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Visual Outcomes and Safety of Two Different Techniques of Scleral Fixated-Intraocular Lens in the Setting of Postoperative and Post-Traumatic Aphakia

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Abstract: Aim: Several techniques of scleral fixated-intraocular lens have been developed. We evaluate visual outcomes and safety of two different techniques of scleral fixated-intraocular lens in the setting of postoperative and post-traumatic aphakia. Methods: This retrospective study included 22 eyes of 22 patients, who had secondary IOL implantation surgery. The data including demographic data, ocular history, indication for surgery, preoperative and postoperative best corrected visual acuity (BCVA), intraocular pressure, detailed anterior and posterior segment evaluation using slit lamp bi-microscopy and indirect ophthalmoscopy were collected. The mean follow-up was 12 months ± 5.2 (SD) (range 12-16 months). Results: Overall, the final BCVA improved in 19 (86%) eyes, did not changed in 2 (9%), and worsened in 1 (4.5%) eye. No significant differences in BCVA were found in two techniques ($p<0.2$). Conclusion: Both techniques of scleral fixated PCIOL are feasible methods of managing post-traumatic and postoperative aphakia. However, functional outcomes are diverse, especially in post-traumatic cases. Longer follow-up in large population is required. Careful selection of cases and surgical method should be made before operation.

Keywords: Aphakia, Intraocular Lens, Scleral Fixation

1. Introduction

Aphakia means an absence of crystalline lens from pupillary space in the eye. Aphakic eyes present with a wide range of situations. At one end of the spectrum lies the uncomplicated eye with either an intact posterior capsule or vitreous face lying behind the pupillary margin and at the other end one encounters a traumatized aphakic eye with a tough cyclitic membrane, lens remnants and probably vitreous incarceration.

Surgical secondary artificial intraocular lens (IOL) implantation is a standard procedure both in post-traumatic and postoperative aphakia. The technique of implantation of IOL may vary from putting the lens into the bag to suturing of IOL to iris or implantation to the anterior or posterior chamber. If anterior capsule is not damaged, the lens may be implanted to the sulcus.

Anterior Chamber Intra-Ocular Lens (ACIOL) carries high risk of postoperative complications as corneal endothelial damage, uveitis, glaucoma, hyphema and cystoid macular edema. Currently, if the posterior capsule is not present, most of the IOL are placed into posterior chamber and sutured to the sclera through the ciliary sulcus or pars plana.

The aim of this study was to estimate the visual outcomes and safety of two methods of secondary posterior chamber IOL implantation – a scleral suturing of Posterior Chamber Intra-Ocular Lens (PCIOL) technique and sutureless intrascleral fixation of foldable three-piece IOL technique- in patients with deficient posterior capsule support due to trauma or complicated cataract surgery.

2. Methods

This retrospective study included patients, who had

secondary IOL implantation surgery performed between January 2013 and December 2015 in our hospital, Vasan Eye Care Hospital, Jabalpur.

This study included 22 eyes of 22 patients (08 female, 14 males). The mean age was 54.13 years ± 19.5 (SD) (range 10-89 years). The mean follow-up was 12 months ± 5.2 (SD) (range 12-16 months).

Inclusion criteria were as follows:

1. Total absence of capsular bag,
2. History of eye trauma or complicated cataract surgery causing aphakia,
3. Regular 1 year follow-up.

The preoperative diagnosis was as follows:

1. Post-traumatic subluxated lens with or without vitreous hemorrhage: 10 eyes,
2. After complicated cataract surgery: 7 eyes,
3. Subluxated hypermature cataract: 1 eye,
4. Subluxated and posterior dislocated PCIOL: 3 eyes.

Data collected included demographic data, ocular history, indication for surgery, preoperative and postoperative best corrected visual acuity (BCVA), intraocular pressure, detailed anterior and posterior segment evaluation using slit lamp bi-microscopy and indirect ophthalmoscopy. Patients were evaluated on the day 1, day 7, 1 month, 3 month and 12 months postoperatively. Intraocular lens position was assessed by slit lamp examination with dilated pupil, non-visibility of the optic edge in a mid-dilated pupil of 4 mm was considered as a good centration. Final BCVA was the principle outcome (expressed in snellen decimal letters). It was reported as the percentage of eyes achieving BCVA of 0.5 or better, BCVA of 0.2-0.4, and BCVA of 0.1 or worse. Data were analyzed using *t*-test.

Surgical techniques

All eyes were operated in local anesthesia (peribulbar block). Two kinds of IOL were implanted: PMMA PCIOL with eyelets in haptics by Aurolab (Aurolab SC6530) and Alcon 3 piece acrylic foldable IOL (Alcon Acrysof MN60AC).

