Original Article

Ophthalmology and Allied Sciences
Volume 4 Number 3, September - December 2018
DOI: http://dx.doi.org/10.21088/oas.2454.7816.4318.1

A study of Cataract Surgery Complications in Patients with Pseudoexfoliation Syndrome

Moizuddin M.D.[1], Sulaiman A.[2]

Abstract

Aim: The purpose of this study was to study the frequency and types of complications of small incision cataract surgery (SICS) in patients with pseudoexfoliation [PEX]. *Method:* This cross-sectional descriptive study was carried out on 65 eyes of 65 patients with cataract and PEX who underwent SICS in a tertiary care hospital. Their perioperative and post-operative complications were documented. *Results:* The most common finding was Poor pupillary dilatation inspite of use of standard mydriatic drops and non-steroidal anti-inflammatory drugs. Spinchterotomy was done in 7 (10.7%) cases. Other problems encountered were accidental posterior capsule rupture, vitreous loss, retained cortical matter, decentered intraocular lens and zonular dialysis. *Conclusion:* Presence of associated PEX in cataract patients significantly increases the risk of vision threatening complications. Use of flexible iris hooks for small pupils and for capsular stability, capsular tension rings and high viscosity viscoelastics are useful modifications of surgical technique for good visual outcome.

Keywords: Pseudoexfoliation; Zonular Weakness; Spinchterotomy; Pupillary Dilatation.

Introduction

Pseudoexfoliation syndrome (PEX) is a condition characterized by the secretion of a greywhite, fibrogranular substance in the anterior segment. The source of this substance is multifocal and is believed to appear secondary to abnormal basal membrane constituents produced by aging epithelial cells [1]. PEX is diagnosed clinically by anterior segment examination, and is defined as the presence of grey-white fibrogranular pseudoexfoliation material on the anterior capsule of the lens and edges of the pupil [2,3]. The prevalence of PEX varies by population; however, PEX frequency increases with age and it is believed that an extremely significant relationship exists between age-related cataractous lens changes and PEX [4]. In eyes with PEX, it has been reported that degenerative changes in the iris stroma and muscle layer may interfere with sufficient pupil dilation [5]. In eyes with pseudoexfoliation, the lens zonules can become detached from the ciliary body and lens by mechanical forces or enzymatic zonulolysis. Clinically, this can lead to iridophacodonesis and spontaneous lens subluxation or dislocation [6]. These structural changes make cataract surgery more difficult and increase the incidence of intraoperative complications [7,8].

Author Affiliation: [1]Assistant Professor [2]Professor, Department of ophthalmology, Narayana medical college and hospital, Nellore, Andhra Pradesh 524003, India.

Corresponding Author: Moizuddin MD, Assistant Professor, Department of ophthalmology, Narayana medical college and hospital, Nellore, Andhra Pradesh 524003, India.

E-mail: drmoizoph@gmail.com

Received on 10.10.2018, **Accepted on** 22.10.2018

Materials and Methods

Sixty five (65) Patients with cataract associated with PEX were included in this study. Patients with a history of miotic use, traumatic cataract, complicated cataract, high myopia and previous ocular surgery were excluded from the study. Patient's age, gender, anterior segment and fundus findings in both eyes, presence of pseudoexfoliative material, IOP, and surgical notes were evaluated. Intraocular pressure was measured by applanation tonometry (Haag-Streit, Switzerland) in all patients. Gonioscopy was done and the angle was graded by Shaffer's system of grading. All patients were operated by the same surgeon with more than 5 years of experience using a small incision cataract surgery (SICS). All patients were put on topical antibiotic drops 1 day prior to surgery. Patients were dilated with mydriatic - cycloplegic drops and non-steroidal anti-inflammatory drops were used

© Red Flower Publication Pvt. Ltd.

to maintain the dilatation. Pupillary diameter after dilatation was measured and graded as poor (4 mm or less), moderate (5-6 mm) and good (7 mm or more). Peribulbar block with 5 ml of 2% xylocaine and 5 ml of 0.5% bupivacaine with 150 units/ml of hyaluronidase. Povidine-iodine 5% was instilled into the conjunctival sac. Fornix base conjunctival flap was made, scleral incision was made with bard parker knife with 15 no. blade superiorly and sclerocorneal tunnel was constructed with crescent. Side port entry was made by side port entry blade, trypan blue dye (0.1%) was injected intracamerally to stain the anterior capsule. Gentle continuous curvilinear capsulorhexis aimed at 6 mm to 6.5 mm was done using the needle cystitome. Acentry done, then gentle thorough hydrodissection was performed to separate cortex from nucleus. Nucleus was delivered by visco expression. Irrigation and aspiration was done with Simcoe's two way irrigation and aspiration cannula. Rigid, single piece, biconvex, polymethyl meth acrylate posterior chamber intraocular lens (IOLs) with optic diameter of 5.25 mm without dialing holes was used and was implantated in bag using Kelman McPherson forceps.

