

# Intra- and Postoperative Cataract Surgery Complications in Patients with Pseudoexfoliation

## Psödoeksfoliasyonu Olan Olgularda Ameliyat Sırası ve Sonrası Katarakt Cerrahisi Komplikasyonları

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**ABSTRACT Objective:** To analyze the intra and postoperative complications of the cataract surgery by phacoemulsification in patients with pseudoexfoliation syndrome (PEX) and compare with normal cases. **Material and Methods:** This is a retrospective single-center cohort study of the cataract surgery complications in patients with and without PEX. The study was conducted on patients who underwent cataract surgery by phacoemulsification between March 2010 and August 2011. Totally 116 eyes (35 with PEX and 81 without PEX) were included. Complications such as undilated pupil, posterior capsule rupture, zonular dialysis and postoperative corneal edema were evaluated. **Results:** 35 eyes with PEX syndrome and 81 eyes without PEX were included in the study. Poorly dilated pupil was seen in 19 (54.3%) eyes in PEX group and 5 (6.2%) eyes in the group without PEX (control group) ( $p<0.05$ ). Posterior capsule tear and zonular dialysis in the PEX group occurred in 2 (5.7%) and 3 (8.6%) eyes respectively. In the control group posterior capsule tear occurred in 3 (3.7%) eyes and zonular dialysis in 1 (1.2%) eye. The difference in posterior capsule tear was not statistically significant between the groups ( $p>0.05$ ) but zonular dialysis was slightly more often in the PEX group ( $p=0.47$ ). Postoperative corneal edema was seen in 18 (54.5%) eyes in the PEX group and in 16 (19.7%) eyes in the control group ( $p<0.05$ ). **Conclusions:** Poorly dilated pupil is the leading problem in patients with PEX. Intra-operative complications are more frequent than in normal patients. Postoperative corneal edema is more frequent and have a higher grade in the PEX group.

**Key Words:** Cataract; complications; phacoemulsification; exfoliation syndrome

**ÖZET Amaç:** Psödoeksfoliasyon sendromu (PEKS) olan olgularda fakoemülsifikasyon yöntemiyle yapılan katarakt cerrahisinin ameliyat sırası ve sonrası komplikasyonlarını incelemek ve normal olgularla karşılaştırmak. **Gereç ve Yöntemler:** PEKS olan ve olmayan olgularda katarakt cerrahisi komplikasyonlarını inceleyen retrospektif tek-merkezli kohort bir çalışmadır. Çalışmaya, mart 2010 ile ağustos 2011 tarihleri arasında fakoemülsifikasyon yöntemi ile katarakt cerrahisi geçiren olgular alındı. Toplam 116 göz (35 PEKS'li, 81 PEKS olmayan) dahil edildi. Genişlemeyen pupil, arka kapsül yırtılması, zonül diyalizi ve ameliyat sonrası kornea ödemi gibi komplikasyonlar incelendi. **Bulgular:** Çalışmaya 35 PEKS'li ve 81 PEKS olmayan göz dahil edildi. Zayıf pupil dilatasyonu PEKS olan grupta 19 (%54,3), PEKS olmayan (kontrol) grupta ise 5 (%6,2) gözde görüldü ( $p<0,05$ ). Arka kapsül yırtılması ve zonül diyalizi PEKS grubunda sırasıyla 2 (%5,7) ve 3 (%8,6) gözde gelişti. Kontrol grubunda arka kapsül yırtılması 3 (%3,7), zonül diyalizi 1 (%1,2) gözde gelişti. Arka kapsül yırtılması gruplar arasında anlamlı fark göstermezken ( $p>0,05$ ), zonül diyalizi PEKS grubunda biraz daha fazlaydı ( $p=0,47$ ). Cerrahi sonrası kornea ödemi PEKS grubunda 18 (%54,5), kontrol grubunda 16 (%19,7) gözde görüldü ( $p<0,05$ ). **Sonuç:** Psödoeksfoliasyonlu olgularda, zayıf pupil dilatasyonu en sık görülen sorundur. Ameliyat sırasında komplikasyonlar normal olgulara göre daha fazladır. Ameliyat sonrası kornea ödemi PEKS grubunda daha sık ve daha ağır olmaktadır.

