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Tear Film Abnormalities in Pateints with Pseudoexfoliation Syndrome

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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.

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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

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

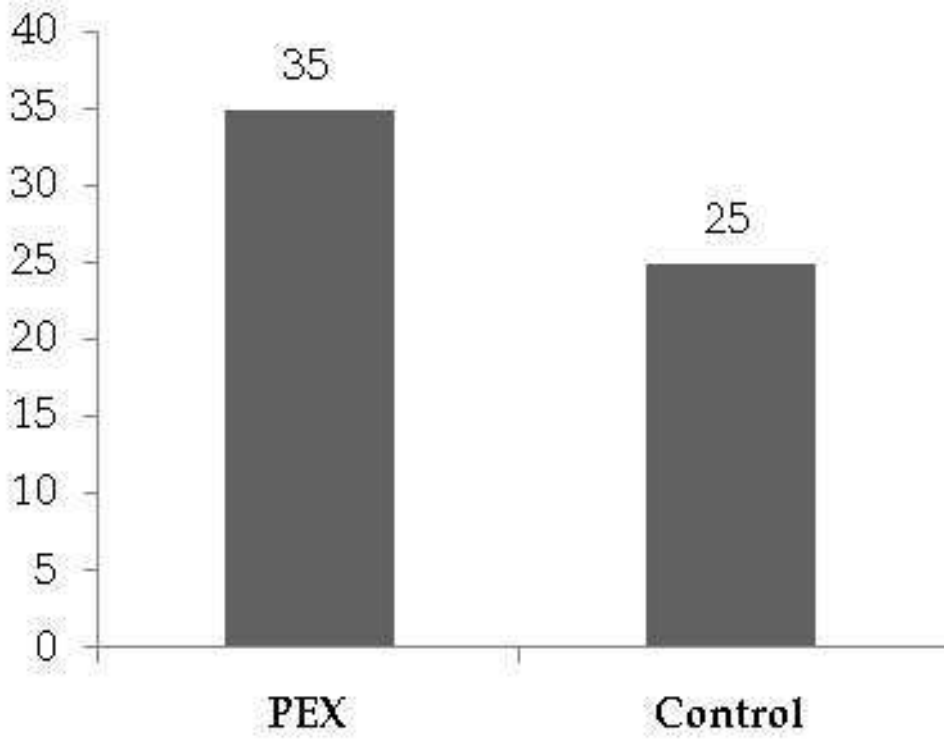

Fig. 1: Number of subjects in the study.

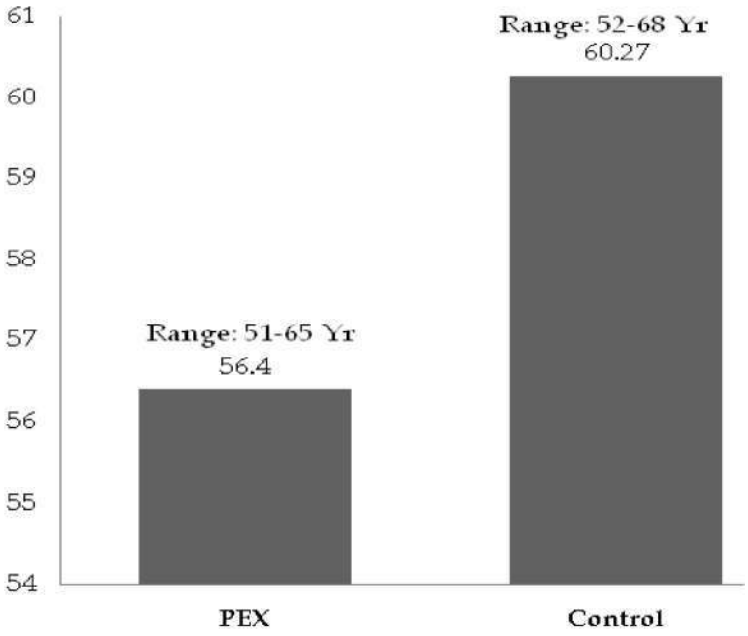

Fig. 2: Mean age of PEX and control group.

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.

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