



## VISUAL OUTCOME AND COMPLICATIONS IN SECONDARY POSTERIOR CHAMBER INTRAOCULAR LENS IMPLANTATION

### Ophthalmology

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### ABSTRACT

**AIM:** To analyse the visual outcome and complications in secondary posterior chamber intraocular lens implantation.

**METHODS:** In this prospective study, 30 aphakic eyes were included. These patients were treated with secondary posterior chamber intraocular lens (PCIOL) implantation either with ciliary sulcus IOL or scleral fixated IOL implantation depending on the presence or absence of adequate capsular support. These patients were followed up for a period of 6 weeks postoperatively and were evaluated for best corrected visual acuity (BCVA), corneal edema, anterior chamber reaction, intraocular lens (IOL) centration and other complications.

**RESULTS:** Of 30 eyes with aphakia, 13 eyes had adequate capsular support and were treated with ciliary sulcus IOL implantation. 17 eyes with inadequate or complete absence of posterior capsule were treated with scleral fixated IOL implantation. Pre-operatively, 17 eyes (56.6%) had BCVA of 6/18 and above. Postoperatively, 25 eyes (83.3%) achieved BCVA of 6/9 and above. 2 eyes (6.6%) developed cystoid macular edema (CME) and one patient (3.3%) developed retinal detachment.

**CONCLUSION:** Secondary PCIOL implantation is an effective and safe method of treating aphakia with a favourable postoperative visual outcome and lower complication rate.

### KEYWORDS

Aphakia, secondary posterior chamber intraocular lens, ciliary sulcus, sclera fixation.

Cataract is the commonest age related disease in most countries worldwide. There are approximately 45 million blind people in the world. At least 80% of these people live in developing countries and more than half are blind as a result of cataract.<sup>1</sup> It is estimated that in India alone, more than 5.1 million patients undergo cataract surgery in a year.<sup>2</sup>

Cataract surgery with implantation of posterior chamber intraocular lens is the standard procedure of choice. In some conditions this is not possible in cataracts with lens subluxation, pseudoexfoliative syndrome with zonular dehiscence or due to intraoperative complications like large breaks of the posterior capsule leaving the patient aphakic.<sup>3</sup>

Implantation of an intraocular lens within the aphakic eye overcomes the optical disadvantages of aphakic spectacles and the handling and wearing difficulties encountered with contact lens.<sup>4,5</sup>

An IOL can be placed in the anterior chamber as in iris-fixated and closed- or open-loop anterior chamber IOLs (AC IOLs), or it can be implanted in the posterior chamber within the ciliary sulcus posterior to the iris, as in sutured iris-fixated and sclera fixated posterior chamber IOLs (PC IOLs).<sup>6-8</sup>

The preferred lens for aphakic rehabilitation is a posterior chamber IOL because its closer to the focal point of the eye reducing the image magnification, its position away from delicate anterior chamber structures especially the corneal endothelium and anterior chamber angle and therefore lower risk of corneal oedema and glaucoma.<sup>9,11</sup>

This study is done to analyse the visual outcome and complications in secondary intraocular lens implantation in the posterior chamber.

### MATERIALS AND METHODS

This prospective clinical study was conducted from September 2011 to September 2012 in a tertiary eye hospital.

The study included 30 aphakic eyes treated with secondary posterior chamber intraocular lens implantation depending on the presence or absence of posterior capsule. Patients with unilateral aphakia and BCVA better than or equal to 6/60 by Snellen's visual acuity chart were included in the study. Patients with central corneal opacity, glaucoma, uveitis, fundus abnormalities affecting visual function like macular degeneration, chorioretinal atrophy were excluded.

All patients underwent standard ocular examination protocol which included preoperative measurements of best-corrected visual acuity (BCVA) with Snellen's chart, slit-lamp examination, measurement of the intraocular pressure (IOP) by Goldmann's applanation tonometry, IOL power calculation and dilated fundus examination. Patients with adequate capsular rim were implanted with ciliary sulcus IOL and patients with no capsular support, underwent scleral fixated IOL.

The surgery was performed under peribulbar block. In patients with adequate capsular rim, after anterior vitrectomy, polymethyl methacrylate (PMMA) IOL was placed in the ciliary sulcus.

In patients with inadequate capsular support, scleral fixated IOL was implanted. Here, superior scleral flap of 6.5 mm length was made along with two 2mm 2/3<sup>rd</sup> thickness sclera flaps 2mm from the limbus at 2 o'clock and 8 o'clock positions. A thorough automated 23 G anterior vitrectomy was done.

A 10-0 polypropylene suture end was threaded into the bore of 26G needle and passed into the sclera flap at 2 o'clock position. The needle was passed posterior to the iris into the posterior chamber. The suture was taken out through the main scleral wound by McPherson forceps. The same procedure was repeated at 8 o'clock position. The two suture ends were tied to the haptics of rigid PMMA lens. The knots were tied to the haptic in 3:2:1 pattern. IOL with sutures tied to the haptics was inserted into the anterior chamber and placed in the ciliary sulcus and centered. The suture was gently pulled and scleral flaps were sutured and the knot buried in the scleral bed in the groove. The main superior scleral flap was sutured with 10-0 nylon suture.

Postoperatively patients were examined after one day, one week and 6 weeks. Post operatively BCVA, IOP and any complications were noted.

