

A comparison between anterior chamber intraocular lenses with those of retro-pupillary iris claw lenses: Visual outcome and complications

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Abstract

Purpose: A comparison of the visual outcome and complications in anterior chamber intraocular lenses with those of retro-pupillary iris fixated lenses.

Materials and Methods: A retrospective observational study done at tertiary hospital in South India. Records of patients who underwent small incision cataract surgery with either anterior chamber intraocular lens (ACIOLs) and retro-pupillary iris fixated lens implantation done between 2009 to 2016 were assessed. Demographic details, and data regarding pre operative status, intraoperative and postoperative events were noted, and compared.

Results: Records of 50 patients of retro-pupillary iris fixated lenses and 44 patients of ACIOLs were analysed. Postoperatively, 42% of patients who had an iris claw had visual acuity better than 6/60, and 50% of patients in the ACIOL group had a visual acuity better than 6/60, in the immediate postop period. 33 patients (66%) in the iris claw lens group had a vision improvement of one line or more, while 26(60.4%) in the ACIOL had a vision improvement of one line or more. ($p=0.214$). The postoperative complications in both groups were similar.

Conclusion: Good surgical technique is the main factor in determining the postoperative outcome notwithstanding the type of lens used, especially in the immediate postoperative period.

Keywords: ACIOL, Retro-pupillary Iris-claw lens, Small Incision Cataract surgery, Postoperative complications, Visual outcome.

Introduction

Intraocular lens implantation has become the sine qua non of cataract surgery.¹ In case of intraoperative complications such as a large posterior capsular rupture or a zonular dehiscence when an in the bag placement or sulcus placement is not possible, an alternative intraocular lens (IOL) needs to be placed in order to optimize the visual outcome. Various substitutes are available such as anterior chamber intraocular lenses, anterior fixated iris lenses, retro-pupillary iris claw lenses and scleral fixated intraocular lenses, each with its pros and cons. The best option to correct aphakia, though, is debated.²⁻⁵ To choose the best intraocular lens for a patient, one has to factor in patient suitability and expertise of the surgeon. The decision also needs to be made as to whether to implant the IOL in the same sitting or during a second surgery.^{1,2}

The open loop haptic design anterior chamber intra-ocular lens is popular because of its ease of insertion and lower complication rates. These intraocular lenses have reported lower corneal endothelial cell loss, corneal decompensation, anterior chamber reaction and glaucoma.^{6,7}

The modified version of the iris claw lens developed by Worst, has claws that are fixated to the mid-periphery of the iris, hence not disturbing the normal physiology of the iris or angle and also underwent modifications subsequently to prevent pupil erosion.^{5,8}

However there is not much literature comparing the ACIOL and the retro-pupillary iris claw lens in small incision cataract surgery. The present study aims to

compare the postoperative outcome, of the two lenses, in complicated small incision cataract surgery.

Materials and Methods

After obtaining appropriate Institutional Review Board approval, a retrospective observational study was done, where the records of patients who underwent a small incision cataract surgery with implantation of either an anterior chamber intraocular lens (ACIOL) or an iris claw lens at our institute between June 2009 and June 2016 were assessed.

Data regarding age sex, presence or absence diabetes mellitus or hypertension and other ocular history was noted. Details of the ocular examination, including assessment of vision, anterior segment evaluation and fundus examination, were noted.

The events that ensued during the surgery – type of intra-ocular lens placed and type of intra-operative complication, and how it was managed were noted. The postoperative vision and complications were recorded. (Fig. 1 & 2)

The Statistical Package for the Social Sciences version 18.0 (SPSS Inc., Chicago, IL, USA) was used for data analysis. The chi square test was used and a p value less than 0.05 was considered statistically significant.

Results

Ninety four eyes of 94 patients who underwent small incision cataract surgery were enrolled in the study. Among them, 50 patients underwent iris claw lens implantation, and 44 patients underwent anterior

chamber intraocular lens implantation. The mean age of the patients was 64.8±8.449. Out of these, 17.5% patients were below the age of 60 years, 46.4% patients between 60 and 70 and 36% were more than 70 years old. Thirty one (50.8%) patients in the 60-70 age group underwent iris claw implantation, 30 (49.2%) patients in ACIOL group. (p=.410). 49.5% were female and 50.5% were male. 26(55.3%) of the females underwent iris claw lens implantation, while 24 (47%) of the males underwent an iris claw lens implantation. (p=0.781). (Table 1)

None of the patients in our study had a previous history of glaucoma. Two patients in each group had a history of trauma. (p=0.927) Two patients in each group had an abnormal pupil. (p=0.797) Only one patient in the iris claw lens group had a shallow AC. (p=0.622)

The pre operative vision was worse than 6/60 in 44 patients in the iris claw lens group, while in the ACIOL group, 37 patients had a vision worse than 6/60. 21(42%) patients who had an iris claw lens placed had a vision of 6/60 or better, while 22 (50%) of the patients who had an ACIOL placed had a vision of 6/60 or better. 33 patients (66%) in the iris claw lens group had a vision improvement of one line or more, while 26 (60.4%) in the ACIOL had a vision improvement of one line or more. (p=0.214) (Table 2).