Post-operatively, patients were put on topical antibiotics and steroids tapered over 4-6 weeks depending upon the post-operative inflammation. Patients were followed on the post-operative day 1, day 7, 1 month and 2 month to evaluate intraocular pressure spikes, presence of intraocular inflammation, decentration/tilt of intra ocular lens and corneal decompensation.

Results

Sixty five eyes of 65 patients with PEX who underwent cataract surgery by SICS technique were included in this study to evaluate the preoperative and post-operative complication. All patients were operated by the same surgeon with more than 5 years experience.

The ages of the 65 patients in this study was between 60 and 80 years. Out of these 41 (63%) were in 60-70 years age group and 24 (36.9%) patients were in 71-80 years age group. 48 (73.8%) were male and 17 (26.1%) were females. 22 (33.8%) eyes had nuclear sclerosis, 29 (44.6%) had cortical cataract and both nuclear sclerosis and cortical cataract was present in 14 (21.5%) eyes. Mean intraocular pressure (IOP) was 17.1±2.2 mmHg. (Table 1,2).

Eight (8) cases had poor pupillary dilatation (4mm or less), 42 had moderate dilatation (5-6mm) and 15 had 7 mm dilatation. None of the eyes showed frank subluxation of lens. All patients underwent cataract surgery using SICS technique. Surgical complications are listed in table. 7 cases (10.7%) required sphincterotomy to facilitate capsulorrhexis and nucleus delivery. 5 eyes (7.7%) had posterior capsular rent, 3 eyes (4.6%) had zonular dialysis, 6 (9.2%) had vitreous loss. Patients were followed on the post-operative day 1, day 7, day 30 and at 2 month to evaluate intraocular pressure spikes, increased in intraocular inflammation, decentration/tilt of intraocular lens and corneal decomposition. (Table 3,4,5).

Post operative Corneal edema was seen in 13 (20%) cases, 8 cases (12.3%) had significant intraocular inflammation, retained lens matter was seen in 3 patients (4.6%), 2 eyes (3.1%) had decentered IOL. Final visual acuity was recorded after 8 weeks of surgery. Pre- or post-operative specular microscopy and pachymetry were not included in this study. (Table 6,7).

Table 1: Sex distribution

Sex	Total	Percentage
Male	48	(73.8%)
Female	17	(26.1%)

Table 2: Age

Age	Total(65)	Percentage
60-70	41	(63%)
71-80	24	(36.9%)

Table 3: Cataract type

Cataract type	Total	Percentage
Nuclear selerosis	22	(33.8%)
Nuclear+cortical	29	(44.6%)
Cortical	14	(21.5%)

Table 4: Visual activity post op

Visual acuity	Total	Percentage
6/12 or better	26	(40%)
6/18-6/36	38	(58.4%)
6/60 or less	1	(1.5%)

Table 5: Pupil dilatation on table

Pupil size	Total	Percentage
(4 mm or less)	8	(12.3%)
(5-6 mm)	42	(64.6%)
(7 mm or more)	15	(23%)

Table 6: Intra op complications

Complications	Total	Percentage
Posterior capsular rent	5	(7.7%)
Zonulal dialysis	3	(4.6%)
Vitreous loss	6	(9.2%)

Table 7: Post op complication

Complications	Total	Percentage
Corneal edema	13	(20%)
Intraocular inflammation	8	(12.3%)
Retained lens matter	3	(4.6%)
Decentered IOL	2	(3.1%)

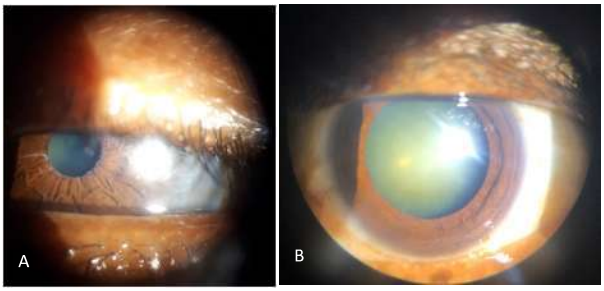

Fig. 1: A. PEX with poor pupil dilatation with immature senile cataract. B. PEX with good pupil dilatation with immature senile cataract.

