

Sulcus Fixated Posterior Chamber Intraocular Lens Implantation in Aphakic Eyes Associated With Previous Cataract Surgery

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Abstract

Aim: To estimate the visual outcome and proportion of surgical complication in patients following sulcus fixated PCIOL.

Method: Prospective, Observational study of 30 patients who had been rendered aphakic during primary ocular surgery for any reason with significant posterior capsular support was considered for secondary IOL implantation. Study period was from November 2017 to April 2018.

Results: Among 15 patients visual acuity was 6/6-6/12, in 15 (50%), 6/18-6/36 in 10 (33.3%) and CF 1 mt-6/60 in 5 (16.67%) patients at the end of 6 weeks follow up period. Post op complications included uveitis seen in 15 (50.0%) patients CME in 20 (66.6%) epiretinal membranes 4 (13.3%) decentered IOL in 2 (6.6%) patient. Vitreous hemorrhage in 3 (10%) patient and 2 (6.6%) patient had developed secondary glaucoma.

Conclusion: In case of intra-operative posterior capsular rupture with doubtful capsular support, sulcus fixated Secondary IOL implantation, has excellent results. Long-term complications were found to be similar to primary PCIOL implantation.

Keywords: Non-sutured; Posterior chamber intra ocular lens; Secondary

Introduction

Cataract surgery is one of the most common and successful surgical procedures performed today. Although aphakia after cataract surgery is usually not planned nowadays and is caused by a complication during surgery, postoperative aphakia is intended in some cases [1]. Visual rehabilitation is difficult.

The correction of aphakia after complicated cataract surgery is challenging for surgeons. Loss of the capsule and or zonules results in inadequate support for the placement of a standard posterior chamber intraocular lens (IOL) [2]. One approach when complications occur is to leave the eye aphakic for possible later secondary IOL implantation.

Aphakic spectacles will generally improve the vision but many, problems remain to which some patients can never adapt. Disadvantages of aphakic spectacles includes image enlargement, prismatic and peripheral aberrational effects leading to spectacle intolerance, limited field of vision with a roving ring scotoma. Distance judgment is impaired with aphakic spectacles leading to clumsiness in performance of simple tasks. Contact lenses can reduce the aberrations and aniseikonia produced by aphakic spectacles. However, many patients are unable to wear contact lenses because of an inability to handle or care for the contact lens, difficulty in fitting the lens, discomfort, contact lens-related complications such as giant papillary conjunctivitis or poor motivation for proper use. Unilateral aphakia in younger patients after traumatic cataract do not have good patient compliance with respect to contact lens wear. Uniocular aphakic has

no possibility of binocular vision with aphakic spectacles and contact lens wear.

Secondary implantation of lens is an insertion of a lens in any eye rendered aphakic by previous surgery [3] secondary implantation of an IOL generally is recommended when traditional spectacle or contact lens correction of aphakia is not acceptable to the patient.

In the absence of capsular support, surgical options to correct aphakia include implantation of an angle-supported anterior chamber IOL, anterior chamber iris-fixated IOL (AC-IFIOL), retropupillary iris-fixated IOL (RP-IFIOL), iris-sutured posterior chamber IOL, and scleral-fixated posterior chamber IOL (SF-PCIOL) [4-8]. Commonly used lens for secondary implantation is anterior chamber or a posterior chamber lens. All techniques have advantages and disadvantages, and no consensus exists on the indications, relative efficacy and safety of these options [9].

For patients with adequate posterior capsular support, we believe that implantation of a PC IOL into the capsular bag or ciliary sulcus most often is the preferred approach.

We have prospectively evaluated the visual outcomes of patients who underwent secondary implantation of Sulcus Fixated -PCIOL in aphakic eyes related to previous cataract surgery and complications after the procedure.

Materials and Methods

Source of data collection

Primary source of information with observational methodology will be used on the patients who are willing to undergo secondary IOL implantation in tertiary eye care government hospital.

Method of data collection

Sample size: 30

Study type: Prospective, Observational study

Duration: 6 months (November 2017 to April 2018)

Inclusion criteria

- Patient dissatisfied with visual rehabilitation obtained with aphakic spectacles.
- Patients with monocular uncorrectable aphakia.
- Patients with aphakia requiring binocular vision and unable to tolerate contact lenses.
- Any patient who have been rendered aphakic for any reason during primary cataract extraction with adequate capsular support.

