

Phacoemulsification and Core Vitrectomy in Fuchs' Heterochromic Uveitis

Fuchs' Heterokromik Üveitinde Fakoemülsifikasyon ve Anterior Vitrektomi

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ABSTRACT

Objective: To evaluate the efficacy of phacoemulsification combined with posterior capsulorhexis, core vitrectomy and ciliary sulcus intraocular lens (IOL) implantation in patients with Fuchs' heterochromic uveitis (FHU).

Materials and Methods: A total of 18 eyes of 18 patients with FHU underwent cataract surgery were included in the study. 18 eyes with FHU underwent posterior capsulorhexis, core vitrectomy and poly (methyl methacrylate) (PMMA) IOL implantation in the ciliary sulcus. Subjects were chosen for this procedure based on an intraoperative vitreous haziness assessment, performed by indirect ophthalmoscopy. Patients with +2 or more vitreous haziness qualified for this procedure.

Results: Of the 83 eyes with FHU that underwent cataract surgery, 18 eyes (21.6%) of 18 patients were employed in the study. There were 11 (61.1%) men and 7 (38.9%) women in the study; ages ranged from 23 to 47, with a mean of 32.06 years. Follow-up ranged from 8 months to 49 months. There were no intraoperative complications except for peripheral iris bleeding in 7 eyes. There was no severe intraocular inflammation in any patient postoperatively. All patients had 0.05 or better logMAR visual acuity after corneal suture removal. Glaucoma developed in 2 patients. For the short term period, the main vision threatening problem was suture-induced astigmatism.

Conclusion: Cataract surgery combined with posterior capsulorhexis, core vitrectomy and IOL implantation in the ciliary sulcus is safe and leads to good visual outcome due to the removal of the hazy vitreous in patients with FHU.

Keywords: Phacoemulsification, Fuchs' heterochromic uveitis, core vitrectomy

öz

Amaç: Bu çalışmada Fuchs' heterokromik üveiti (FHÜ) olan hastalarda arka kapsüloreksis, kor vitrektomi ve silier sulkusa intraoküler lens (IOL) implantasyonu ile kombine fakoemülsifikasyon cerrahisinin etkinliğini değerlendirmek amaçlanmıştır.

Gereç ve Yöntem: Fuchs' heterokromik üveiti olan ve katarakt cerrahisi uygulanan 18 hastanın 18 gözü çalışmaya alındı. FHÜ olan 18 göze; arka kapsüloreksis, kor vitrektomi ve silier sulkusa polimetilmetakrilat (PMMA) IOL implantasyonu uygulandı. İntraoperatif, indirekt oftalmoskop ile vitreusta bulanıklık derecesi değerlendirilerek; +2 veya daha fazla vitreus bulanıklığı olan hastalar bu prosedüre dahil edildi.

Bulgular: Fuchs' heterokromik üveiti olan ve katarakt cerrahisi uygulanan 83 gözün 18'i (%21,6) çalışmaya dahil edildi. 23 ile 47 yaş aralığında (ortalama 32.06 yıl) olan hastaların 11'i (%61,1) erkek, 7'si (%38,9) kadın idi. Hastaların takip süresi 8 ay ile 49 ay arasında değişmekteydi. 7 gözde gelişen iris periferinde kanama dışında; intraoperatif herhangi bir komplikasyon görülmedi. Hiçbir hastada postoperatif şiddetli intraoküler inflamasyon görülmedi. Korneal sütürler alındıktan sonra, tüm hastalar logMAR'a göre 0,05 veya daha iyi seviyede görme keskinliğine sahipti. 2 hastada glokom gelişti. Kısa dönemde görme seviyesini etkileyen ana problem sütüre bağlı astigmatizma idi.

Sonuç: Fuchs' heterokromik üveiti olan hastalarda; arka kapsüloreksis, kor vitrektomi ve silier sulkusa IOL implantasyonu ile kombine katarakt cerrahisi güvenilirdir. Bulanık olan vitreusun uzaklaştırılmasına bağlı olarak, görsel sonuçları iyi olan bir prosedürdür.

