

Secondary Scleral Fixated Intraocular Lens Implantation in Aphakia – Sutured vs Sutureless SFIOL's

Rajesh Goel¹, Akshi Agarwal^{2*}, Sukriti Upadhyay³, Dharmesh Sharma⁴, Sunita Goyal⁵, Jitendra Ahuja⁶

¹Associate Professor (Ophthalmology), SMS Medical College, Jaipur, Rajasthan, India

²Assistant Professor (Gynae & Obs), SMS Medical College, Jaipur, Rajasthan, India

³Senior Resident (Ophthalmology), SMS Medical College, Jaipur, Rajasthan, India

⁴Associate Professor (PSM), SMS Medical College, Jaipur, Rajasthan, India

⁵Dermatologist, SMS Hospital, Jaipur, Rajasthan, India

⁶Associate Professor, RUHS, Jaipur, Rajasthan, India

Received: 24-08-2020 / Revised: 12-10-2020 / Accepted: 29-10-2020

Abstract

Purpose: To study and compare the safety and efficacy of two techniques of SFIOL implantation, i.e. sutured versus sutureless SFIOL. **Methods:** 80 aphakic eyes (due to complicated cataract surgeries in the past) were included in our study. Secondary SFIOL implantation was done in all the subjects. Patients were randomly divided into 2 groups using lottery method. Preoperative BCVA, slit lamp examination, fundus examination, macular OCT and IOP were noted for both the groups. In both the groups, SFIOL was implanted after doing anterior vitrectomy. Group A consisted of 40 patients who underwent SFIOL implantation (sutured) using 9-0 prolene suture whereas Group B consisted of 40 patients who underwent SFIOL implantation using Modified Yamane technique (sutureless). **Results:** Pre-operative BCVA of 26 patients (65%) in Group A and 22 patients (55%) in Group B was found to be less than 3/60. Post-operative BCVA at 6 months follow up was found to be in range of 6/24 to 6/18 in 28 patients (70%) in Group A and 24 patients (60%) in Group B. We found that the postoperative visual acuity improved in both the groups as compared to preoperative levels but comparison of post operative BCVA between the two groups was not significant. **Conclusion:** Results of both the techniques are comparable. Long-term data comparing the various techniques used to place SFIOLs will be crucial to identify optimal strategies for SFIOL implantation.

Keywords: SFIOL : Scleral Fixated Intraocular Lens ,BCVA : Best Corrected Visual Acuity ,IOP :Intraocular Pressure

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Introduction

Intraocular lenses(IOLs)can have inadequate support for placement in the capsular bag as a result of ocular trauma, metabolic or inherited conditions such as Marfan's syndrome or pseudoexfoliation, or complicated cataract surgery. Surgical options for patients with inadequate capsular support include alternative placement in the anterior chamber intraocular lens (ACIOLs), fixation to the iris, or fixation to the sclera. The surgical techniques for each of these approaches have improved considerably over.

*Correspondence

Dr. Akshi Agarwal

Assistant Professor (Gynae & Obs), SMS Medical College, Jaipur, Rajasthan, India

E-mail: dr.goyalrajesh@gmail.com

the last several decades resulting in improved visual and ocular outcomes. If no capsular or iris support exists, the surgeon can fixate an IOL to the sclera or the patient can remain aphakic. IOLs can be fixated to the sclera using sutures or by tunneling the IOL haptics into the sclera without sutures. In cases of SFIOL implantation following complicated cataract surgery, it is important to decide whether the IOL will be implanted primarily (i.e. at the time of cataract surgery) or secondarily (i.e. at a future date). Prospective, randomized trials comparing timing options for surgery have not been performed, but data from retrospective studies suggest that primary or secondary implantation of an SFIOL results in similar visual outcomes and complication rates.[1, 2] Therefore, the decision to implant an IOL primarily or secondarily will likely largely depend on the surgeon's comfort level and experience with SFIOL

placement and the clinical circumstances surrounding the need for an SFIOL.[3] SFIOLs can be categorized as either sutured or sutureless. Sutured SFIOL techniques vary according to the type of suture used, the type of IOL used, the maneuvers used to place the sutures, and the way in which suture knots are placed. Complications associated with sutured SFIOLs include suture breakage and lens dislocation and severe complications such as retinal detachment, suprachoroidal hemorrhage, and suture-related endophthalmitis. Sutureless techniques attempt to avoid suture-related complications by burying the IOL haptics in scleral tunnels or scleral flaps; however, these IOLs can still dislocate, and long-term data regarding IOL stability and severe complication rates is lacking

Objectives

This study was conducted to study and compare the safety and efficacy of two techniques of SFIOL implantation, i.e., sutured versus sutureless SFIOL. The pre-operative and post-operative best corrected visual acuity (BCVA) was compared between the two groups. The complications, which occurred, were documented for each group.

