



STUDY OF VISUAL OUTCOME IN PATIENTS AFTER AC-IOL (ANTERIOR CHAMBER INTRA-OCULAR LENS) IMPLANTATION DURING CATARACT SURGERY

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ABSTRACT

Background: Following posterior capsular rupture (PCR) and vitreous loss during cataract surgery, sometimes there is inadequate support for implanting a conventional intra-ocular lens (IOL) in the capsular bag. Flexible openloop anterior chamber intraocular lens, trans-sclerally sutured posterior chamber intraocular lens and iris-claw lenses are the most acceptable alternatives in such a scenario.

Objective: To review our experience with primary anterior chamber intraocular lens implantation at a District Hospital in Rajkot.

Methods: Analysis of medical records of a consecutive series of primary anterior chamber intraocular lens implantations carried out at the G.T. Sheth Eye Hospital at Rajkot, from September 2011 to April 2013. Eyes with complicated or traumatic cataracts, ocular co-morbidity and cases of combined surgery were excluded from the analysis of visual outcome.

Results: There were 70 cases of primary anterior chamber intraocular lens implantations during the study period. Posterior capsule rupture and resultant inadequate capsular support was the commonest indication for implanting the anterior chamber intraocular lens. Postoperatively 82.85% had a best corrected visual acuity of 6/12 or better. The commonest postoperative complications were cystoid macular oedema, recurrent iritis and persistent elevated intra-ocular pressure (IOP).

Conclusion: Our results indicate a satisfactory visual outcome with primary implantation of anterior chamber intraocular lenses. Caution should be exercised when implanting an anterior chamber intraocular lens following complicated cataract surgery, particularly in the absence of appropriate capsular support.

KEYWORDS : cataract surgery, AC-IOL, posterior capsular rupture, vitreous loss

INTRODUCTION

Intraocular lenses are of two designs; anterior and posterior chamber lenses. (1) The posterior chamber lenses (PC-IOL) are used most extensively after manual cataract extraction or phacoemulsification and they are considered better as compared to anterior chamber lenses (AC-IOL). (2) However, in certain situations during cataract surgery, when there is inadequate posterior capsular support either due to posterior capsular rupture or capsular bag dialysis, a PC IOL is contraindicated. In such conditions, an AC-IOL may be used for implantation. (2-4)

After vitreous loss in cataract surgery, it has been advised to implant a PC-IOL whenever there is adequate capsular support. (5) Only in cases of inadequate capsular support, AC-IOL implantation may be carried out.

The initial closed loop AC-IOLs used during the 1970s and 1980s were associated with several problems and thus they never became widely used. (6-8) However, the modern AC-IOLs now have improved designs, which have drastically reduced the rate of complications. (9) These AC IOLs are flexible, open loop and one-piece lenses and they now provide a good alternative.



Figure 1: Modern Kelmann Multiflex type AC-IOL

MATERIALS AND METHODS

The study is Case Series of patients undergoing primary AC-IOL implantation carried out at the G.T. Sheth Eye Hospital, Rajkot. All cases of primary AC-IOL implantation were carried out from September 2011 to April 2013. The following data were analyzed; age, sex, preoperative Visual Acuity (VA), type of cataract, type of surgery and surgical complications, grade of surgeon (resident or consultant), preoperative and postoperative intraocular pressure and postoperative VA at discharge and at one week, two weeks and six weeks. Results of postoperative refractions were also recorded.

Eyes with ocular comorbidity, complicated or traumatic cataracts and cases of combined surgery were excluded from the analysis of visual outcome.

All operations were carried out under local anaesthesia. Cataract extraction was done via small incision cataract surgery SICS.

The technique used for inserting the AC-IOL is simple, although they may be difficult to place correctly. The aim is to place the AC-IOL in the anterior chamber with its footplates resting on the scleral spur, without capturing any iris tissue or interfering with pre-existing iridotomies.

A horizontal white-on-white measurement is made to avoid any large discrepancy between the angle size and that of the IOL. (IOL diameter should be 1 mm greater than that of the angle.)

Anterior vitrectomy is done if vitreous is present in the anterior chamber, Intracameral Pilocarpine is injected, if required, followed by viscoelastics. The incision is enlarged. The AC-IOL is then inserted, taking care to avoid iris tissue, which would manifest itself by ovalization of the pupil.

A peripheral iridectomy was done superiorly at 12'o clock and viscoelastic is removed.

The entry wound is sutured adequately using 10-0 Ethilon suture. Finally the anterior chamber is formed using air.

The patients underwent detailed evaluation on the first post-operative day, 1st week post.-op. & 6th week post.-op.

RESULTS

Out of total 3936 cataract surgeries in the study period, 70 patients underwent AC-IOL implantation (1.78%). Out of these 70, 28 were male patients and 42 were female patients.