Anahtar Kelimeler: Fakoemülsifikasyon, Fuchs' heterokromik üveiti, kor vitrektomi

Introduction

Fuchs' heterochromic uveitis (FHU) is a type of anterior uveitis with a chronic and insidious character. It may present at any age but most often appears in young adults. Patients usually are not aware of having FHU until cataract development, although in some cases, it is diagnosed during routine ophthalmic examination.

The diagnosis of FHU is based on the criteria of Kimura et al. [1], which include small, white, diffuse stellate keratic precipitates on the corneal endothelium; mild anterior chamber cells and flare; lack of iridocapsular or posterior synechiae; vitreous disorders such as floaters, vitreous debris, and vitreous cells; glaucoma; and iris atrophy with or without heterochromia [1].

There is no strong evidence regarding the underlying etiology. Several studies have suggested that *Toxoplasma gondii*, chronic herpetic infection, and congenital Horner syndrome may be etiological factors of FHU [2].

Regardless of the etiology, this uveitic syndrome has several vision-impairing ocular complications such as cataracts, secondary glaucoma, and vitreous haze. The incidence of cataract ranges from 15% to 75%, with most studies reporting an incidence of approximately 50% [3, 4]. Following cataract surgery, the crucial problems that threaten vision are ocular inflammation, glaucoma, posterior capsular opacification (PCO) and vitreous haze [5].

In this study, we performed core vitrectomy and ciliary sulcus intraocular lens (IOL) implantation following posterior capsulorhexis with the aim of removing hazy vitreous to improve the visual outcomes of patients.

Materials and Methods

The study was conducted at The Medical Faculty of Atatürk University between May 2009 and June 2013. Of 83 eyes with FHU that underwent cataract surgery, 18 (21.6%) eyes of 18 patients with vitreous haze were included in this study; 11 (61.1%) patients were men and seven (38.9%) were women. The inclusion criteria were those described by Kimura et al. [1]. All patients had unilateral FHU (Figure 1). The age of the patients ranged from 23 to 47 years, with a mean of 32.06 (SD=6.75). Heterochromia was observed in six eyes. We did not have reliable data regarding the duration of uveitis.

Patients with logMAR scores of ≥ 0.70 did not undergo surgeries. Patients with glaucoma, corneal opacities, or a history of taking steroid medications were not eligible for this combined procedure, despite having vitreous haziness.

Vitreous haziness was intraoperatively evaluated using indirect ophthalmoscopy in sterile conditions and graded on the basis of standard photographs developed by Nussenblatt et al. [6]. Preoperative anterior vitreous evaluation could not be performed in any patient because of cataract-related poor visualization.

