

Visual Outcome after Scleral Fixation of Intraocular Lens (SFIOL) Implantation Following Pars Plana Vitrectomy (PPV) and Removal of dropped Intra-Ocular Lens (IOL)

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Abstract

Introduction: Placement of a posterior chamber scleral fixated intraocular lens (SF-IOL) is the only option for patients whose eyes lack zonular or capsular support. Long-term data comparing the various techniques used to place scleral fixation intraocular lens (SF-IOL) will be crucial to identify optimal strategies for scleral fixation intraocular lens (SF-IOL) implantation. **Aim of the study:** The aim of the study was to observe the visual outcome after SFIOL implantation following PPV in case of dropped intraocular lens. **Methods:** This prospective observational study was conducted at National Institute of Ophthalmology & Hospital, Dhaka, Bangladesh. The study duration was 6 months, from August 2019 to January 2020. The study was conducted with a total of 30 patients with aphakia due to dropped intraocular lenses. The patients were selected non-randomly on a first come first serve basis. **Results:** The mean age of the participants was 57.7 ± 7.64 years and the majority (60.0%) were female with 66.67% had left eye involvement. Mean visual acuity at baseline was 1.34 ± 0.26 (SD) in the Log MAR unit, which had significant improvement at each follow-up period. After 3 months visual improvement was 0.34 ± 0.27 in LogMAR unit. A few cases of corneal edema, raised intraocular pressure, lens decentration and some other complications were observed after surgery. **Conclusion:** In most cases, a decent optical outcome may be reached by using this surgical approach. To prove that it might be a safe and effective treatment without zonular or capsular support, long-term follow-up, a large sample size, and many surgeons' involvement are required.

Keywords: Scleral fixated intraocular lens (SF-IOL), Aphakia, Pars plana vitrectomy (PPV).

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Introduction

Cataract surgery is the most commonly performed surgery in Ophthalmology. Implantation of the intraocular lens in the capsular bag following cataract surgery has revolutionized in the field of ophthalmic surgery for restoration of effective post-operative vision. Malbran et al. were the first to describe trans-sulcus fixation of posterior chamber IOLs (SFIOL) in aphakic eyes that had previously undergone ICCE in 1989.¹ In another 2016 study, Devendra et al. showed that the SFIOL for management of dropped nucleus is a better surgical option with better visual outcome.² SFIOL implantation can be done in applicable cases either primarily during operation or secondarily after anterior chamber reaction subsides. That posterior chamber scleral fixation intraocular lens (PC-SFIOL) with sutures is a preferred method in the management of post-vitrectomised aphakic eyes when the capsular or zonular support is not adequate for in the bag implantation of posterior chamber intraocular

lenses, as observed in the study of Francis et al.³ In their study, 95.27% of patients had improvement, 2.70% unchanged, and only 2.02% worsening of their final postoperative visual acuity compared to preoperative measurement. Epiretinal membrane formation was the most common complication which caused the worsening of vision in that study.³ Another 2016 study showed that combined PPV and SFIOL is an efficacious procedure for managing dropped Intraocular lens (IOL), crystalline lens dislocation, and aphakia.⁴ In their study, over 90% of the patients regained or improved their postoperative visual acuity, and most of the complications could be avoided or minimized by adopting proper techniques. In Bangladesh, many surgeons are practicing both primary and secondary scleral fixated intraocular lens (SFIOLs) following pars planovitrectomy (PPV). PPV reduces the risk of secondary glaucoma, CME, epiretinal membrane, entoptic phenomena (floaters), and vitreous opacity. There are very few available studies having documentation of visual outcomes following SFIOL in Bangladesh's perspective. The current study was conducted to evaluate visual outcomes after secondary scleral fixation intraocular lens (IOL) implantation.

Methodos

This prospective observational study was conducted at the National Institute of Ophthalmology &

Hospital, Dhaka, Bangladesh from August 2019 to January 2020. The study included a total of 30 patients with aphakia due to dropped intraocular lenses. The patients were selected non-randomly on a first come first serve basis. Patients with retinal detachment, macular lesion, corneal scar, corneal oedema & opacity, vitreous haemorrhage, uveitis, patients suffering from ocular surface diseases, patients with glaucoma, optic atrophy were excluded from this study. Patients having history of intraocular surgery other than cataract surgery were also excluded. Informed written consent was obtained from each of the participants, and ethical approval was obtained from the ethical review committee of the study hospital. Selected patients underwent detailed ocular and systemic examination as well as relevant investigations. Scleral fixation IOL was done in every patient by a single competent surgeon. They were followed up on 1st and 7th postoperative days, 1 month and 3 months after surgery. Postoperative visual acuity was recorded during every visit. All the relevant findings were recorded in a pre- designed data collection sheet. Data were analyzed using window software SPSS ver.20. The mean value of the postoperative visual acuity was compared with that of the baseline value by paired t-test. A p-value of <0.05 was considered significant. Results are presented by appropriate tables and figures.

