseudoexfoliation glaucoma, any trabecular disorder increases Intraocular Pressure.

Though pigmentary glaucoma has an early age of onset, high ocular pressure generally develops in 20 to 40year old sufferers. In pigmentary glaucoma there is mostly a vertical pigment band at the corneal endothelium, termed as Krukenberg's spindle or Zentmeyer line—a function hardly ever discovered in pseudoexfoliation glaucoma and intraocular pressure varies from 16-24mmHg. Pigment and pseudoexfoliation glaucoma may additionally have iris transillumination defects. Moreover, the defects in pigmentary glaucoma are in the radial section of peripheral iris, while in pseudoexfoliation glaucoma are more patchy and in the direction of the margin of the pupil. The iris in pigmentary glaucoma tends to have a concave periphery which is another distinguishing feature.²⁷

Conclusions

It is concluded that pseudoexfoliation syndrome is more common in females as compared to males. Most of the pseudoexfoliation population of my sample size showed intraocular pressure from 17mmhg to 19mmhg. The male and female ratio mention ratio here, in which females are more prevalent than males i.e. 64% and 36%. Patients who had age 45-60 years are taken. Patients between the age 45-47 years, patients with an age range of 48-50 years, and the age group of 51-53 years are having a population of 12%, 36%, 16%, and 24% respectively. Results showed that the intraocular pressure in diagnosed pseudoexfoliation syndrome and it explains the maximum of 17mmhg-19mmhg intraocular pressure in 72% of the patients while 20% of patients had 20mmhg-23mmhg and only 08% of the patient had intraocular pressure 14mmhg-16mmhg.