47 (94%) of the patients in the iris claw lens group had one or more side port entries, while 9(20%) of the patients in the ACIOL had a side port entry (p=0.000). None of the patients in the iris claw lens group had undergone a peripheral iridectomy, while all of the patients in the ACIOL group had undergone a peripheral iridectomy. (p=0.000).

Intraoperative complications were similar in both groups. (Table 3)

When the post op complications were analysed, 39 in iris claw lens group (78%) and 35 (81.39%) in ACIOL had post op complications (p=0.868). Twenty eight (71.7 %) of those iris claw lens patients that had a post operative complication had a vision of worse than 6/60. In the ACIOL group, 20 (57%) of the patients that had a post operative complication had a vision of worse than 6/60. (p=0.000).

Twelve (24%) patients with an iris claw lens had microcystic edema as a post op complication, while 7 (16%) of the patient in the ACIOL group had microcystic edema as a post op complication. 4(33%) of those that had a microcystic edema in the iris claw lens group had a vision of 6/60 or better, while 3(42.8%) in the ACIOL group that had a microcystic edema had a vision of 6/60 or better. (p>0.05)

Thirty one (62%) in the iris claw lens group had a central corneal stromal edema, while 24 (54.5%) in the ACIOL group had corneal stromal edema. 22 (70.9%) of those in the iris claw lens group that had a central corneal stromal edema had a vision of worse than 6/60 (p=0.006), while 14(58.3%) in the ACIOL that had a central corneal stromal edema had a vision worse than

6/60. Hence, the central corneal stromal edema forebodes a worse vision especially in the iris claw lens group. None of the patients in either group had striate keratopathy.

There was an iridodialysis in 2 (4%) of the patients who had had an iris claw lens implanted, while none in the ACIOL group. The shape of the pupil was oval in 33 (66 %) of the patients with an iris claw lens implanted, while only 7(16%) had an oval pupil in the ACIOL group. (p=0.000). Seven (50%) of the patients in the iris claw lens group that had a round pupil had a vision of 6/60 or better, while 14 (42.42%) of the patients in the iris claw lens group that had an oval pupil had a vision of 6/60 or better. 14 (50%) of the patients in the ACIOL group with a round pupil had a vision of 6/60 or better, while 5 (71%) of the patients in the ACIOL group with an oval pupil had a vision of 6/60 or better. Thus, the shape of the pupil had no bearing on the post operative vision in either group. (p>0.05)

Hypheema was encountered as a post operative complication in 8(20.45%) of the patients in the ACIOL group, while it was seen in 1 (2%) patient in the iris claw lens group; who had a vision of worse than HMCF. (p=0.022), hence statistically significant. Out of the 8 patients in the ACIOL group who had a hypheema, 6 (75%) had a vision worse than HMCF (p=0.01). Hence the presence of a post operative hypheema worsened the visual outcome.

Three (6%) of the iris claw lens group had a post operative shallow ac, while 3 (6.8%) had a post operative shallow ac in the ACIOL group, all of whom had undergone a peripheral iridectomy. None of the patients in either group had a wound gape post operatively. Similar number of patients in both groups was found to have a fibrin reaction. (p=0.411).

One (2%) of the iris claw patients had to undergo a second surgery, while 4(9%) in the ACIOL group had to undergo a second surgery (p=0.05), hence statistically significant. (Table 4)

Table 1: Demographics

Procedure done	ACIOL	Iris claw lens
Total number	44	50
Sex (%)		
Males	23 (52.2)	24 (44.7)
Females	21 (47.8)	26 (55.3)
Age (%)		
60-70 years	31	30

Table 2: Comparison of preoperative (preop) and postoperative (postop) visual acuity

Visual acuity	ACIOL	Iris claw lens
Pre op >6/60	7 (15.9%)	6 (12%)
Pre op <6/60	37 (84%)	44 (88%)
Post op > 6/60	22 (50%)	21 (42%)

Post op 6/60-CF3	6 (13.63%)	16 (32%)
Post op <CF3m	16 (36.36%)	13 (26%)

Table 3: Intraoperative complications

Intraoperative complication	ACIOL	Iris claw lens
Vitreous loss	40	47 (p=0.000)
Iridodialysis	0	2 (p=0.37)
Zonular dehiscence	1	5
Removal of capsular bag	3	17 (p=0.017)