Methodology

This was a prospective longitudinal randomized control study conducted in the Upgraded Department of Ophthalmology, S.M.S. Medical College and Hospital, Jaipur over a period of 6 months. (June 2018 to January 2019). 80 aphakic eyes (due to complicated cataract surgeries in the past) were included in our study. Secondary SFIOL implantation was done in all the subjects. Patients were randomly divided into 2 groups using lottery method. Preoperative BCVA, slit lamp examination, fundus examination, macular OCT and

IOP were noted for both the groups. In both the groups, SFIOL was implanted after doing anterior vitrectomy. Group A consisted of 40 patients who underwent SFIOL implantation (sutured) using 9-0 prolene suture whereas Group B consisted of 40 patients who underwent SFIOL implantation using Modified Yamane technique (sutureless). All patients were prescribed topical 1% Prednisolone acetate eye drops 2 hourly tapering over a period of 6 weeks, 0.5% Moxifloxacin eye drops four times a day (for 7 days) and homatropine e/d BD for one week after the surgery. Post-operative follow up was done at 1st day, 1 week, 1 month and 6 months. The following parameters such as BCVA, IOP, macular OCT were recorded on each follow up. Any complications which occurred post operatively such as IOL decentration or IOL tilt (using slit lamp examination), hyphema, iridodialysis, erosion of sutures, haptics over conjunctiva, hypotony and secondary glaucoma were noted for both the groups.

Results

In our study, the mean age of the subjects in Group A was 69.4 years (SD - 3.7) and in Group B was 73.9 years (SD - 3.1). In Group A, there were 15 females (37.5%) and 25 males (62.5%) and in Group B, there were 18 females (45%) and 22 males (55%). Pre-operative BCVA of 26 patients (65%) in Group A and 22 patients (55%) in Group B was found to be less than 3/60. Post-operative BCVA at 6 months follow up was found to be in range of 6/24 to 6/18 in 28 patients (70%) in Group A and 24 patients (60%) in Group B. We found that the postoperative visual acuity improved in both the groups as compared to preoperative levels but comparison of post operative BCVA between the two groups was not significant.

Table 1: SFIOL implantation (sutured)

Visual acuity	SFIOL implantation (sutured)	
	Number of subjects	
	Preoperative	Postoperative
6/6 – 6/12	0	4
6/18 – 6/24	0	28
6/36 – 6/60	2	8
5/60 – 4/60	12	0
< 3/60	26	0

Chi Square = 73.6 p < 0.001 (Highly Significant)

Table 2: SFIOL implantation (sutureless)

Group B	SFIOL implantation (sutureless)	
	Number of subjects	
	Preoperative	Postoperative
Visual acuity		
6/6 – 6/12	0	8
6/18 – 6/24	0	24
6/36 – 6/60	2	4
5/60 – 4/60	16	4
< 3/60	22	0

Chi Square =61.8 , p <0.001 (Highly Significant)

No intra-operative complications were noted in both the groups. Post-operative hyphema was noted in 3 patients (7.5%) at Day 1 in Group A. No significant IOP changes were noted in both the groups post-operatively. Post-operative macular OCT at 6 months showed CME in 4 patients (10%) in Group A and 2 patient (5%) in Group B. In Group A, 4 patients (10%) had IOL tilt and 2 patients (5%) had IOL decentration. In Group B, 4 patients (10%) had IOL decentration. Haptics over Conjunctiva were found in 2 cases in Group B .Complications such as erosion of suture and iridodialysis were not seen in any of the above cases.