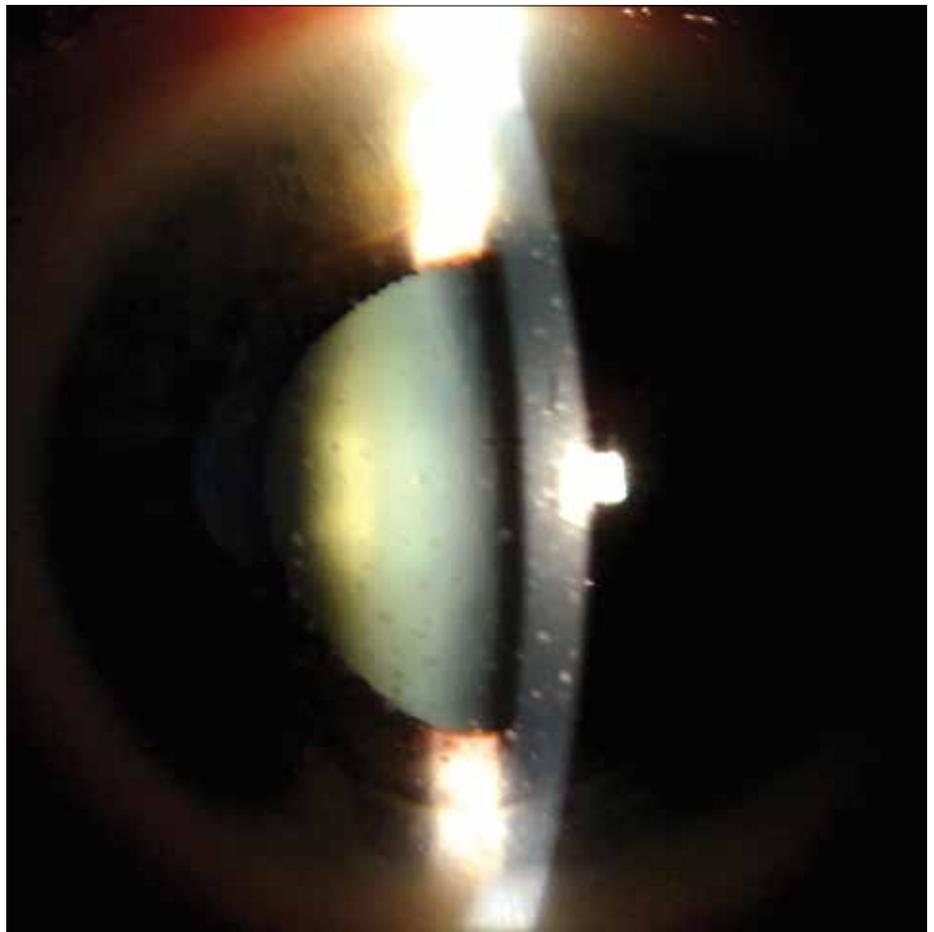


Figure 1. Cataract and diffuse keratic precipitates in FHU.
FHU: Fuchs' heterochromic uveitis

No patient received steroid medication preoperatively.

The surgery was performed under posterior subtenon or general anesthesia. All patients underwent phacoemulsification with approximately 5.5 mm anterior capsulorhexis via the limbal incision. Following cataract removal, all eyes were examined using indirect ophthalmoscopy; ≥ 6.0 mm posterior capsulorhexis and core vitrectomy were performed in eyes with +2 or more vitreous haziness.

Following posterior capsulorhexis, a 23-G infusion cannula was inserted in the side-port incision and 23-G core vitrectomy was performed via the limbal incision after performing single suture of the wound to stabilize the anterior chamber. In case of narrow anterior and posterior capsulorhexis, anterior and posterior capsul were enlarged by a vitreous cutter.

Following core vitrectomy, the limbal incision was widened to 6.5 mm for ciliary sulcus implantation of a single-piece poly (methyl methacrylate) (PMMA) IOL, which had 13.5-mm

haptic and 6.5-mm optic diameter. Because of larger posterior capsulorhexis, sulcus implantation was performed. After IOL implantation, the incision was continuously sutured using 10-0 nylon (Figure 2). In all patients, the surgery was completed with subconjunctival dexamethasone injection.

Postoperatively, a topical antibiotic (four times a day), topical steroid (eight times a day), and cycloplegic drops (twice a day) were administered for 1 week. After the first week, the antibiotic and cycloplegic treatments were discontinued, and the topical steroid was gradually tapered and discontinued within 4-6 weeks.

All patients underwent routine ophthalmic examinations pre- and postoperatively. Intraocular pressure (IOP) was assessed using the Goldmann applanation tonometry and fundus examination with a 90-diopter lens. Patients were examined at 1 day, 7 days, 1 month, and 2 months after surgery, followed by 3-month intervals thereafter. Under topical anesthesia, the corneal sutures were removed 8 weeks after the procedure.