REFERENCES

- Vessani RM, Ritch R, Liebmann JM, Jofe M. Plasma homocysteine is elevated in patients with exfoliation syndrome. *Am J Ophthalmol*. 2003 Jul;136(1):41–46.
- Bialasiewicz AA, Wali U, Shenoy R, Al-Saeidi R. Patients with secondary open-angle glaucoma in pseudoexfoliation (PEX) syndrome among a population with high prevalence of PEX: Clinical findings and morphological and surgical characteristics. *Ophthalmologie*. 2005;102:1064–8.
- Ritch R, Schlötzer-Schrehardt U, Konstas AG. Why is glaucoma associated with exfoliation syndrome? *Progr Ret Eye Res*. 2003;22:253–75.
- Leske MC, Heijl A, Hyman L, Bengtsson B, Komaroff E. Factors for progression and glaucoma treatment: The Early Manifest Glaucoma Trial. *Curr Opin Ophthalmol*. 2004;15:102–6.
- Naumann GO, Schlötzer-Schrehardt U, Kuchle M. Pseudoexfoliation syndrome for the comprehensive ophthalmologist. Intraocular and systemic manifestations. *Ophthalmology*. 1998;105:951–68.
- Conway RM, Schlötzer-Schrehardt U, Kuchle M, Naumann GO. Pseudoexfoliation syndrome: Pathologic manifestations of relevance to intraocular surgery. *Clin Exp Ophthalmol*. 2004;32:199–210.
- Prince AM, Ritch R. Clinical signs of the pseudoexfoliation syndrome. *Ophthalmology*. 1986 Jun;93(6):803–807.
- Puska P, Vasara K, Harju M, Setälä K. Corneal thickness and corneal endothelium in normotensive subjects with unilateral exfoliation syndrome. *Graefes Arch Clin Exp Ophthalmol*. 2000 Aug;238(8):659–663.
- Naumann GO, Schlötzer-Schrehardt U. Keratopathy in pseudoexfoliation syndrome as a cause of corneal endothelial decompensation: a clinicopathologic study. *Ophthalmology*. 2000 Jun;107(6):1111–1124.
- Pohjanpelto P. Long-term prognosis of visual field in glaucoma simplex and glaucoma capsular. *Acta Ophthalmol (Copenh)* 1985 Aug;63(4):418–423.
- Vesti E, Kivelä T. Exfoliation syndrome and exfoliation glaucoma. *Prog Retin Eye Res*. 2000 May;19(3):345–368.
- Yarangümelı A, Davutluoglu B, Köz OG, Elhan AH, Yaylaci M, Kural G. Glaucomatous damage in normotensive fellow eyes of patients with unilateral hypertensive pseudoexfoliation glaucoma: normotensive pseudoexfoliation glaucoma? *Clin Experiment Ophthalmol*. 2006 Jan-Feb;34(1):15–19.
- Schlötzer-Schrehardt U, Koca MR, Naumann GO, Volkholz H. Pseudoexfoliation syndrome. Ocular manifestation of a systemic disorder? *Arch Ophthalmol*. 1992 Dec;110(12):1752–1756.
- Mitchell P, Wang JJ, Smith W. Association of pseudoexfoliation with increased vascular risk. *Am J Ophthalmol*. 1997 Nov;124(5):685–687.
- Ritch R, Schlötzer-Schrehardt U. Exfoliation syndrome. *Surv Ophthalmol*. 2001;45:265–315.
- Ritch R. Exfoliation syndrome: The most common identifiable cause of open-angle glaucoma. *J Glaucoma*. 1994;3:176–8.
- Schlötzer-Schrehardt U, Naumann GO. Perspective-Ocular and systemic pseudoexfoliation syndrome. *Am J Ophthalmol*. 2006;141:921–37.
- Zenkel M, Pöschl E, von der Mark K, Hofmann-Rummelt C, Naumann GO, Kruse FE, et al. Differential gene expression in pseudoexfoliation syndrome. *Invest Ophthalmol Vis Sci*. 2005;46:3742–52.
- Zenkel M, Lewczuk P, Jünemann A, Kruse FE, Naumann GO, Schlötzer-Schrehardt U. Pro-inflammatory cytokines are involved in initiation of the abnormal matrix process in pseudoexfoliation syndrome/glaucoma. *Am J Pathol*. 2010;176:2868–79.
- Zenkel M, Kruse FE, Naumann GO, Schlötzer-Schrehardt U. Impaired cellular stress response in eyes with pseudoexfoliation syndrome/glaucoma. *Invest Ophthalmol Vis Sci*. 2007;48:5558–66.
- Ovodenko B, Rostagno A, Neubert TA, Shetty V, Thomas S, Yang A, et al. Proteomic analysis of exfoliation deposits. *Invest Ophthalmol Vis Sci*. 2007;48:1447–57.
- Sharma S, Chataway T, Burdon KP, Jonavicius L, Klebe S, Hewitt AW, et al. Identification of *LOXL1* protein and apolipoprotein E as components of surgically isolated pseudoexfoliation material by direct mass spectrometry. *Exp Eye Res*. 2009;89:479–85.
- Chen L, Jia L, Wang N, Tang G, Zhang C, Fan S, Liu W, Meng H, Zeng W, Liu N, Wang H, Jia H. Evaluation of *LOXL1* polymorphisms in exfoliation syndrome in a Chinese population. *Mol Vis*. 2009;15:2349–2357.
- Williams SE, Whigham BT, Liu Y, Carmichael TR, Qin X, Schmidt S, Ramsay M, Hauser MA, Allingham RR. Major *LOXL1* risk allele is reversed in exfoliation glaucoma in a black South African population. *Mol Vis*. 2010;16:705–712.
- Challa P, Schmidt S, Liu Y, Qin X, Vann RR, Gonzalez P, Allingham RR, Hauser MA. Analysis of *LOXL1* polymorphisms in a United States population with pseudoexfoliation glaucoma. *Mol Vis*. 2008;14:146–149.
- Csiszar K. Lysyl oxidases: a novel multifunctional amine oxidase family. *Prog Nucleic Acid Res Mol Biol*. 2001;70:1–32.
- Ho SL, Dogar GF, Wang J, Crean J, Wu QD, Oliver N, Weitz S, Murray A, Cleary PE, O'Brien C. Elevated aqueous humour tissue inhibitor of matrix metalloproteinase-1 and connective tissue growth factor in pseudoexfoliation syndrome. *Br J Ophthalmol*. 2005;89(2):169–173. doi: 10.1136/bjo.2004.044685