The following is the data regarding age wise distribution seen in the study:-

Age (years)	No. of patients
41-45	2
46-50	8
51-55	3
56-60	15
61-65	18
66-70	12
71-75	4
76-80	2
81-85	4
86-90	2

The following is the classification of type of cataract as evaluated pre-operatively:

Type of cataract	No. of patients
Mature cataract	10
Hyper mature cataract	6
Traumatic cataract	1
Dislocated cataract	2
Near mature cataract	4
Nuclear sclerosis, cortical Immature cataract	28
Posterior polar Immature cataract	19

Classification of patients depending upon the pre-operative vision:-

Pre-operative vision	No. of patients
HM+ PL+ PR4+	17
FC close to eye	3
FC lmt. To 6 mt.	22
6/60	16
6/36 or better	12

The following is a chart and table depicting the percentage of patients who in the post operative period had a visual acuity of 6/12 or better:-

Duration	Vn of 6/12 or more
1st post op day	31.42%
1 week post op	54.28%
6 week post op (BCVA)	82.85%

We thus observed that though the visual acuity on first post-operative day was relatively less in the patients, there was gradual recovery in the visual acuity and at the 6th week post op, 82.85% had a V/A of 6/12 or better.

Comparing the BCVA at the 6th week post-op:

BCVA at 6th week post-op	Percentage of patients
6/18 or better	88.57%

6/12 or better	82.85%
6/9 or better	50%

We observed that at least 88.57 % of patients achieved a visual acuity of 6/18 or better. Out of which 82.85 % had a V/A of 6/12 or better.

Comparing the pre operative visual acuity and BCVA after 6 weeks post operatively we found that there was a statistical significant difference by the Paired T Test.

The average spherical refractive error was -0.596 D with a standard deviation of 1.275 D, while the average astigmatic error was -1.60 D with a standard deviation of 0.89 D.

The overall complication rate was 12.85 %. Complications such as cystoid macular edema, recurrent iritis, persistent elevated IOP, hyphaema, vitreous haemorrhage, bullous keratopathy were seen. the given chart and table conveys the frequency of individual complication.

Post-op Complications	No. of Pts.	Percent
Cystoid Macular Edema	2	2.8
Recurrent Iritis	2	2.8
Persistent Elevated IOP	2	2.8
Hyphaema	1	1.4
Vitreous Haemorrhage	1	1.4
Bullous Keratopathy	1	1.4

DISCUSSION

In case of PCR and vitreous loss during cataract surgeries, whenever there is inadequate capsular support, AC-IOL implantation, Trans-Scleral fixation of IOL (SF IOL) and Iris fixated IOLs are the preferred techniques for IOL implantation.⁽⁶⁾

In our centre, due to a lack of surgical skill for transscleral suturing of a PC-IOL, and unavailability of vitrectomy machine, we implant an AC-IOL if capsular support is inadequate.

Traditionally it has been studied that whenever there is vitreous loss during cataract surgery, the post-operative visual outcome is poorer and there are increased chances of post-operative complications.^(10,11) Also implantation of an AC IOL after vitreous loss is associated with a poorer visual outcome than implantation of a PC IOL.^(12,13)

In our series the proportion of eyes with a good outcome is comparable to studies by Pojda SM et al⁽⁹⁾, Pearson PA et al⁽¹⁶⁾ and Rattigan et al⁽¹⁷⁾ where final visual acuities of at least 6/12 in over 70% were reported. It is in contrast to studies by Aduvula et al⁽⁴⁾, Shah et al⁽¹⁴⁾ and Fasih et al⁽¹⁵⁾ which reported poor outcomes.

Complete removal of vitreous from the anterior chamber before implanting AC-IOL is of utmost importance. In case of persistent vitreous complications like wound leak, persistent corneal edema and traction to retina may occur which may hamper the recovery.

Glaucoma, uveitis, and persistent corneal edema are complications seen with the use of AC-IOLs in cataract surgery.⁽¹⁶⁾ Cystoid macular edema, recurrent iritis and persistent elevated IOP were the commonest postoperative complication in our series. Rate of complications seen in our series was observed to be less than the various studies stated above. Hyphaema, bullous keratopathy and vitreous haemorrhage were observed in one patient each.

Uveitis-Glaucoma-Hyphaema (UGH) syndrome is now rare with current generation of AC-IOLs. Due to improved design the newer AC-IOLs cause less angle damage and thus a lower incidence of UGH syndrome and raised intraocular pressure.⁽⁵⁾

We did not observe any case of retinal detachment.

Limitations of our study are that we could not compare results after AC-IOL implantation to the alternate methods (SFIOL / Iris fixated IOL) as they are not performed in the Institution. Also as surgeries were done by consultant surgeons as well as residents, there may non-uniform outcomes due to the lack of experience of trainee residents.

In conclusion, this study reveals that there is satisfactory visual outcome following primary AC IOL implantation in our Institute. It goes without saying that utmost care should be taken to clear the vitreous from the anterior chamber prior to AC-IOL implantation. In the absence of tools for vitrectomy, AC-IOL is an indispensable tool for cases in which there is inadequate capsular support.

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