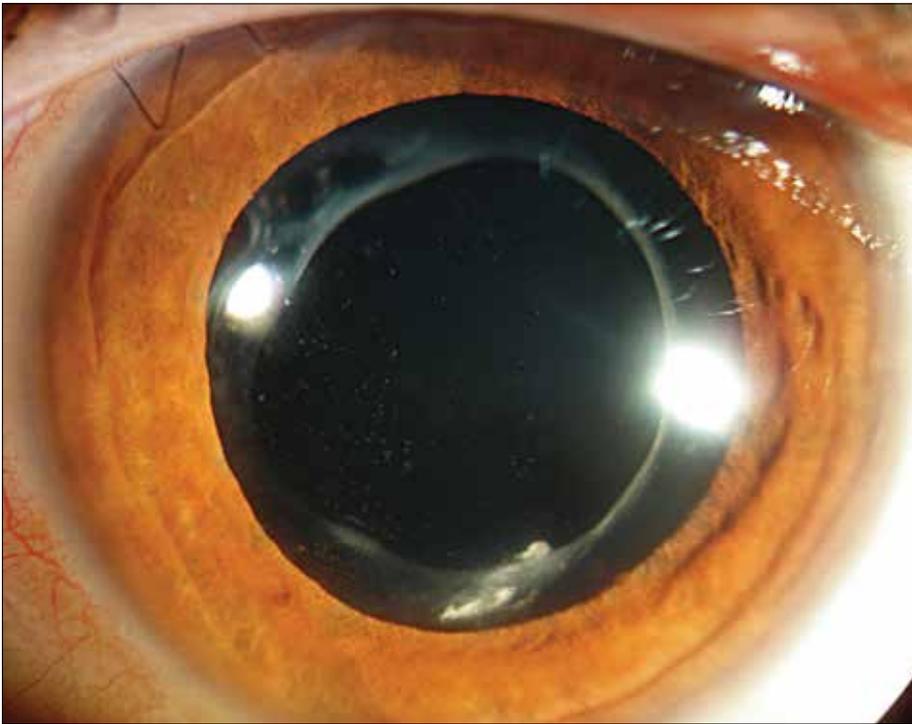


Figure 2. After cataract surgery with posterior capsulorhexis, anterior vitrectomy, and IOL implantation in the ciliary sulcus. The corneal suture is seen under the superior eyelid.
IOL: ciliary sulcus intraocular lens