Discussion

PEX syndrome affects mainly elderly group of patients who are also likely to undergo cataract surgery. In the present study, 65 eyes of 65 patients of cataract with PEX were evaluated for perioperative and post-operative complications following SICS in a tertiary care center.

PEX is a relatively common finding in elderly patients undergoing cataract surgery, but pre-operative detection may be missed if the eyes are not seen under slit lamp.

Direct signs of zonule instability such as lens subluxation, zonular dialysis, iridodonesis or phacodonesis should be carefully looked for pre-operatively. Often the earliest sign is a subtle iridodonesis. It is best assessed prior to the pupillary dilatation while lens related changes are best seen after dilatation [11]. One study reported that an axial anterior chamber depth of less than 2.5 mm increased risk of surgical complications five fold [3]. The amount of exfoliative material in the zonules does not seem to be predictive of intra operative zonule weakness [12].

The ages of patients diagnosed with PEX in this study were in 60-80 years age group. Epidemiological studies of PEX have shown that it is more common in patients older than 60 years and prevalence further increases with age [13,14].

Of the 65 patients, 48 (73.8%) were male and 17 (26.1%) were female. Some previous studies showed male preponderance while Arvind et al. in 2003 showed no sex predilection [10]. Avramides, et al reported a female preponderance [15]. Of the 65 patients studied, 22 (33.8%) had nuclear sclerosis, 14 (21.5%) had cortical cataract and both changes were seen in 29 (44.6%) cases. Most studies have found a strong association between PEX and nuclear cataract [12,16,17]. It has been hypothesized that high-levels of epithelial metabolic activity may be beneficial for ion pumps and electrolyte environment of cortical fibers [16].

In the present study, most frequent problem encountered was a rigid pupil (76.9%) and none of the pupils dilated more than 7 mm in spite of use of standard mydriatic drops. Carpel [18] found a high 94.1% prevalence while, Alfaiate et al. [13] found prevalence of 48.4%. We resorted to sphincterotomy, but other alternatives include bimanual stretching and use of iris hooks or flexible iris retractors are also possible. Sphinterotomy and stretching have the disadvantage of causing post-operative distorted pupil, which may even lead to the pupillary capture.

The Other complications, we had include posterior capsular rent, vitreous loss, zonular dialysis. These are also related to difficult maneuvers due to small rigid pupils. Zonular fragility increases the risk of lens dislocation, zonular dialysis or vitreous loss up to 10 times [9]. Rate of vitreous loss varied from 0% to 11% across different studies [11,17].

Frequency of retained lens matter especially subincisional cortex can invite severe post-operative inflammation and decentration of IOL. Such complications can directly affect the visual recovery post-operatively. Hence surgical skill becomes an important factor for good visual outcome in such patients.

Strategies to reduce stress on the zonules include avoidance of excessive fluctuations in the anterior chamber pressure by controlled paracentesis and liberal use of viscoelastics and gentle maneuvers of lens especially gentle hydrodissection to allow unimpeded rotation of the nucleus. In cases with frank zonular weakness, use of a capsule tension ring that distributes forces circumferentially, also reduces post-operative IOL decentration.

IOL decentration has also been reported even when the lens is entirely in the capsular bag, primarily due to decentration of the entire bag [19,20]. This study demonstrated an increased incidence of intra-operative and post-operative complications. A thorough awareness of PEX syndrome and its effects on all ocular tissue is critical to understand the multi factorial causes

of operative complication and thereby avoid or minimize them.

PEX presents challenges that must be adequately addressed with proper pre-operative preparation, surgical care and post-operative follow-up. However, cases may go undetected due to failure to dilate the pupil or to examine the lens with the slit lamp after dilatation. Adequate pre-operative assessment should aim to identify potential problems like the possibility of fragile zonules and difficult visualization due to small pupils. This can help with surgical planning, particularly predicting the possible need for ophthalmic viscosurgical devices, pupil expansion devices and capsule support devices all of which can increase the margin of safety in these potentially complex cases. Appropriate post-operative follow-up is required to monitor and address IOP, capsular contracture and IOL decentration issues. The main limitations of the study were the small sample size and duration of the study. Furthermore, we did not include pre- and post-operative specular microscopy and corneal pachymetry.

Conclusion

PEX association with cataract patients may have the chances of vision loss. Advanced surgical technique which uses the flexible iris hooks for small pupils and for capsular stability, capsular tension rings and high viscosity viscoelastics may resultant good visual outcome.