Exclusion criteria

- Distorted pupil
- Severe peripheral anterior synechiae
- Patient with recurrent uveitis, glaucoma and vitreoretinal problem.
- Any patient having less than 3 months follow-up period

Method of study

Patients who will be attending the OPD between November 2017 and April 2018 and who have been rendered aphakic during primary ocular surgery for any reason with significant posterior capsular support are considered for secondary intraocular lens implantation (Table 1).

Pre-operative evaluation of the patient

Complete evaluation of the eye to be operated, along with evaluation of the fellow eye was done. Blepharitis, conjunctivitis, dacryocystitis was excluded and if present was treated prior to operation. Entropion, trichiasis and chronic infection of meibomian glands were looked for and treated. Pre-operative assessment of the operating eye in terms of best corrected visual acuity, sensitivity to light, pupillary reaction /pupil peaking, B-scan ultrasonography was done. A detailed evaluation of the anterior segment including cornea, depth of anterior chamber, angle of anterior chamber. Posterior capsule intact or ruptured was noted. Posterior segment was evaluated using direct ophthalmoscope, indirect ophthalmoscope, and 90D lens (Table 2).

IOL calculation was done with SRK II formula. Keratometry was done for any corneal astigmatism. A well informed consent which includes risks and complications of the surgery and its anaesthesia was taken. Patients were explained about the complications like cystoid macular oedema or corneal decompensation.

Surgery was performed under local anesthesia using 2% xylocaine with or without adrenaline (peribulbar block). A superior or temporal sclerocorneal tunnel was performed depending on the surgeon's preference and preoperative astigmatism. In all cases, optimal and judicious use of viscoelastic hydroxypropyl methyl cellulose was exercised. Synechiolysis was performed using a cyclodialysis spatula or cut with vannas scissors to release synechiae, which are extensively adherent to anterior capsule or posterior capsule of the lens. In all cases, anterior and posterior capsular support was reassessed on table. If vitreous is present in the anterior chamber, adequate anterior vitrectomy was performed by an automated vitrectomy machine. A single piece or 3 piece PMMA lens was inserted, depending on support available for placing the IOL. Wound was closed with suture (9-0 nylon) in most of cases (Table 3).

Patients were followed post-operatively for a minimum period of 6 months. Patients were examined on post op day day 1, 1st week, 2nd week, fortnightly for 2 months and then monthly. Post-operative follow up including Snellen visual acuity, Intra ocular pressure evaluation by applanation, Slit lamp biomicroscopy, Fundus examination and Retinoscopy was done. OCT was done in Cystoid Macular edema (CME) suspects. Postoperative complications are recorded.

Results

Demographics

Out of 30 patients, 12 were females and rest 18 was males.

Age group ranges from 40 to 73 years.

Most of the patients were in age group of 61-70 years.

Age group	Number
40-50	7
51-60	7
61-70	13
71-80	3

Table 1: Age Distribution of Patients.

Since cataract is more common in this age group, even secondary iol is in this age group.

Post-operative vision	Number / percentages
CF 1mt- 6/60	5 (16.67%)
6/36-6/18	10 (33.33%)
6/12-6/6	15 (50%)

Table 2: Post-operative vision at 6 weeks.

Discussion

Secondary IOL implantation is a widely practiced method for optical rehabilitation of eyes that are left aphakic after cataract extraction because of intolerance of contact lenses and/or spectacle correction [10-14]. In the absence of capsular support, surgical options to correct aphakia include implantation of an angle-supported anterior

chamber IOL, anterior chamber iris-fixated IOL (AC-IFIOL), retropupillary iris-fixated IOL (RP-IFIOL), iris-sutured posterior chamber IOL, and scleral-fixated posterior chamber IOL (SF-PCIOL). Standard PCIOLs placed in ciliary sulcus or capsular bag are the standard of care [15].

Most of them had good postoperative vision.

Complications	Number	Percentage
Uveitis	7	46.6
CME	10	66.6
Epi-retinal membrane	2	13.3
Decentred IOL	1	6.6
Vitreous haemorrhage	1	6.6
Secondary glaucoma	1	6.6

Table 3: Postoperative complications.

Aphakic patients with residual capsule often have synechiae between anterior capsule and posterior surface of the iris or between anterior and posterior capsule. Surgeon has the option of the placing a PCIOL in ciliary sulcus after releasing adhesions or attempting capsular bag placement after reopening the bag. Stability and complications rates are similar to that primary PCIOL implantation in the sulcus.