**Anahtar Kelimeler:** Katarakt; komplikasyonlar; fakoemülsifikasyon; dökülme sendromu

Pseudoexfoliation (PEX) syndrome was first described by Lindberg in 1917 and further characterized by Vogt in 1925.<sup>1</sup> It is diagnosed by slit-lamp detection of a fibrillogranular material on the anterior lens capsule and at the pupillary margin.<sup>2</sup> The presence of PEX in skin, heart, lungs, liver, kidney, and cerebral meninges in addition to the classic intraocular locations support the evidence of the systemic nature of the pseudoexfoliation syndrome.<sup>3</sup>

Cataracts were reported to be more common in patients with PEX.<sup>4,5</sup> Pseudoexfoliation is frequently associated with increased intraocular pressure, poor pupillary dilatation and zonular weakness which predispose eyes with PEX to complications such as capsular tear and vitreous loss during cataract surgery.<sup>6</sup> Spontaneous intraocular lens (IOL) dislocation and secondary cataract are late complications of the PEX syndrome.<sup>7-9</sup>

In the present study we analyzed the intra and postoperative complications of the cataract surgery by phacoemulsification in patients with PEX and compared the results with normal patients.

## MATERIAL AND METHODS

A retrospective, single-center comparative study was conducted on patients who underwent cataract surgery by phacoemulsification between March 2010 and August 2011 Corum State hospital. Demographic parameters (age, gender, medical and ophthalmologic history), clinical features (visual acuity, intraocular pressure, pupil dilatation) before and after surgery, and surgery complications were recorded. Patients with glaucoma, zonular dialysis, previous ocular surgery and trauma and those who underwent extracapsular cataract surgery were excluded from this study. The diagnosis of PEX was done by detection of typical fluffy, granular material deposition on anterior lens capsule or pupillary margin after the dilation of the pupil. Before surgery pupils were dilated with 1% cyclopentolate and 2.5% phenylephrine drops. Pupil size less than 5 mm was accepted as small pupil. During surgery in patients with small pupil, the viscomydriasis was tried and if adequate di-

latation was not achieved then iris retractors were used. All surgeries were done by the same physician (L.N.) using divide and conquer technique. All the complications during surgery were noted in details. Patients were examined at the first day, first week and first month postoperatively. Visual acuity, intraocular pressure and anterior and biomicroscopic examination were evaluated and noted. Postoperative corneal edema was graded according to the Efron classification as grade 0: absent, 1: edema seen only on biomicroscopic examination, 2: edema where anterior chamber details can easily be evaluated, 3: edema where anterior chamber details can hardly be seen and 4: edema with no detectable anterior chamber details.<sup>10</sup> All the intra and postoperative complications were compared between the patients with and without PEX. The study was approved by the Local Ethics Committee.

For statistical analysis we used Statistical Package for Social Studies (SPSS 16.0, Chicago, IL). Descriptive statistics, independent student t-test and chi-square tests were used and p value less than 0.05 was accepted as significant.

## RESULTS

One hundred and sixteen eyes of 103 patients were included in the study. The eyes were divided into two groups: 35 eyes with PEX syndrome and 81 eyes without PEX (control group). The mean age of patients with PEX was 74.8±6.0 years and it was 68.3±11.1 years in the control group. The age difference between the groups was statistically significant ( $p < 0.05$ ). Preoperative mean intraocular pressure was 13.3 (7-21) mmHg in the PEX group and 14.4 (7-24) mmHg in the control group ( $p > 0.05$ ). The most frequent intraoperative problem was the pupil which was poorly dilated and it was seen in 19 (54.3%) eyes in PEX group and 5 (6.2%) eyes in the control group ( $p < 0.05$ ). Viscomydriasis and pupillary dilatator hooks were used to obtain enough dilatation. Dilatator hooks were required in 5 eyes with PEX and none in the control group. Posterior capsule tear and zonular dialysis in the PEX group occurred in 2 (5.7%) and 3 (8.6%) eyes respectively. One of the capsule tears

required anterior vitrectomy and IOL was placed in the sulcus. In second case no vitreous loss occurred and IOL was placed in the bag. In two patients with zonular dialysis the capsular tension rings were used to stabilize the capsule and IOLs were placed in the bag. In the third patient with zonular dialysis no tension ring was used and IOL was minimally dislocated downward postoperatively. In the control group posterior capsule tear occurred in 3 (3.7%) eyes, all required anterior vitrectomy and IOLs were placed in the sulcus. Zonular dialysis developed in 1 (1.2%) eye in whom capsular tension ring was not required for IOL implantation. The difference in posterior capsule tear was not statistically significant between the groups ( $p>0.05$ ) but zonular dialysis was slightly more often in the PEX than in the control group ( $p=0.47$ ). Postoperative corneal edema was seen in 18 (54.5%) eyes in the PEX group and in 16 (19.7%) eyes in the control group ( $p<0.05$ ). In the PEX group corneal edema was grade 1 in 8 eyes, grade 2 in 9 and grade 3 in one eye. In the control group edema was grade 1 in 13 eyes and grade 2 in 3 eyes. All the patients with corneal edema except one recovered within one week postoperatively and none of the patient suffered from persistent edema. Only one patient in the PEX group had grade 3 corneal edema which lasted for two weeks.