References

1. Kanski JJ. The Glaucomas Clinical Ophtalmology. 3rd Ed. Oxford: Butterworth-Heinemann Co; 1994. pp.223–79.
2. Sowka J. Pigment dispersion syndrome and pigmentary glaucoma. Optometry. 2004;75:115–22.
3. Kuchle M, Amberg A, Martus P, Nguyen NX, Naumann GO. Pseudoexfoliation syndrome and secondary cataract. Br J Ophthalmol. 1997;81:862–6.
4. Şenol N, Erda S. Senil psödoeksfoliasyonlarda kataraktöz lens değişiklikleri. T Oft Gaz. 1988; 18:325–7.
5. Repo LP, Naukkarinen A, Paljvari L, Teravista ME. Pseudoexfoliation syndrome with poorly dilating pupil: a pupil and electronmicroscopic study of the sphincterarea. Graefes Arch Clin Exp Ophtalmol. 1996;234:171–6.
6. Katsimpris JM, Petropoulos IK, Apostolakis K, Feretis D. Comparing phacoemulsification and extracapsular cataract extraction in eyes with pseudoexfoliation syndrome, small pupil, and phacodonesis. Klin Monbl Augenheilkd. 2004;221:328–33.
7. Lumme P, Laatikainen L. Exfoliation syndrome and cataract extraction. Am J Ophtalmol. 1993;116:51.
8. Sunay F, Şentürk A, Borataç N, Şendilek B, Erbil H. Katarakt hastalarında eksfoliasyon sıklığı ve cerrahi sonuçlar. T Klin Oftalmoloji. 1997;6:31–5.
9. Sekeroglu MA, Bozkurt B, Irkec M, Ustunel S, Orhan M, Saracbasi O. Systemic associations and prevalence of exfoliation syndrome in patients scheduled for cataract surgery. Eur J Ophthalmol 2008;18:551-5.
10. Arvind H, Raju P, Paul PG, Baskaran M, Ramesh SV, George RJ, et al. Pseudoexfoliation in South India. Br J Ophthalmol 2003;87:1321-3.
11. Shingleton BJ, Crandall AS, Ahmed II. Pseudoexfoliation and the cataract surgeon: Preoperative, intraoperative, and postoperative issues related to intraocular pressure, cataract,and intraocular lenses. J Cataract Refract Surg 2009;35:1101-20.
12. Moreno J, Duch S, Lajara J. Pseudoexfoliation syndrome: clinical factors related to capsular rupture in cataract surgery. Acta ophthalmologica. 1993;71(2):181-4.
13. Alfaiate M, Leite E, Mira J, Cunha-Vaz JG. Prevalence and surgical complications of pseudoexfoliation syndrome in Portuguese patients with senile cataract. J Cataract Refract Surg 1996;22:972-6.
14. Jawad M, Nadeem AU, Khan Au, Aftab M. Complications of cataract surgery in patients with pseudoexfoliation syndrome. J Ayub Med Coll Abbottabad 2009;21:33-6.
15. Avramides S, Traianidis P, Sakkias G. Cataract surgery and lens implantation in eyes with exfoliation syndrome. J Cataract Refract Surg 1997;23:583-7.
16. Young AL, Tang WW, Lam DS. The prevalence of pseudoexfoliation syndrome in Chinese people. Br J Ophthalmol 2004;88:193-5.
17. Shastri L, Vasavada A. Phacoemulsification in Indian eyes with pseudoexfoliation syndrome. J Cataract Refract Surg 2001;27:1629-37.
18. Carpel EF. Pupillary dilation in eyes with pseudoexfoliation syndrome. Am J Ophthalmol 1988;105:692-4.
19. Shingleton BJ, Marvin AC, Heier JS, O'Donoghue MW, Laul A, Wolff B, et al. Pseudoexfoliation: High risk factors for zonule weakness and concurrent vitrectomy during phacoemulsification. J Cataract Refract Surg 2010;36:1261-9.
20. Ritch R, Schlötzer-Schrehardt U. Exfoliation syndrome. Surv Ophthalmol 2001;45:265-315.