Each procedure was performed by one surgeon. 17 patients underwent scleral fixation of PMMA PCIOL and 5 patients underwent sutureless intrascleral fixation of foldable 3 piece IOL. All eyes underwent pars plana vitrectomy as a routine accompaniment.

a. Transscleral suture fixation of PCIOL

First, complete vitrectomy is performed, along with clearing of pars plana membranes or capsular remnants. Careful examination of peripheral retina is done. 3×2 mm partial thickness flaps are made along horizontal axis. Scleral dissection continued till blue limbal zone is visualized. Two points 1mm apart marked 0.5 mm posterior to limbus. Scleral tunnel 6.5 to 7 mm is made at superior limbus for anterior chamber entry and IOL insertion. 10-0 polypropylene with straight needle is passed through scleral bed from previously marked site. Then needle is directed towards limbal section, one 26-G needle introduce through the tunnel to dock and guide the straight needle out through tunnel. Similar procedure is repeated on opposite side. Now, straight needle is passed from below upwards through the haptic eyelet on one side and above downwards through the eyelet of the other haptic. Then, a bent 26-G needle passed perpendicular to sclera through the second mark on the scleral flap bed and directed to tunnel section. The straight needle is fed into the lumen of 26-G bent needle to bring the suture out. This is repeated on the other side.

The two ends of polypropelene suture emerging out from each scleral bed are tied with a loose knot. The SFIOL is inserted in the eye through tunnel dialed in position by gradually pulling the external suture. Once complete dialing is achieved, a slip knot is tied on either side to keep IOL in position. The knots are rotated and buried in the sclera suture tract. Scleral flap is closed by 7-0 vicryl, and then conjunctiva is reposited back with sutures.

b. Sutureless intrascleral fixation of foldable 3 piece IOL

After completing vitrectomy, two partial thickness limbus based scleral flaps are made in horizontal plane. A straight entry sclerotomy is made with 23-G MVR blade about 1.5 mm from limbus in the bed of each scleral flap. A corneal tunnel is fashioned and a three-piece foldable IOL then injected into the eye. For cases needing removal of the previous IOL, a 6.5 mm scleral tunnel at 12'o clock was fashioned. The IOL used was a modified C- Loop with a 5 degree angulation at the optic haptic junction. An end griping 25-G microrrhexis forceps is introduced from the sclerotomy site and the tip of the leading haptic is grasped. When the entire IOL unfolded, the leading haptic was pulled and externalized beneath the flap. This then followed by the externalization of the trailing haptic from the other sclerotomy site. After both the haptics were externalized, two scleral pockets were created with a 26 G needle in alignment with the sclerotomy wound along the edge of the scleral flap. The tip of 26 G needle was stained with a dye so that the entry point of the scleral pocket got stained and was easy to identify at the end of the surgery when the haptics were to be tucked. Scleral flap is closed by 7-0 vicryl, and then conjunctiva is reposited back with sutures [1].

3. Results

Overall, mean preoperative BCVA was 0.197 (0.016-1.0) whereas early postoperative BCVA was 0.226 (range 0.083-0.33) and final postoperative BCVA 0.510 (range 0.05 to 1.0). Mean preoperative BCVA in group A was 0.155 (range 0.016-0.3) and 0.341 (range 0.016-1.0) in group B. Mean early postoperative BCVA was 0.228 (range 0.01 to 0.33) and 0.22 (range 0.1- 0.25), respectively (p=0.865). Mean final postoperative BCVA was 0.515 (range 0.05- 1.0) and 0.582 (range 0.25 to 1.0) respectively (p=0.683).

Table 1. *Data analysis of two different surgery groups.*

	Group A- Suture scleral fixation (n=17)	Group B-Sutureless intrascleral fixation (n=5)
Mean age	56.11	47.4
Male /female ratio	10/7	4/1
Post-traumatic aphakia	11	4
Postoperative aphakia	6	1
Mean preoperative BCVA	0.155	0.341
Mean early postoperative BCVA	0.228	0.22
Mean final BCVA	0.515	0.582
Complications	1 Knot exposure	1 Dislocation of lens 1 retinal detachment

Overall, the final BCVA improved in 19 (86%) eyes ($p<0.0016$), 0.5 (6/12) or better in 13 (59%) eyes, did not changed in 2 (9%), and worsened in 1 (4.5%) eye. No significant differences in BCVA were found in two techniques ($p<0.2$).

4. Complications

In the present study we noticed one dislocation of PCIOL in foldable lens technique (group-B), which we managed with resurgery. One retinal detachment after 2 months of the surgery, this patient underwent revitrectomy with fluid air exchange with endolaser with silicone oil injection. In group A we found 1 eye had postoperative knot exposure and irritation.

5. Discussion

In present study we have shown the functional results and complication rate after two secondary PCIOL implantation techniques in patient with post-traumatic and postoperative aphakia after 1 year follow-up. Many authors highlight the fact that transscleral fixation provides the most physiological placement of IOL in cases of absence of the lens capsule.

