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Orginal Article

Results of scleral fixated intraocular lens implantation

Ercan Ozsoy[1], Behice Suheda Duman[2], Abuzer Gunduz[3], Tongabay Cumurcu[3]

[1]Haseki Training and Research Hospital, Department of Ophthalmology, Istanbul, Turkey
[2]Tire State Hospital, Department of Ophthalmology, Izmir, Turkey
[3]Inonu University Faculty of Medicine, Department of Ophthalmology, Malatya, Turkey

Abstract

Aim: To evaluate the results of scleral fixated intraocular lenses (SFIOLs) implantation in eyes that had lost capsular support.
Material and methods: Eyes of twenty patients who had lost their capsular support due to various causes included in this study. This study involved 5 females and 15 males. Eight eyes were included following complicated cataract surgeries, five eyes were patients in trauma, three eyes were with subluxated intraocular lens, three aphakic eyes which underwent congenital cataract surgeries and one eye that had beginning of bullous keratopathy due to anterior chamber lens were operated. The secondary SFIOLs implantation were performed in all eyes. Preoperative and postoperative best corrected visual acuities were compared.
Results: The mean age of patients was 61.4±15.04 years. The mean follow-up time was 3.12±0.7 months. The best corrected mean preoperative and postoperative visual acuities of patients were found as 0.16±0.02 and 0.38±0.07; respectively, using the Snellen chart. In our study; in two patients corneal edema, in one patient pupillary irregularity and in one patient increased intraocular pressure were observed. There was a statistically significant difference between the mean preoperative and postoperative visual acuities of patients according to the Wilcoxon test (p=0.01).
Conclusion: SFIOLs implantation have still maintained its importance for correction of aphakia in patients without adequate capsular support despite all new developments.

Keywords: Scleral Fixated; Aphakia; Capsular Support.

INTRODUCTION

The aim of cataract surgery is to remove the lens material and place the intraocular lens in the capsular bag in a single session. However, this can not be performed in some cases due to various reasons (1). The preferred options to restore vision in an eye without sufficient capsular support are aphakic glasses, contact lenses or secondary lens implantation methods (2). Surgery in aphakia is a controversial subject. There has been no optimal surgical approach for these cases so far (3). Intraocular lens implantation is performed into the anterior chamber or with fixation to the iris or sclera (4,5). However, each of these methods has its own features including surgical difficulties, surgery durations, intraoperative and postoperative complications. The main reason for secondary intraocular lens implantation is the lack of sufficient capsular support. The most common causes of capsule damage are complicated cataract surgery and trauma. Conditions such as endophthalmitis and uveitis may also weaken the capsule. Other disorders such as the Weill-Marchesani syndrome, Marfan syndrome, pseudoexfoliation syndrome, sulfite oxidase deficiency and homocystinuria may also change the zonal integrity and capsular stability (1).

Scleral-fixated intraocular lenses (SFIOLs) are indicated when the patient has no capsular or iris support. Anterior chamber or iris-fixated intraocular lens implantation can be performed in patients with an intact iris. Especially, in patients who has a shallow anterior chamber or corneal disease such as Fuch's corneal distrophy, corneal edema, or a corneal transplant SFIOLs may be the preferred option. (6)

In this study, we aimed to evaluate the results of SFIOLs in eyes without capsular support due to various reasons.

MATERIAL and METHODS

Twenty eyes of twenty patients who had lost capsular support due to various reasons were included in the study conducted at the Inonu University Medical Faculty's Ophthalmology Clinic between February 2011 and October 2013. The study was performed retrospectively reviewing the patient records.. Written informed consent was obtained from all patients before the surgery. Patients who did not come for follow-up for at least two months after the surgery were excluded from the study. All patients had complete ocular examination records including preoperative and postoperative best corrected

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Corresponding Author: Ercan Ozsoy, Haseki Training and Research Hospital, Department of Ophthalmology, Istanbul, Turkey
E-mail: ercanozy@hotmail.com

visual acuities, intraocular pressure, and anterior segment and fundus examinations. The visual acuities of patients were evaluated with the Snellen chart and the intraocular pressures were measured with Goldmann applanation tonometry (Haag-Streit, Switzerland).

In all eyes, secondary implantation was performed. All cases had undergone surgery by the same surgeon with an external approach. The patients used antibiotic and steroid drops for a month after the surgery. The corneal sutures were removed at the postoperative 6th to 8th week.

Surgical technique: Limbal peritomies were performed at the 3 and 9 o'clock quadrants. 50% thickness limbal-based triangular scleral flaps were created in the both quadrants. The main incision, about 6 mm in width, was then created in the superior clear cornea. The anterior chamber was filled with viscoelastic substance. Subsequently, the needleless end of a single-needle PC-9 polypropylene suture was attached to the holes in the haptics of the polymethylmethacrylate intraocular lens. In the area where the flap was created at a distance of 1.5 mm posterior to the limbus a 27 G insulin needle was introduced into the eye .

The needle end of the PC-9 polypropylene suture was advanced into the anterior chamber from the main incision and placed at the end of the insulin needle in the pupil area. The needle of the PC-9 suture was then removed from the eye using the guidance of the insulin needle. The same procedure was repeated for the other side.