Discussion

Optical rehabilitation in patients with aphakia presents a unique surgical challenge. The choice of intraocular lens (IOL) implantation includes anterior chamber (AC) IOL, iris claw IOL, sutured sclera fixated IOL and sutureless sclera fixated IOL (SFIOL).[4] Each of these IOL has its own merits and demerits. ACIOL is technically less demanding but has potential for increased damage to the corneal endothelium and angle structures. [4, 5] Iris claw and iris fixated IOLs have increased chances of pigment release and intraocular inflammation. [5] SFIOL has the advantage of more physiological position near the nodal point of eye and greater distance from the cornea. Sutured SFIOL implantation is technically more demanding and can have problems such as pseudophacodonesis and suture related complications such as suture knot exposure, suture breakage, and IOL subluxation. [6] However, to avoid suture related intraoperative and postoperative problems, Gabor *et al.* introduced a new technique wherein sutureless technique for sulcus fixation of a posterior chamber IOL was done using permanent incarceration of the haptics in a scleral tunnel parallel to the limbus. [7] This method combines the control of a closed eye system with the postoperative axial stability of the posterior chamber IOL while avoiding suture

related problems.Sutureless techniques for an intrascleral fixation of PCIOLs in the management of aphakia have been reported by several investigators. [8-15] This type of surgery is used because it has some advantages over conventional trans-scleral suturing of the IOL. [11-14] Agarwal *et al.* achieved sutureless implantation using fibrin glue to close the scleral flaps without suture related complications. [16]

In previous techniques of sutureless scleral fixation of IOL, it is not easy to insert the IOL haptic into a scleral tunnel because the sclerotomy and scleral tunnel are close to each other. To overcome the problems in intrascleral tucking of haptics, Yamane *et al.* made vertical dissection so that the sclerotomy for haptic externalization is further apart from the scleral tunnel and haptics can be grasped and inserted easily. [9]

In our study, pre-operative mean BCVA was found to be 1.7 (logMAR; Range: 1.9 to 1) in Group A and 1.6 (logMAR; Range: 1.8 to 1.3) in Group B. Post-operative mean BCVA at 6 months follow up was found to be 0.22 (logMAR; Range: 0.3 to 0.22) in Group A and 0.3 (logMAR; Range: 0.5 to 0.22) in Group B. We found that the postoperative visual acuity was similar between the two groups (p-value: 0.12 – not significant). There have been relatively few studies directly comparing one type of SFIOL technique with another. Ganekal and colleagues compared sutured SFIOL (n = 25) with fibrin-glue assisted SFIOL (n = 25) implantation and found that postoperative visual acuity was similar between the two groups. [17]

In our study, no intra-operative complications were noted in both the groups. Post-operative hyphema was noted in 1 patient (5%) at Day 1 in Group A. No significant IOP changes were noted in both the groups post-operatively. Post-operative macular OCT at 6 months showed CME in 2 patients (10%) in Group A and 1 patient (5%) in Group B. In Group A, 2 patients (10%) had IOL tilt and 1 patient (5%) had IOL

decentration. In Group B, 2 patients (10%) had IOL decentration. Haptics over Conjunctiva were found in 2 cases in Group B. Complications such as erosion of suture and iridodialysis were not seen in any of the cases. Ganekal et al [17] found that the sutured IOL group experienced significantly more complications compared to the fibrin glue group (56% vs 28%, respectively, $p = 0.045$). Higher rates of post-operative glaucoma and inflammation occurred in the sutured IOL group compared to the fibrin glue group. Another study compared sutured SFIOL surgery using the Hoffman pockets ($n=31$) to the Scharioth SIS technique ($n=11$) in patients with post-traumatic or post-operative aphakia with a mean follow up time of 14.5 months. [18] A single surgeon performed all of the procedures in both groups. The authors did not find any difference in postoperative visual acuity between the two groups ($p = 0.161$). However, two eyes in the SIS group had IOL dislocations while no eyes in the sutured pocket fixation group had an IOL dislocation. Conclusions of superiority of one technique cannot be drawn without longer-term studies with more enrolled patients.

Conclusion

Surgical techniques for SFIOLs are improving as innovative surgeons attempt modifications of existing techniques. Methods to reduce the perioperative complications associated with inaccurate suture placement and to decrease the risk of IOL decentration and dislocation merit additional study. As industry improves suture material options and IOL designs, surgeons will have more options to improve SFIOL placement while minimizing postoperative complications. In our study results of both the techniques ie sutured versus sutureless are comparable. Long-term data comparing the various techniques used to place SFIOLs will be crucial to identify optimal strategies for SFIOL implantation.

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Source of Support: Nil

Conflict of Interest: Nil