Table –I: Baseline characteristics of the study subjects (n=30)

Variables	Values
Age (in years) (Mean ±SD)	57.7±7.6
Gender	
Male	12 (40.0%)
Female	18 (60.0%)
Eye Involvement	
Right Eye	10 (33.3%)
Left Eye	20 (66.7%)

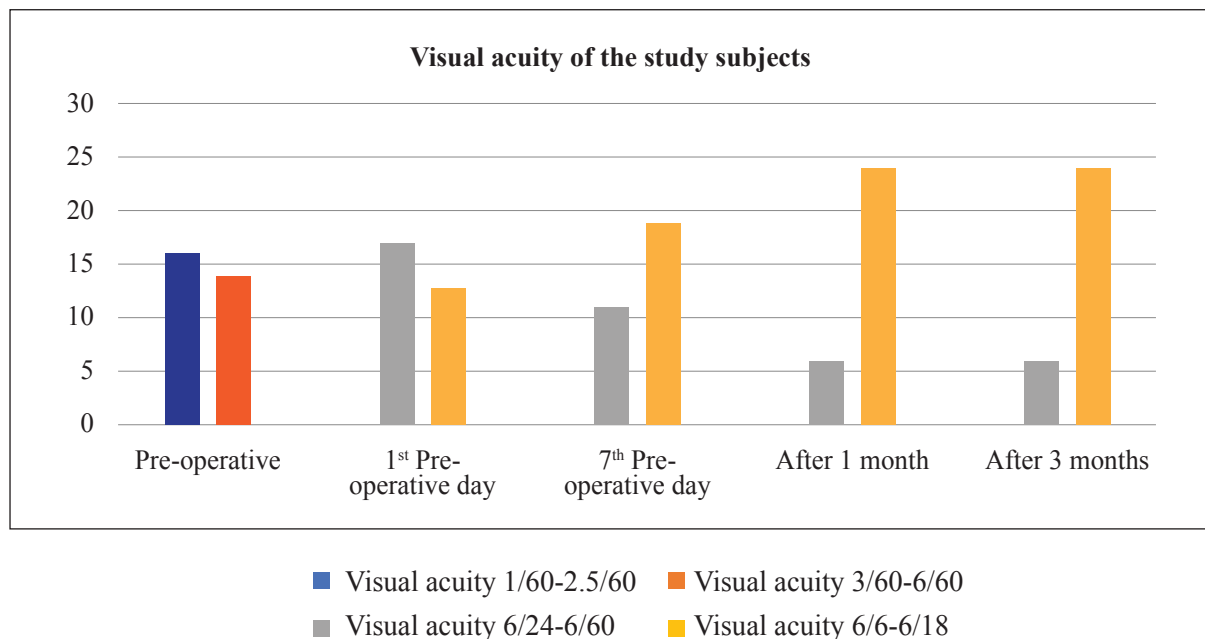
The Mean ± SD age of the participants was 57.7±7.64 years, Among the 30 subjects of the present study, 60% were female, and 40% were male. Regarding eye involvement, 66% had left eye involvement, and 33.33% had right eye involvement (table I).

Table- II: Distribution of the study subjects by visual acuity in Log MAR unit (n=30)

Assessment periods	Visual Acuity (in Log MAR unit) Mean \pm SD	p-value
Baseline	1.34 \pm 0.26	
Day 1	0.55 \pm 0.25	<0.001s
Day 7	0.45 \pm 0.24	<0.001s
After 1 month	0.37 \pm 0.26	<0.001s
After 3 months	0.34 \pm 0.27	<0.001s

Paired t test

According to the Log MAR unit, the baseline pre-operative unaided visual acuity was 1.34 ± 0.26 . It was 0.55 ± 0.25 (SD), 0.45 ± 0.24 (SD), 0.37 ± 0.26 (SD) and 0.34 ± 0.27 (SD) during 1st postoperative day, 7th postoperative day, 1 month and 3 months after surgery respectively. The changes in mean postoperative visual acuity from baseline during follow-up periods were statistically significant (table II).

**Figure I: Comparison of postoperative visual acuity of the study subjects (n=30)**

Immediate pre-operative visual acuity was 1/60 to 2.5/60 in 16 (53.33%) of patients and 3/60 to 6/60 in 14 (46.67%) of patients. Visual acuity was within 6/6-6/18 in 13 (43.33%) of patients and 6/24-6/60 in 17 (56.67%) of patients on the 1st post-operative day. On the 7th postoperative day, visual acuity was within 6/6-6/18 in 19 (63.33%) of patients and within 6/24 -6/60 was in 11 (36.67%) of patients. It was within 6/6-6/18 in

24 (80.0%) of patients and 6/24-6/60 in 6 (20.0%) of patients after both 1-month and 3 months follow-up periods (figure I).