The intraocular lens was placed into the posterior chamber through the corneal incision. The ends of the PC-9 suture were tied so as to remain under the scleral flap. The end of the scleral flap was sutured to the sclera with 7/0 vicryl. The corneal incision and conjunctiva were closed with 10/0 nylon and 7/0 vicryl suture respectively.

Statistical analysis

The SPSS 20.0 (SPSS Inc., Chicago, IL, USA) program was used for the statistical analysis. The Wilcoxon test was used to compare the preoperative and postoperative best corrected visual acuities of the patients. A p value <0.05 was accepted as significant.

RESULTS

The mean age of the patients included in the study was 61.4±15.04 years. The mean follow-up duration was 3.12±0.7 months. There were 5 (25%) female and 15 (75%) male patients (Table 1). Twelve right and eight left eyes were included in the study. The scleral fixated intraocular lens implantation surgery reasons for the eyes included in this study were complicated cataract surgery in 8 (40%) eyes, trauma in 5 (25%) eyes, subluxated intraocular lens in 3 (15%) eyes, aphakia after congenital cataract surgery in 3 (15%) eyes and early bullous keratopathy caused by an anterior chamber lens in 1 (5%) eye (Table 2). Preoperative and postoperative mean best corrected visual acuities which measured with Snellen chart were 0.16±0.02 and 0.38±0.07,respectively (Table 3).

Complications included corneal edema in 2 patients (10%), irregular pupil in 1 patient (5%) and increased intraocular pressure in 1 patient (5%).

A statistically significant difference was found between the preoperative and postoperative best corrected visual acuities of patients (P=0.01)

Table 1. Demographic datas and mean follow-up time of patients

Mean age (year)	61.4±15.04
Gender	
Female (n)	5 (25%)
Male (n)	15 (75%)
Mean follow-up time (month)	3.12±0.7

n: number of patients

Table 2. Causes of scleral fixated intraocular lenses

Causes	n=20 (100%)
Complicated cataract surgery	n=8 (40%)
Trauma	n= 5 (25%)
Subluxated intraocular lens	n= 3 (15%)
Aphakia after congenital cataract surgery	n= 3 (15%)
Early bullous keratopathy	n= 1 (5%)

n: number of eyes

Table 3. Pre-operative and post-operative mean visual acuities of the patients

Pre-operative mean visual acuity	0.16±0.02
Post-operative mean visual acuity	0.38±0.07
P	0.01

(mean±standard deviation)

DISCUSSION

One of the aims of modern cataract surgery is to leave the posterior capsule intact and place the posterior chamber intraocular lens inside the capsular bag. If posterior capsular integrity is impaired but some capsule support is still available, the posterior chamber lens can be placed in the sulcus (7). The ideal lens in aphakic patients without sufficient capsular support is controversial. Anterior chamber lenses, lenses sutured to the iris or sclera, or iris-claw lenses can be used (8). Each of these options has its own risks and complications. The one with the low complication rate and best visual results should therefore be selected.

Placing an angle-supported anterior chamber lens is technically easier and the surgery duration is shorter compared to the other methods. However, this method can lead to complications such as endothelial cell loss and resultant corneal decompensation, cystoid macular edema, uveitis, glaucoma and irregular pupil (9). Some surgeons do not recommend anterior chamber lenses, especially in young people, due to the long-term complications (1).

Complications of iris lens fixation include peripheral anterior synechiae, irregular pupil and dilatation failure in the later periods, corneal endothelial cell loss, uveitis, glaucoma, cystoid macular edema and hyphema (1,10).

The SFIOLs implantation technique is more difficult and the surgery takes longer than the other methods (11). However, the cost of these lenses is low, the intraocular lens is close to the focal point of the eye and away from the corneal endothelium and anterior chamber angle, closer to its natural position (12). Also, SFIOLs act as a mechanical barrier between vitreous cavity and anterior chamber (13). We preferred this method in this study because of the advantages mentioned above. Retinal detachment, hemorrhage, exposure of the suture and knot, endophthalmitis and open-angle glaucoma can be encountered with this technique. Also,there is a risk that the intraocular lens will tilt or dislocate later (1,12).

Buyuktortop et al. reported that SFIOLs implantation could result in a significant increase in visual acuity compared to the preoperative level when performed as primary surgery with appropriate additional procedures and that the preservation of the preoperative visual acuity should be the target in case of secondary scleral fixation surgery (14). However, secondary implantation was performed in our patients and a significant postoperative visual acuity increase was observed. The preoperative visual acuities included in our study were best spectacle-corrected visual acuities. We believe that the reasons for this conclusion is the lack of important complications such as macular edema, vitreous hemorrhage and retinal detachment in our patients. Ercalık et al. found the post-operative preservation and/or increase of vision rate in patients who had undergone secondary SFIOLs implantation as 93.7% (15). Their result supports our results as secondary implantation was also performed in our study.

The low number of cases and the short follow-up duration can be considered as the limitations of our study. More valuable outcomes might be obtained with a greater number of cases and longer follow-up duration.

We have found that there was a significant difference between the preoperative and postoperative best corrected visual acuities of patients who undergone secondary SFIOLs implantation. In this study, we encountered corneal edema in two patients, irregular pupil in one patient, and intraocular pressure elevation in one patient.

CONCLUSION

The best surgical treatment option in eyes without capsular support is still controversial. We believe that SFIOLs implantation is still important in the correction of aphakia despite all the new methods.

Conflicts of interest, The authors declare that there is no conflicts of interest.

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