Table 4: Post operative complications

Complication	ACIOL	Iris claw lens
Shallow AC	3	3 (p=0.411)
Hyphaema	8	1 (p=0.022)
Microcystic edema	7	12
Stromal edema	24 (54.54%)	31(62%)
Pupil shape alteration	7 (16%)	33 (66%) (p=0.000)
Second surgery	4 (9%)	1 (2%) (p=0.05)
AC reformation	3	0
Cortex removal	1	0
Lens refixation	0	1

**Fig. 1:****Fig. 2:**

Discussion

Intraocular lens implantation forms an important step during a cataract surgery. But, due to inadvertent complications such as posterior capsular rupture or a large zonular dehiscence, a posterior chamber intraocular lens cannot be placed. In such situations, an alternate intraocular lens such as an anterior chamber intraocular lens, an iris claw lens or a scleral fixated intraocular lens may be used. But which lens is to be used is very much debatable. Each type of lens have its

own pros and cons.¹⁻⁴ In terms of ease of implantation, ACIOLs and iris claw lens score over a scleral fixated lens.⁹⁻¹¹ But, ACIOLs have a higher risk of corneal decompensation and glaucoma. Iris claw lens are more useful in a compromised angle, but its insertion involves a longer learning curve as compared to an ACIOL.⁸

Wagoner et al, in their review article found that 96.1% of cases who had an iris claw lens placed achieved a BCVA within one or better than preoperatively on a snellen's chart and 90.1 % of patients who had a secondary ACIOL had a BCVA within one line or better than preoperatively on a snellen's chart.⁶ In our study, 33 patients (66%) in the iris claw lens group had a vision improvement of one line or more, while 26 (60.4%) in the ACIOL had a vision improvement of one line or more.(p=0.214). The visual outcomes are similar for both types of lenses used. Chan et al also found that visual outcomes and complications were similar irrespective of the types of IOL used.⁹

In the study done by Gonnermann et al, on iris claw lenses, they had a pupil shape alteration in 24.8% of eyes, and Baykara et al reported pupil ovalization in 12.7% of eyes, where as in our study we had shape alteration in 66% of patients.^{3,12}

Hyphaema was reported in 2.1% by Gonnermann et al, and iris claw disenclavation in 8.7% of patients, while in our study hyphaema was seen in 2%, and iris claw lens disenclavation in 2% of the eyes. 4.1% of the patients who underwent ACIOL implantation in the study done by Evereklioglu et al, had a post operative hyphaema.^{3,13} In our study we found that 20.45% of the patients had a post operative hyphaema, while only 2 % of the patients had a post operative hyphaema among the patients who had undergone an iris claw lens implantation. De Silva et al suggested in their study, the hyphaema seen among the patients that undergo an ACIOL implantations due to peripheral iridectomy. In our study, none of the patients in the iris claw lens group underwent a PI, while all the patients in the ACIOL group underwent a PI.⁸

In the current study we found central stromal corneal edema to be affecting visual outcome more than microcystic edema. 31.8% of the ACIOL had transient corneal stromal edema, whereas Chan et al found that 66.6% had corneal stromal edema.⁹

Common complications such as raised IOP, transient corneal edema, residual lens material seen in patients with ACIOL implantation where similar to other studies.^{9,14} De Silva et al reported complications in the iris-claw lens as shallow AC (6%), increased IOP (9%) of patients with transient corneal edema and hyphaema.⁸ In our study the number of patients with a postoperative shallow AC or fibrin reaction were similar in both the iris claw lens and the ACIOL groups.

Iris-claw lens disinclination occurred in one of our cases (2%), where as in a study done by Forlini et al they found it in 0.9% of cases.⁴

The limitation of the current study is that its retrospective, and includes cases from multiple surgeons. The choice of the IOL was decided based on the comfort of the surgeon. We also lack long term follow up as most of the patients were from remote rural areas where it is difficult to report for proper follow up.

In our study we find that the visual outcome is comparable, similar to the study done by Gonnermann et al where they conclude that iris claw is comparable to any other IOL in absence of capsular support.^{3,15,16} Also Melamud et al found that irrespective of the type of IOL, or the location of IOL placement, the results are comparable.¹⁴ Jare et al report that posterior chamber iris claw lenses are a good option in case of complicated cataract surgery.⁵

Conclusion

Implantation of an ACIOL or a retropupillary iris claw lens are good alternatives in small incision cataract surgeries with a compromised posterior capsular support. A simpler and faster surgical technique would favor an ACIOL, where as it may be avoided in shallow anterior chamber, where an iris claw lens maybe more suitable.

Our analysis shows that, the choice as to which IOL should be used depends on the comfort of the surgeon and good surgical technique, as the visual outcome and post operative complications are comparable.

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