Original Article

Ophthalmology and Allied Sciences
Volume 4 Number 3, September - December 2018
DOI: http://dx.doi.org/10.21088/oas.2454.7816.4318.2

Tear Film Abnormalities in Pateints with Pseudoexfoliation Syndrome

Kumar Amruth C[1], Ramya Deepthi P[2], Shiva Krishna M[3]

Abstract

Aim: The present study is designed to understand the tear film abnormalities in patients with pseudoexfoliation syndrome. *Method:* The prospective non-randomized study of 50 eyes of 25 normal subjects and 50 eyes of 35 patients with PEX syndrome were undertaken. Tear film changes, schirmer's 2 test and tear film break up time (TBUT) were performed. *Result:* The mean age was 56.4±4.2 years and 60.27±5.3 years in both PEX and control group respectively. 20 (57.1%) of the 35 patients in the study group had unilateral PEX and other 15 (42.85%) had bilateral presentation. The average mydriasis in eyes with PEX syndrome was 5.2 mm and in eyes without PEX syndrome was 6.5mm. Average Schirmer's and TBUT in control group were 18.15±4.2 mm and 14.75±2.5s respectively. Whereas, the values were 7.21± 3.4 mm and 6.2±2.1s in PEX group and the differences were statistically significant ($p< 0.05$). *Conclusion:* Analysis of tear functions can help in the better management of PEX syndrome.

Keywords: PEX Syndrome; Tear Film Break Up Time (Tbut); Schirmer's 2 Test.

Introduction

Pseudoexfoliation syndrome is relatively wide spread generalized disease of connective tissue in the elderly population. Approximately 10% of people over 60 years have PEX [1-3]. The prevalence of PEX based on hospital reports from India varies between 1.87% and 13.5%. In our country, the prevalence of PEX in South India was found to be 3.8% and Andhra Pradesh eye disease study reported it as 3.01% [20,21]. Deposition of PEX fibrillsin the trabecular meshwork makes an important contribution to the occurrence of PEX glaucoma. This Special form of elastosis app ears to result from inter play between genetic and environmental factors in form of a complex disease [4,5]. Several studies in PEX patients showed association with polymorphisms in the gene lysyl oxidase like1 [6,7]. While the PEX syndrome was for long considered aspecific disease of the anterior segment of the eye, today it is known to be a generalized process of the extracellular matrix [8]. Using electron microscopy or specific immunohistochemical markers, deposits of PEX material can be found innumerous organ systems also in skin and outer ocular tissues especially in conjunctiva [9]. Increased concentration of fibrogenic growth factors, reduce dactivities of proteolytic enzymes, subclinical in flammatory processes and increase doxidative stress are all be lieved to be involved in pathogenesis of this abnormal matrix process [10]. Patients of PEX can develop corneal endotheliopathy, sphincter atrophy of the iris, poor mydriasis, iris neovascularization, transillumination defects and flaky material on the lens capsule, zonular dialysis and spontaneous dislocation of the lens. They are also more predisposed to goblet cell loss and dry eye. Cataract surgery and glaucoma medications can further induce the risk of dry eye in such patients [11]. Our study has assessed the tear function in PEX and also compared the findings in eyes without PEX.

Author Affiliation: [1,2]Assistant Professor, [3]Post graduate, Department of Ophthalmology, Narayana Medical College and Hospitals, Nellore, Andhra Pradesh 524003, India.

Corresponding Author: Ramya Deepthi P., Assistant Professor, Department of Ophthalmology, Narayana Medical College and Hospitals, Nellore, Andhra Pradesh 524003, India.

E-mail: amruth.chavan@gmail.com

Received on 26.06.2018, **Accepted on** 17.09.2018

Materials and Methods

Type of study: prospective non-randomized study. Group 1 consists of 25 normal subjects (50 eyes) and Group 2 consists of 35 PEX syndrome patients (50 eyes). The study has been done at department of ophthalmology, narayana medical college and hospital, Nellore.

Inclusion/exclusion criteria: Patients diagnosed for PEX syndrome in lens or iris were included. Subjects with other conditions like PEX glaucoma, diabetes mellitus, ocular surface disorder, previous

© Red Flower Publication Pvt. Ltd.

ocular surgeries and adnexal abnormalities were excluded. The demographics were recorded for each patient. Slit lamp examination and laterality of PEX were performed for all patients. Tear film changes were identified by schirmer's 2 test and tear film break up time (TBUT)

Schirmer's 2 test: Eyes were instilled with proparacaine drops and 5 mm of schirmer's strip was bent and placed in the inferior fornix between the medial two-third and lateral one-third and readings are measured after 5 min. The length of the wetted filter paper was directly read on the scale. The value of <10 mm was considered as abnormal and was suggestive of dry eye.

TBUT: Tear break-up time was measured after instilling fluoresce in dye and observing with the use of a cobalt blue filter, while the patient refrains from blinking. The TBUT is the time which elapses from the last blink to the first appearance of a dark spot in the fluoresce in-stained film and is seen to evolve in a characteristic way with time. The normal TBUT varies between individuals and also varies in the same person at different times of the day. In general, a break-up time of <10s suggests an unstable tear film.