In patients with intact posterior capsule, a significant surgical obstacle is reopening the capsular bag [16]. In cases without extensive capsular fibrosis, the anterior and posterior capsule is separated. The key is locating one area in which the anterior capsule edge is not strongly adherent to posterior capsule. Using this entry point, viscoelastics are used to separate the capsule layers. If adhesions are very dense, blunt dissection with cannulas or other instruments can be attempted. In some cases, the adhesions can be left intact focally by creating an extension of anterior capsulotomy peripheral to adhesion using either capsulorhexis-like tearing techniques or scissors cutting the anterior capsule. A final alternative is sharp dissection between anterior and posterior capsules, but this carries a greater risk of penetrating the posterior capsule.

Ciliary sulcus fixation is another alternative for secondary PC IOL implantation [17]. This requires at least peripheral capsular support and intact zonular support.

It is often necessary to lyse adhesions between capsular remnants posterior iris to reconstruct the ciliary sulcus for IOL placement [18]. It is important to visually confirm that the haptics are not inadvertently directed under the anterior capsule during insertion to ensure proper support and avoid vitreous entanglement.

Overall results of secondary IOL surgery are better if the initial cataract surgery has been uncomplicated. Eyes with previous cataract surgery complicated by vitreous loss have worse results, regardless of type of IOL used at second surgery.

Advantages non-sutured secondary PC IOLs are Lower incidence of CME, Lower incidence of pupillary block, Lower incidence of UHG syndrome (uveitis glaucoma hyphema), Lower incidence of peripheral bullous keratopathy, Less endothelial cell loss, Mechanical barrier against vitreous movement and barrier against diffusion of vasoactive

substances that could lead to CME or retinal detachment, Distance from trabecular meshwork and positioned at nodal point of eye [19].

In present study 86% of patient developed good visual acuity in immediate postoperative period up to 6/18. Only 15% of patients have visual acuity less than 6/18 in immediate postoperative period. The most common reasons for decreased visual acuity was postoperative corneal edema, uveitis, fibrinous membrane and striate keratopathy.

Jaais et al. conducted a study in which vision of 6/9 or better were seen in 9 of 13 eyes (70%) with PCIOL 10 implants [20].

Hahn et al. retrospectively studied secondary IOL implantation in aphakic eyes. The final postoperative visual acuity of 20/40 or better was achieved in 92.0% of the eyes with posterior chamber lenses [21].

Mithal et al. in their study to evaluate the visual outcomes and complication profiles of secondary implantation of open-loop anterior chamber, sulcus fixated posterior chamber and scleral fixated posterior chamber intraocular lens, 59.0% of PCIOL group had a visual acuity of 6/18 or better [22].

Most common immediate post-operative complication was uveitis (46.6%). It was due to iris manipulation during synechiolysis. The next common postoperative complications were Cystoid Macular Edema due to significant surgical complication and vitreous loss associated with primary surgery. Next complication encountered was secondary glaucoma, due to blockage of trabecular meshwork by inflammatory cells. Other complications were Lens tilt/decentration and Vitreous hemorrhage was found to be a frequent problem with secondary PC IOLs due to extensive surgical manipulation involving the iris to release iridocapsular adhesions and vitrectomy needed to clear vitreous in anterior chamber and close proximity of IOL haptics to the ciliary sulcus irritating the ciliary body.

Charan et al. in their retrospective analysis of 100 cases of non-sutured secondary PC IOLs, 19 patients had significant anterior chamber reaction, 8 patients developed corneal edema, 5 patients had Striate keratopathy, 1 patient developed toxic anterior segment syndrome, 1 patient developed 360 degree choroidal detachment, 1 patient had a wrong IOL power inserted and 2 patients developed hyphema.

Azhar et al. conducted a study regarding the complications during secondary IOL implantation and they concluded that haemorrhage in 13.9% and vitreous loss occurred in 3.9% patients. Cystoid macular oedema occurred in 5.8% and corneal decompensation in 19.2% of patients [23].

Conclusion

In our study, we had excellent results in secondary IOL implantation. Proper preoperative assessment and good surgical technique can give excellent results in secondary PC IOL implantation. The long term complications are almost similar to any primary IOL implantation [24]. Our study shows the importance of aborting the IOL implantation in primary surgical procedure if the surgeon has intraoperative complication and is not sure of adequate capsular support. The patient can be reassessed postoperatively, and IOL implantation can be done as a secondary procedure at end of 3 months when capsular fibrosis occurs, thus increasing the chances of IOL implantation and giving patients good quality vision.

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