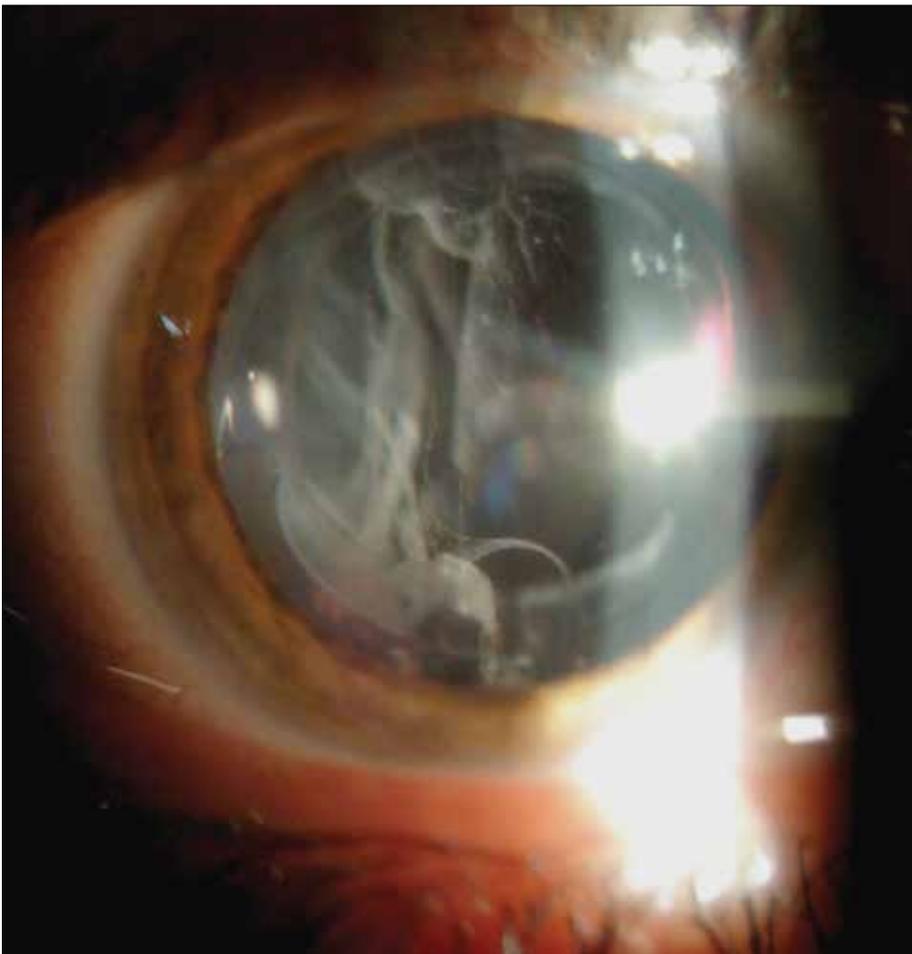


Figure 3. Vitreous haze owing to incomplete core vitrectomy.

All patients were informed about the procedures and provided consent for participation. We explained the intraoperative vitreous examination and described all the details of the surgery that would be performed in case the vitreous haze exceeded the set threshold. The study was planned according to the ethics guidelines of the Helsinki Declaration, and the study protocol was approved by the local ethics committee of Ataturk University School of Medicine.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences software version 17.0 (SPSS Inc.; Chicago, IL, USA). Paired t-test was used to detect the correlation between variables. A p value of ≤ 0.05 was accepted to be statistically significant.

Results

Preoperatively, logMAR visual acuity was < 0.70 in all eyes. One week after the surgery, all patients had ≥ 0.15 logMAR visual acuity. Following the removal of the corneal sutures, logMAR visual acuity was ≥ 0.05 because of the disappearance of high suture-induced astigmatism.

All the patients had satisfactory pupillary dilation preoperatively. There were no intraoperative complications, except peripheral iris bleeding in seven patients (Amsler sign).

Postoperative follow-up ranged from 8 to 49 months ($M=23.67$, $SD=9.9$).

Mild-to-moderate intraocular inflammation was observed in all eyes postoperatively. There was no fibrin formation in the anterior chamber or behind IOL. After 1 week, the inflammation decreased to a normal level for patients with FHU.

A moderate increase in IOP, which occurred because of the insufficient removal of the viscoelastic, was noted in four patients after the procedure. In two (11.1%) patients, an increase in IOP was detected 1 month after surgery. These patients use *combined anti-glaucomatous eye drops* for IOP control.

One patient suffered from floaters and blurred vision owing to vitreous haze as a result of incomplete core vitrectomy (Figure 3). Six months after cataract surgery, pars plana vitrectomy was performed. There were no further intra- or postoperative complications.

We did not detect clinical cystoid macular edema in any patient during follow-up nor did any patients present with IOL centration problems or retinal detachment.