Statistical analysis: Statistical analysis in this study was performed using Student's t-test.

Table 1: Analysis of Schirmer's and TBUT in PEX and Control groups.

	Schirmer's (mean± SD)	TBUT (mean± SD)	P value
Control	18.15±4.2 mm	14.75±2.5s	<0.05
PEX	7.21±3.4 mm	6.2±2.1s	

Results

Twenty (20) (57.1%) of the 35 patients in the study group had unilateral PEX and the rest 15 (42.85%) had bilateral presentation. The mean age of the patients in PEX group and control group was 56.4±4.2 years (range 51-65) and 60.27±5.3 years (range 52-68) respectively (Figure 1). The average mydriasis in eyes with PEX syndrome was 5.2 mm and in eyes without PEX syndrome was 6.5 mm (Figure 2). Average Schirmer's and TBUT in control group were 18.15±4.2 mm and 14.75±2.5s respectively whereas in PEX group, the values were 7.21±3.4 mm and 6.2±2.1s and the differences were statistically significant (P< 0.05).

Discussion

Pseudoexfoliation syndromeis characterized by the widespread production and progressive accumulation of an abnormal extracellular fibrillar

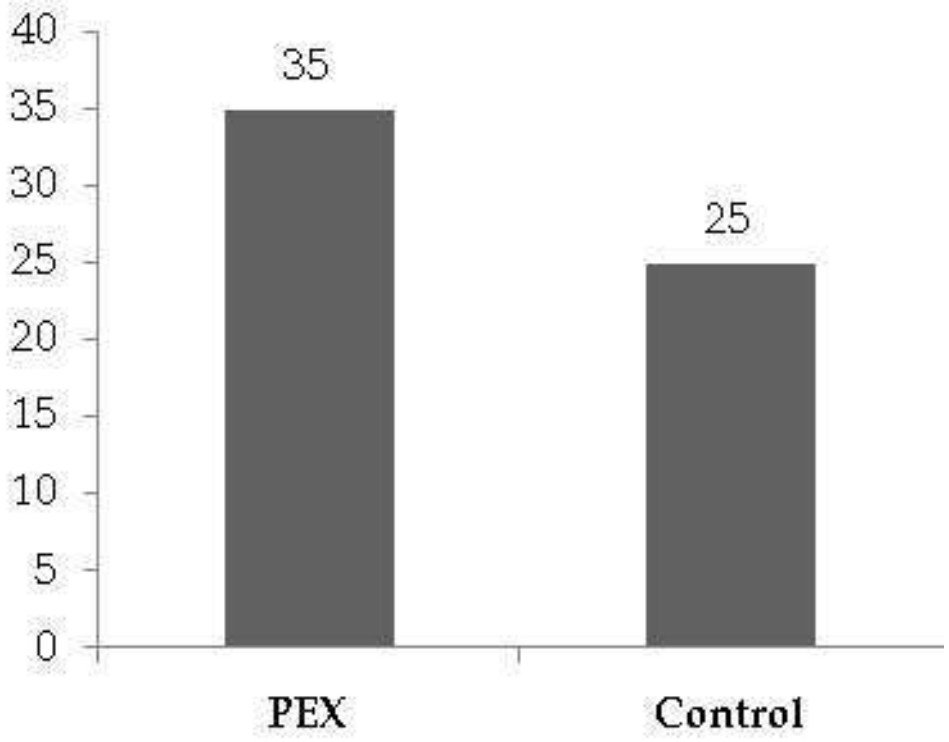

Fig. 1: Number of subjects in the study.

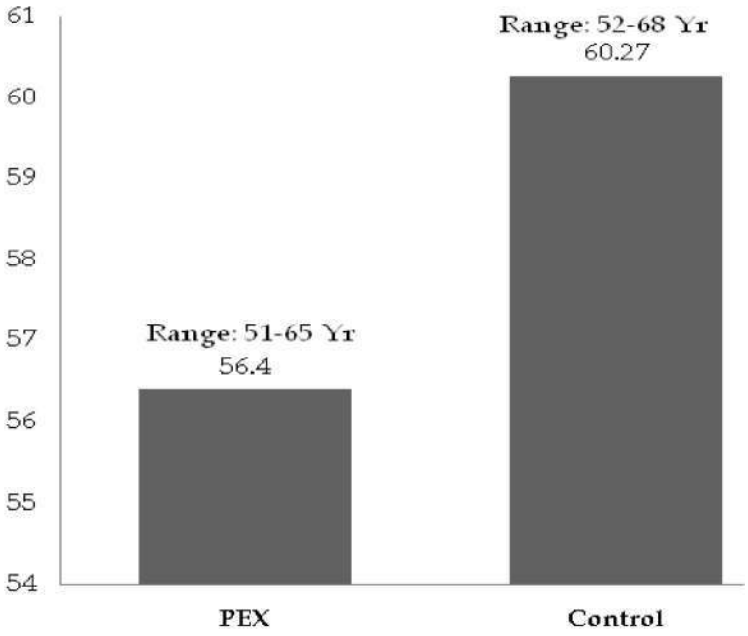

Fig. 2: Mean age of PEX and control group.