Several techniques for fixation of the posterior chamber IOL to the ciliary sulcus have been developed [2-7]. Malbran and co-authors were first to report transscleral sulcus fixation with sutures of PCIOL in aphakic patients who had previous intra capsular cataract extraction [8]. Other authors also reported the functional results of scleral-fixated posterior chamber intraocular lenses [9-12].

Relatively new technique is fibrin-glue assisted sutureless fixation described by Agrawal et al [13]. In this technique scleral flaps are made horizontally at 3 and 9 0' clock. IOL haptics were externalized from scleral wound and inserted in scleral pocket. Glue is applied to attach the scleral flap. One year results showed good outcomes.

A study by Haszcz et al [14] showing 42 eyes operated for secondary scleral fixated PCIOL. 26 (62%) eyes showed visual improvement, did not changed in 5 eyes (12%), and worsened in 11 eyes (26%). In the group of eyes with worsening of the visual acuity most of them (8 eyes) were post-traumatic. In our study, final BCVA improved in 19 (86%) eyes ($p<0.0016$), 0.5 (6/12) or better in 13 (59%) eyes, did not changed in 2 (9%), and worsened in 1 (4.5%) eye. No significant difference in BCVA were found in two techniques ($p<0.2$).

Haszcz et al [14] noticed two dislocations of PCIOL and none of the eyes of knot exposure and erosion were found. In our study, we found one case PCIOL dislocation and one case of suture erosion. One case of retinal detachment reported.

In the recent study by Agrawal [15] the percentage of eyes with vision worsening after scleral fixation was 6.9%, compared to 4.5% in our study.

6. Conclusion

Both techniques of scleral fixated PCIOL are feasible methods of managing post-traumatic and postoperative aphakia. However, functional outcomes are diverse, especially in post-traumatic cases. Longer follow-up in large population is required. Careful selection of cases and surgical method should be made before operation.

References

[1] Scharioth GB, Prasad S, Georgalas I, Tataru C, Pavlidis M. Intermediate results of sutureless intrascleral posterior chamber intraocular lens fixation. J Cataract Refract Surg. 2010; 36 (2): 254–9.

[2] Por YM, Lavin MJ. Techniques of intraocular lens suspension in the absence of capsular/ zonular support: diagnostic and surgical techniques: Marco zarbin and Chu David. Surv Ophthalmol. 2005; 50 (5): 429–461.

[3] Chang DF. Siepser slipknot for McCannel iris-suture fixation of subluxated intraocular lenses. J Cataract Refract Surg. 2004; 30: 1170–1176.

[4] Teichmann KD. Pars Plana fixation of posterior chamber intraocular lenses. Ophthalmic Surg. 1994; 25: 549–553.

[5] Smiddy WE, Sawusch MR, O'Brien TP, Scott DR, Huang SS. Implantation of scleral-fixated posterior chamber intraocular lenses. J Cataract Refract Surg. 1990; 16: 691–696.

[6] Osher RH, Cionni RJ. The torn posterior capsule: its intraoperative behavior, surgical management, and long-term consequences. J Cataract Refract Surg. 1990; 16: 490–494.

[7] Shashidhar S, Suresh Babu G, Shruthi Chandra, Manasa Penumetcha. "Primary Versus Secondary Implantation of Scleral Fixated Posterior Chamber Intraocular Lens". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 32, August 10, 2015; Page: 4760-4770.

[8] Malbran, ES, Malbran, E Jr, and Negri, I. Lens guide suture for transport and fixation of secondary intraocular lens implantation after intracapsular extraction. Int Ophthalmol. 1986; 9: 151–160.

[9] McCluskey P, Harrisberg B. Long-term results using scleral-fixated posterior chamber intraocular lenses. Cataract Refract Surg. 1994; 20: 34–39.

[10] Hahn TW, Kim MS, Kim JH. Secondary intraocular lens implantation in aphakia. J Cataract Refract Surg. 1992; 18: 174-9.

[11] Shapiro A, Leen MM. External transscleral posterior chamber lens fixation. Arch Ophthalmol. 1991; 109: 1759-60.

[12] Bleckmann H, Kaczmarek U. Functional results of posterior chamber lens implantation with scleral fixation. J Cataract Refract Surg. 1994; 20: 321-6.

[13] Agrawal A, Kumar DA, Jacob S, Baid C, Agrawal A, Srinivasan S. Fibrin glue assisted sutureless posterior chamber intraocular lens implantation in eyes with deficient posterior capsules. J Cataract Refract Surg. 2008; 34: 1433–8.

[14] Haszcz D, Nowomiejska K, Oleszczuk A, et al. Visual outcomes of posterior chamber intraocular lens intrascleral fixation in the setting of postoperative and posttraumatic aphakia. BMC Ophthalmol. 2016; 16 (1): 50.

[15] Agrawal S, Singh V, Gupta SK, Misra N, Srivastava RM. Transscleral fixation of closed loop haptic acrylic posterior chamber intraocular lens in aphakic nonvitrectomized eyes. Indian J Ophthalmol. 2015; 63 (8): 649–53.