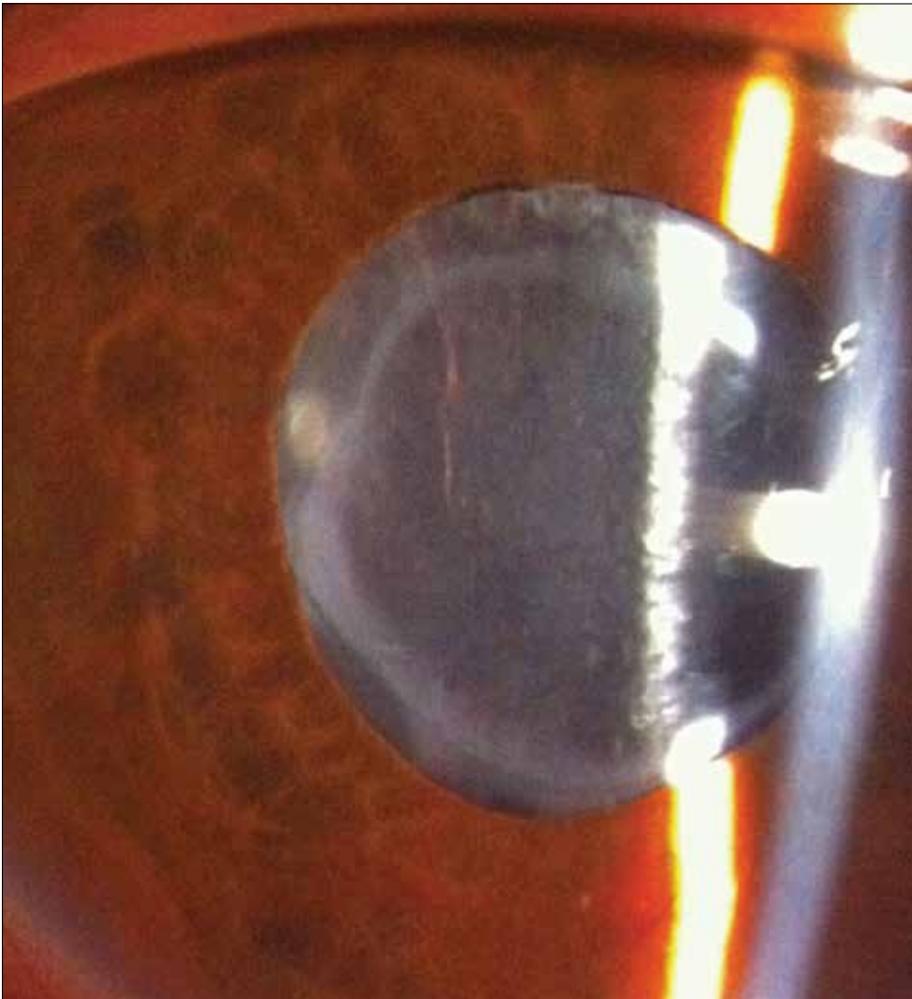


Figure 4. Posterior capsular opacification in FHU. FHU: Fuchs' heterochromic uveitis

Discussion

Fuchs' heterochromic uveitis is a chronic uveitic condition with mild-to-moderate intraocular inflammation. Patients usually are not aware of the disease initially because of its insidious course, and it may remain unrecognized until cataract development causes blurred vision. In some cases, patients may also suffer from floaters and blurred vision owing to vitreous haziness.

Fuchs' heterochromic uveitis primarily affects young adults; therefore, techniques for cataract surgery that yield maximum visual acuity and minimal complications are critical for the long-term quality of life FHU patients. This study aimed to eliminate the problem of vitreous haziness by performing posterior capsulorhexis, core vitrectomy, and ciliary sulcus IOL implantation.

No intraoperative complications were encountered during the study except peripheral iris bleeding. This problem was anticipated and has been previously reported [7-9]. It usually occurs

after penetrating the anterior chamber, independent of the surgical technique.

Postoperative inflammation, particularly in uveitic patients, is a serious problem. Budak et al. [9] reported 17.1% of FHU patients experienced severe ocular inflammation after cataract surgery. Ram et al. [7] detected significant ocular inflammation in four patients, and Javadi et al. [8] reported fibrin formation in the anterior chamber in four eyes (9.7%) in the postoperative period of cataract surgery in FHU patients. We observed mild-to-moderate ocular inflammation in all patients on the first postoperative day. However, 1 week after surgery, the inflammation decreased to the normal level that is observed in FHU patients.