material in many ocular and extraocular tissues [12,13]. Etiology is unknown. It may be a generalized disorder involving abnormal production or turnover of extracellular matrix in the basement membrane. Risk factors include ageing and possible genetic association. In India epidemiological studies revealed the prevalence of PEX to range from 3% to 10% and this increases progressively after 50 years [14]. According to Jones, tear secretions are divided into basic and reflex. The basic secretion is the fundamental, indispensable element of the secretory system, and it can produce all three layers of the tear film [15]. Schirmer's 2 test (with corneal and conjunctival anesthesia) reflects mainly basic tear secretion and this test is reported to be more sensitive in the diagnosis of mild cases of dry eye, so it was used for screening in the present study. BUT is correlated with tear film stability [16].

Age has been reported to be inversely related with tear film stability. PEX or PEX-related disturbances, such as the increased intraocular pressure, may accelerate the physiological age related decrease on tear secretion and tear film stability. The present study was conducted to assess the tear film changes in eyes with PEX and are compared to age-matched control eyes without PEX. Unilateral PEX syndrome is an early manifestation of bilateral disease. Uninvolved eye in a patient with clinically unilateral PEX syndrome has an 81% likelihood of being affected ultrastructurally [17,18].

In the current study, 57% of PEX cases were unilateral and 43% of cases were bilateral. Rao and Kaliaperumal in their study concluded that 95% of PEX syndrome can be successfully diagnosed prior to dilatation by the presence of PEX material in the pupillary ruff [19]. The mucous layer of the tear film is secreted by the goblet cells located in the conjunctiva. The TBUT evaluates the sufficiency of the mucous layer of tear film and shows that mucin secretion levels are affected by conjunctival goblet cell morphology and density. Kozobolis et al. found a significant positive correlation between the conjunctival involvement in PEX and decreased tear secretion and tear film stability [20].

PEX material in conjunctival tissue provoke the changes in the basics features of the morphology of goblet cells. Alterations in the morphology of the goblet cells can cause changes in the tear film quality. In our study, the mean Schirmer's value was 7.21 mm and TBUT value was 6.2s, in PEX group which was significantly lower when compared to the control group. In a study by Erdogan *et al.*, concluded that the mean values of TBUT and Schirmer's were lower in PEX and PEX glaucoma groups than in control group [21]. Cho et al., in their study have shown that cataract surgery itself can induce dry eye to some extent which can be manifested in patients who already have symptoms of dry eye [22]. Anti-glaucoma medications like timolol can also lead to dry eye and corneal epithelial changes [23]. Again using such drugs in patients with PEX syndrome increases the likelihood of occurrence of symptoms of dry eye.

Conclusion

Tear is important for maintaining clarity of cornea, providing clear vision and improving defense mechanism of the eye. Hence, the reduced tear function leads to xerophthalmic manifestations in PEX, which will not only reduce the corneal and lenticular clarity and efficiency but also will decrease the ophthalmic local defense mechanism. Ocular surface is also affected by use of topically administered medications such asdrugs with benzalkonium chloride or beta blockers Ophthalmologists should be aware of this condition when treating the patients with PEX syndrome. In such situations, use of preservative free medications should be prescribed. Future studies should address how the improvement in tear functions can help in the better management of PEX.