### RESULTS

A total of 30 aphakic eyes were subjected to secondary intraocular lens implantation. 43.3% of the patients belonged to the age group of 41-60 years and 56.7% of the patients were in the age group of 61-70 years. Majority of the patients were females accounting for 63% and males were 37%.

Pre-operatively, 17 eyes (56.6%) had BCVA of 6/18 and above. 11 eyes (36.6%) had 6/24-6/36 and 2 eyes (6.6%) had BCVA of 6/60. (Table 1) Among 30 eyes, 17 eyes (56.3%) had inadequate capsular support or

total absence of capsul suggestive either previous ICCE or large posterior capsular rupture and underwent SFIOL. 13 eyes (43.3%) had adequate capsular rim and underwent ciliary sulcus fixation IOL.

One week postoperatively, in ciliary sulcus IOL implantation group, 11 eyes (84.6%) achieved BCVA of 6/12 and above. 1 patient (7.6%) had BCVA of 6/24 and 1 patient (7.6%) had BCVA of 6/36. In SFIOL group, 14 eyes (82.3%) achieved BCVA of 6/12 and above. 1 patient (5.8%) had BCVA of 6/24. 2 eyes (11.7%) achieved BCVA of 6/36. In ciliary sulcus IOL implantation group, 2(15.3%) patients had anterior uveitis and 1(7.6%) patient had SK. In SFIOL group, 1(5.8%) patient had increased IOP, 2(12%) patients had corneal edema and 2 eyes (11.7%) had persistent anterior uveitis.

At 6 weeks postoperatively, in ciliary sulcus IOL group, 11 eyes (80%) achieved BCVA of 6/6, 1 patient (7.6%) had 6/24. 1 patient (10%) achieved BCVA of 6/36 and the cause for defective vision was due to the complication. In SFIOL group, 14 eyes (82.3%) achieved BCVA of 6/9 and above. 2 eyes (11.7%) had BCVA of 6/36. 1 patient (5.8%) had BCVA of less than 6/60 which was attributed to the associated complication. In ciliary sulcus fixation IOL group, 1 patient (7.6%) developed cystoid macular oedema. In SFIOL group, 1 patient (5.8%) had corneal edema, 1 patient (5.8%) developed CME and 1 patient (5.8%) developed retinal detachment.

**Table-1: Pre-operative and post-operative BCVA**

BCVA	Pre-operative	Post-operative	
		Ciliary sulcus IOL	SFIOL
6/6-6/9	2	11	14
6/12-6/18	15	-	-
6/24-6/36	11	2	2
6/60 and less	2	-	1

**Table-2: Post-operative complications**

Post-op complications	Ciliary sulcus IOL	SFIOL
<b>Early complications</b>		
Striate keratopathy	2	2
Corneal edema	1	4
Hyphema	-	1
Anterior uveitis	2	2
IOL decentration	-	1
Increased IOP	-	1
Vitreous hemorrhage	-	-
<b>Late complications</b>		
Corneal edema	-	1
Increased IOP	-	-
Cystoids macular edema	1	1
Retinal detachment	-	1

**DISCUSSION**

A large number of aphakia patients opt for secondary IOL implantation because of intolerance to contact lens and/or spectacle correction.<sup>12</sup>

Various designs and fixation sites have been introduced for the correction of aphakia. But the posterior chamber IOL has become clearly the treatment of choice these days.

Preoperative evaluation of patients having secondary IOL implantation is important to enable accurate surgical planning including choice of IOL. In patients, where inadequate dilation precludes the detection of capsular support, ciliary sulcus IOL implantation should be considered, with the final decision lying with the operating surgeon.<sup>13,14,15</sup>

Mazhry et al did a prospective study of 45 patients to evaluate secondary PCIOL implantation. In this study, average postoperative visual acuity was in the range of 6/9-6/12. The most common complication was glaucoma in 8 eyes (16%), vitreous hemorrhage in 4 eyes (8 %) and hyphema in 2 eyes (4%).<sup>9</sup> In our study, 83.3% had BCVA of 6/9 and above. Hyphema and glaucoma was seen in 1 patient. No vitreous haemorrhage was observed in our study.

In a retrospective study done by Siva Charan, 100 patients underwent non sutured secondary PCIOL implantation. In his study, 85% of patients developed visual acuity up to 6/24. Most common complication was anterior chamber reaction (19 cases). 8 cases developed corneal oedema. 5 cases had SK, 1 case developed

choroidal detachment, 2 cases had hyphema, vitreous haemorrhage was seen in 2 cases and fibrous membrane was seen in 9 cases.<sup>16</sup> In our study, in non sutured PCIOL group most common complication was anterior chamber reaction (15%) and SK (15%). No hyphema or vitreous haemorrhage noted in our study and one patient developed CME.

Although sulcus-supported posterior chamber IOLs needs adequate capsular support, they have a reduced complication rate in comparison to SFIOLs.

The limitations of this study are smaller sample size, shorter duration of follow-up and comparison between ciliary sulcus implanted IOL and SFIOL group of patients was not done. Longer follow up with large sample size is required for further assessment of functional outcome.

**CONCLUSION**

Secondary PCIOL implantation is an effective and safe method of treating aphakia with a favourable postoperative visual outcome and lower complication rate.

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