## DISCUSSION

The patients with PEX were older than the patients in the control group in our study. This may be explained by increased risk of PEX with age in a normal population.<sup>5</sup>

Coming up with more complications during cataract surgery in patients with PEX is a subject of discussion as it is supported by some authors but even though refused by the others.<sup>6,11-13</sup> Most of the complications are associated with poor pupillary dilatation which is supposed to be related to the atrophy of the iris muscle cells and degenerative changes both in the stromal tissue and in the muscular layer of the iris shown previously on histopathologic specimens.<sup>14,15</sup> In a study of Guzek et al. decreasing pupil size was found to be the only statistically significant risk factor for vitreous loss.<sup>16</sup>

Adequate pupillary dilatation is always needed either for proper nucleus extraction and cortex aspiration in extracapsular cataract extraction or for sufficient capsulorhexis in phacoemulsification surgery. Increased secondary cataract formation in patients with PEX was also partly related to inadequate removal of equatorial lens cortex and epithelium and it was partly related to reduced polishing of the posterior capsule in patients with smaller pupils.<sup>7</sup> In these patients, iris retractors, hooks, radial iridotomy, sphincterotomy, mechanical dilatation or viscomydriasis can be used to facilitate uneventful surgery.<sup>17-19</sup> In our study we primarily tried viscomydriasis which was commonly enough for adequate pupillary dilatation and in the rest we used iris retractors.

Zonular weakness in patients with PEX may lead to zonular dialysis during cataract surgery and IOL subluxation thereafter.<sup>20</sup> In a study by Oltulu et al zonular dialysis occurred in 8.3% and posterior capsule tear in 6.2% of PEX patients.<sup>21</sup> In our study we had similar results with 3 (8.6%) zonular dialysis and 2 (5.7%) posterior capsule tear rates in the PEX group. Although the rate of zonular dialysis was slightly higher in the PEX group ( $p=0.47$ ), the difference in posterior capsule tear was not statistically significant between the groups ( $p>0.05$ ). These findings are similar to study by Guzek et al, where zonular break was associated but capsular tear was not associated with PEX.<sup>16</sup> In contrast to this Menkhaus et al found no influence of PEX on these complications and they concluded that modern cataract surgery makes it possible to achieve good operative results, even in risk patients.<sup>13</sup> All of these controversies may be related to surgeon experience or study group selection differences where other risk factors may also have influence on surgery results.

In two patients with zonular dialysis in PEX group, capsular tension rings were used for stabilization of the capsule and IOLs were placed in the bag. One patient with zonular dialysis in whom tension ring was not used had postoperative IOL dislocation. No tension ring was required for the patient with zonular dialysis in the control group and the lens was successfully placed in the bag.

The most frequent postoperative problem was corneal edema which occurred in 18 (54.5%) eyes in the PEX group and in 16 (19.7%) eyes in the control group ( $p < 0.05$ ). Corneal edema was more frequent in the PEX group and had a higher grade, but all the patients recovered within one week postoperatively except one who had edema lasted for two weeks. Higher frequency of edema in patients with PEX can be associated with longer surgery duration which unfortunately was not registered and evaluated in this study. Another possible cause would be endothelial cell decrease or damage which was reported previously.<sup>22,23</sup> In a study by Schlötzer-Schrehardt et al large clumps of typical pseudoexfoliation material adhering to the corneal endothelium and masses of pseudoexfoliation material incorporated into the posterior Descemet's membrane were found on transmission electron microscopy in patients with PEX.<sup>24</sup> Later Naumann et al. described a distinct type of corneal

endotheliopathy which can lead to an early corneal endothelial decompensation and potentiate the known complications in eyes with PEX.<sup>25</sup> Fortunately, all of the patients in our study showed relieve of edema with topical steroid drops and none suffered from persistent edema.

In conclusion, patients with PEX are predisposed to intra- and postoperative complications more than patients without PEX. Although the rate of small pupil is high in the PEX patients the rate of complications is relatively low and this can be attributed to the surgeon experience and improved technologic devices. Awareness of the risk of increased postoperative corneal edema in PEX patients may lead the surgeon to take some preventive measures and reduce this boring problem.

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