Discussion

Disruption of zonules or a large tear in the posterior capsule can occur during cataract surgery due to a lack of integrity of the posterior lens capsule or zonules. Zonules are the tiny thread-like fibers in

the eye that are responsible for keeping the lens firmly in place. Disruption of the zonules can cause the dropping of the intraocular lens (IOL). Following the invention of the intraocular lens (IOL), patients were able to achieve the normal or near-normal vision. So patients do not wish to remain aphakic and choose to undergo surgery with implantation of an anterior chamber intraocular lens (AC-IOL), an iris fixation intraocular lens (IF-IOL), or a posterior chamber scleral fixation intraocular lens (SF-IOL). Any of these IOLs, according to the evidence, will result in good visual acuity. For individuals who lack both iris and capsular support, a posterior chamber scleral fixated intraocular lens (SF-IOL) is the sole alternative. SFIOL surgical techniques are improving as innovative surgeons attempt modifications of existing methods to reduce perioperative complications such as incorrect suture placement and the danger of increased intraocular pressure, lens decentration, and dislocation. After pars planovitrectomy (PPV), SFIOL implantation is a safe and visually appealing procedure. As a result, in these individuals, combining the two procedures as a one-step treatment becomes an evident step toward sight restoration. In the present study, mean age of patients was 57.7 ± 7.64 years where females were 60%. Left eye involvement was in 20 (66.67%) patients. Mean preoperative visual acuity was 1.34 ± 0.26 (SD) in the log MAR unit. These mean values improved significantly at each follow-up, with values of 0.55 ± 0.25 , 0.45 ± 0.24 , 0.37 ± 0.26 , and 0.34 ± 0.27 in log MAR unit in 1st POD, 7th POD, after 1 month and 3 months respectively after SFIOL implantation. This was similar to the findings of another study by Tekkar et al. where the mean baseline best visual acuity was 0.78 ± 0.63 in the log MAR unit, and at 6-month post-operative follow up it was 0.37 ± 0.29 in the log MAR unit. Their findings were also statistically significant.⁵ A comparison of visual acuity at different post-operative follow-up periods also showed significant improvement in visual acuity at each follow-up. As the surgery requires ample skills and time, it can lead to pigment dispersion. Among the participants, 67% faced no complications, while the remaining participants face some form of complication. 10% of the participants faced raised intraocular pressure (IOP), which was managed medically and returned to normal by

their follow-up at 3 months. Corneal edema was also present in 10% of our study participants. Some other complications of our study were anterior uveitis (7%), vitreal hemorrhage (3%), and lens decentration. Similar complications were also observed in other studies regarding the visual outcome after SFIOL.^{6,7,8} The study by Ali et al. showed postoperative complications such as ocular hypotony (9.4%), ocular hypertension (7%), and vitreous hemorrhage (7%), which were absent in the findings of our study.⁸ Kumar et al.⁹ in 2017 did a study of visual outcome and complications of various techniques of scleral fixated intraocular lens (IOL). In early postoperative period corneal oedema, anterior chamber reaction and raised intraocular pressure were common complications. Their final best corrected visual acuity (BCVA) was 6/12 & 6/9 respectively. Khan et al.¹¹ 2015, in their study on clinical outcome and safety profile of scleral fixated intraocular lens (SF-IOL) showed postoperative visual outcome and complications which was also statistically significant. 85 eyes of 84 patients were undergone ab externo scleral fixated IOL. Visual acuity in LogMAR unit improved from 1.43 ± 0.72 (20/538 snellen equivalent) preoperatively to 0.64 ± 0.61 (20/87 snellen equivalent) postoperatively.

Lee et al⁷ 2003, compared visual outcome of primary and secondary implantation of scleral fixated intraocular lens (SF-IOL) in their study. There were 30 and 25 eyes in group 1 and group 2 respectively. Follow up was from 6 to 36 months. Mean log MAR postoperative visual acuity in group 1 was not significantly different (0.50 (SD 0.36)) from that of group 2 (0.36 (0.21)). In this study secondary SF-IOL was implanted in dropped IOL cases and final visual outcome was 0.34 ± 0.27 in log MAR unit, baseline visual acuity was 1.34 ± 0.26 (SD).

Overall the surgical and visual outcome was good in this study. There were no cases of suture exposure, intraocular lens (IOL) dislocation, endophthalmitis, retinal detachment, macular oedema during the follow up period.

In this study, the surgical and visual outcomes were both good. During the follow-up period, there were no incidences of suture exposure, IOL

dislocation, endophthalmitis, retinal detachment, or macular edema.

Conclusion

The study highlighted that the postoperative visual outcome of posterior chamber SFIOL implantation following pars plana vitrectomy in patients with dropped IOL without zonular or capsular support is a safe and good option for visual rehabilitation.

Recommendation

Posterior chamber Scleral Fixation Intraocular lens (SF-IOL) implantation could be a good option for the rehabilitation of patients with a dropped intraocular lens (IOL) without capsular rim support. Long term multi-centered study with a large sample size is needed for final recommendation.

Conflict of Interest: Nothing to declare.

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