The importance of IOL material is controversial in uveitic patients. It has been reported that hydrophobic acrylic lenses have the best capsular biocompatibility and that hydrophilic acrylic lenses exhibit the best uveal biocompatibility [10]. Some studies have suggested that IOLs

with PMMA or acrylic optics are more favorable in uveitic patients [11, 12]. Decreased incision size and reduced contact between IOL and uveal tissue appear significant for preventing postoperative inflammation [10, 13, 14]. However, despite enlarging the limbal incision immediately before IOL implantation, neither did we observe any severe postoperative inflammation in our patients nor did we detect any long-term inflammation that can be associated with uveal contact. This discrepancy between our results and previously published results may be related to differences between the course of FHU and that of other uveitic conditions.

Glaucoma has been reported at a rate of 15%-50% in unoperated eyes with FHU and at 3%-35% in operated eyes [1, 2, 9]. Therefore, glaucoma development may not be associated with cataract surgery. Patients with glaucoma were not eligible to undergo the procedure described in this study. In our cases, four patients showed an increase in postoperative IOP owing to incomplete removal of the viscoelastic from the anterior chamber; after 1 week, all patients had IOP levels in the normal range. During the follow-up period, glaucoma developed in two (11.1%) eyes. The ocular tension was controlled with combined anti-glaucomatous medication.

Postoperative vitreous opacities were reported with an incidence of 12%-50% in previous studies [15, 16]. Soheilian et al. [17] assessed vitreous opacity after cataract removal and performed vitrectomy in eyes that had +3 or more vitreous haziness (six of 32 eyes). They performed core vitrectomy and pars plana vitrectomy in two and four eyes, respectively [17]. Scott et al. [18] performed pars plana vitrectomy with lensectomy in four eyes. Both studies suggest that lensectomy combined with vitrectomy is safe and improves visual rehabilitation [18]. Tejawani et al. [19] reported significant postoperative vitreous haze causing decreased visual acuity in 4.8% of patients Javadi et al. [8] concluded that vitreous haze was the most significant vision-limiting problem during the postoperative period. In our cases, one patient suffered from vitreous floaters. Core vitrectomy was not completely performed in this patient, and vitreous haziness continued to be evident in postoperative examinations. We performed pars plana vitrectomy 6 months after cataract surgery.

The rate of PCO in FHU patients has been reported to be 20%-45% (Figure 4) [20-22]. Javadi et al. [8] did not detect clinically significant PCO in eyes with acrylic IOLs. Ram et al. [7] reported significant PCO in six of 20 eyes at postoperative 6 months and found that one

patient from this group had an acrylic IOL. However, their follow-up was limited. FHU presents most often in patients aged 20-40 years [23]. With the age, the rate of PCO development will likely increase. Considering the age range and the high incidence of PCO in FHU, posterior capsulorhexis before core vitrectomy shows additional long-term benefit in eyes with hazy vitreous.

Postoperatively, our patients experienced temporary astigmatism, resulting from sutures closing the wider corneal incision required to implant the PMMA IOL. However, when the sutures were removed 8 weeks after surgery, the astigmatism resolved and had no lasting negative effect on the patients' vision. Although foldable IOLs require a smaller incision to implant, PMMA IOLs have a larger diameter, which we believe make them more stable in the sulcus. Further research is required to support this theory.

Given the good vision rehabilitation rates and lack of complications observed in this study, we conclude that posterior capsulorhexis, core vitrectomy, and IOL implantation in the ciliary sulcus following cataract surgery is safe and effective for FHU patients with vitreous haze.

Ethics Committee Approval: Ethics committee approval was received for this study from local ethic committee of Atatürk University School of Medicine (Decision Date: 08.11.2012/Decision No: 3).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - S.K., O.O.; Design - S.K., O.O., O.A.; Supervision - M.E., B.K.; Funding - S.K., O.O., E.A.; Data Collection and/or Processing - B.K., K.Y., E.C.; Analysis and/or Interpretation - S.K., O.B.; Literature Review - S.K., O.O., E.C.; Writing - S.K., O.O.; Critical Review - O.B.

Conflict of Interest: No conflict of interest was declared by the authors.

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