References

1. You QS, Xu L, Wang YX, Yang H, Ma K, Li JJ, Zhang L, Jonas JB. Pseudoexfoliation: normative data and associations: the Beijing eye study 2011. Ophthalmology. 2013 Aug;120(8):1551-8. doi: 10.1016/j.ophtha.2013.01.020.
2. Arnarsson A, Sverrisson T, Stefánsson E, Sigurdsson H, Sasaki H, Sasaki K, Jonasson F. Am J Ophthalmol. 2006 Sep;142(3):419-28.
3. Romero-Aroca P, Masip-Serra R, Martínez-Salcedo I, Salvat-Serra M, Fernández-Ballart J, Bautista-Pérez A. High prevalence of pseudoexfoliation syndrome and its complications in Tarragona in northeast Spain. Eur J Ophthalmol. 2011 Sep-Oct;21(5):580-8. doi: 10.5301/EJO.2011.6254.
4. Elhawy E1, Kamthan G, Dong CQ, Danias J. Pseudoexfoliation syndrome, a systemic disorder with ocular manifestations. Hum Genomics. 2012 Oct 10;6:22. doi: 10.1186/1479-7364-6-22.
5. Schlotzer-Schrehardt U. Genetics and genomics of pseudoexfoliation syndrome/glaucoma. Middle East Afr J Ophthalmol 2011;18:30-6.
6. Sharma S, Chataway T, Burdon KP, Jonavicius L, KlebeS, Hewitt AW, Mills RA, Craig JE. Identification of LOXL1 protein and Apolipoprotein E as components of surgically isolated pseudoexfoliation material by direct mass spectrometry. Exp Eye Res. 2009 Oct;89(4):479-85.
7. Wiggs J. Association Between LOXL1 and pseudoexfoliation. Arch Ophthalmol. 2008 Mar;126(3):420-1. doi: 10.1001/archopht.126.3.420.
8. Schlotzer-Schrehardt U, Naumann Go, Ocular and systemic pseudoexfoliation syndrome. Am J Ophthalmol. 2006 May;141(5):921-937.
9. French DD, Margo CE, Harman LE. Ocular pseudoexfoliation and cardiovascular disease: a national cross-section comparison study. N Am J Med Sci. 2012 Oct;4(10):468-73. doi: 10.4103/1947-2714.101987.
10. Praveen MR, Shah SK, Vasavada AR, Diwan RP, Shah SM, Zumkhawala BR, Thomas R. Pseudoexfoliation as a risk factor for peripheral vascular disease: a case-control study. Eye (Lond). 2011 Feb;25(2):174-9.
11. Ritch R, Schlötzer-Schrehardt U. Exfoliation syndrome. Surv Ophthalmol. 2001 Jan-Feb;45(4):265-315.
12. Newell F. The glaucomas. In: Newell F, (ed). Ophthalmology. Principles and Concepts. St Louis, Mosby: 1992;380–81
13. Skuta G. Pseudoexfoliation Syndrome, Pigment Dispersion Syndrome and the Associated Glaucomas. In: Tasman W, Jaeger EA (eds). Duane's Clinical Ophthalmology. Philadelphia. JB Lippincot Co. 1989.
14. Arvind H, Raju P, Paul Pg, Baskaran M, Ramesh Sv, George Rj, et al. Pseudoexfoliation in South India. Br J Ophthalmol 2003;87:1321-3.
15. Jones LT. Anatomy of the tear system. Intern OphthalmolClin 1973;13(1):3–22
16. Kanski JJ. The lacrimal system. In: (Kanski JJ, ed) Clinical Ophthalmology. A systematic approach. Oxford, Butterworth Heinemann. 1989.
17. Tarkkanen A. Pseudoexfoliation of the lens capsule. A clinical study of 418 patients with special reference to glaucoma, cataract, and changes of the vitreous. Acta Ophthalmol Suppl 1962;Suppl 71:1-98.
18. Parekh P, Green Wr, Stark Wj, AkpekEk. Electron microscopic investigation of the lens capsule and conjunctival tissues in individuals with clinically unilateral pseudoexfoliation syndrome. Ophthalmology 2008;115:614-9.
19. RaoVa, Kaliaperumal S. PEX syndrome. Karnataka J Ophthalmol 2004;21:11-8.
20. Kozobolis Vp, Detorakis Et, Tsopakis Gm, Pallikaris Ig. Evaluation of tear secretion and tear fi lm stability in pseudoexfoliation syndrome. Acta OphthalmolSc and 1999;77:406-9.
21. Erdogan H, Arici Ds, TokerMi, Arici Mk, Fariz G, Topalkara A. Conjunctival impression cytology in pseudoexfoliative glaucoma and pseudoexfoliation syndrome. Clin Experiment Ophthalmol 2006;34:108-13.
22. Cho Yk, Kim Ms. Dry eye after cataract surgery and associated intraoperative risk factors. Korean J Ophthalmol 2009;23:65-73.
23. KuppensEv, De Jong Ca, Stolwijk Tr, De Keizer Rj, Van Best Ja. Effect of timolol with and without preservative on the basal tear turnover in glaucoma. Br J Ophthalmol 1995;79:339-42.