

Posterior Iris-Claw Lens – A Boon to Budding Cataract Surgeons

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Abstract

Aim: The aim was a retrospective comparative study on visual outcomes and complications of retro-pupillary fixated iris-claw lens (RPICL) with respect to the experience level of the operating surgeons. **Methods and Materials:** A retrospective study in which records of 126 patients who had RPICL implanted following cataract surgery between January and December 2020 at our hospital were analyzed. Patients were categorized into two groups: (a) RPICL done by a consultant (with experience of a minimum of 25 RPICL done) and (b) RPICL done by a resident (less than two RPICL done, with assistance). Visual outcome (best-corrected visual acuity in logMAR) and postoperative complications (on the first postoperative day and one month) were analyzed in the two groups. **Results:** There was a total of 126 eyes in 126 patients, of which primary RPICL was implanted in 45 eyes by the consultants (group A) and 81 eyes by the residents (group B). Overall ocular risk factors warranting a difficult surgery were significantly higher in the consultant group when compared with the resident group ($P = 0.001$). Mean preoperative vision was 0.899 and 1.137 in group A and group B, respectively. The final postoperative vision (postoperative period 1 month) was 0.246 and 0.332 in group A and group B, respectively. There was no statistically significant difference in preoperative and postoperative vision between both groups. Postoperative complications on day 1 were more in group B (71.6%) than in group A (55.6%) ($P = 0.054$). However, most of them resolved within 1 month postoperative period. **Conclusion:** Primary RPICL implantation is an effective modality of visual rehabilitation in complicated cataract surgery with deficient capsular support and is a boon for young budding cataract surgeons.

Keywords: Complicated cataract surgery, deficient capsular support, learning curve, retro-pupillary fixated iris-claw lens, visual rehabilitation

INTRODUCTION

Spectacle independence following cataract surgery is the demand of the current generation, and with cataract surgery being considered a refractive surgery in the 21st century, postoperative visual rehabilitation at the earliest is very much expected in complicated cataract surgery with deficient capsular support. In 1971, Worst *et al.* were the first to present the iris-claw lens (fixated just above the iris plane).^[1] It was only after Mohr *et al.*^[2] that the retro-pupillary fixated iris-claw lens (RPICL) gained popularity. Here, we report our study on visual outcomes of RPICL with respect to the experience level of the operating surgeons.

METHODS AND MATERIALS

A retrospective study in which case files of 126 eyes of 126 patients operated for cataract surgery followed by primary

RPICL implantation between January and December 2020 at our hospital were analyzed. Patients were categorized into two groups: (a) RPICL done by a consultant with experience of a minimum of 25 RPICL done (group A) and (b) RPICL done by a resident doctor with the experience of less than two RPICL done with assistance (group B). All the eyes had deficient capsular bag support for the placement of IOL either in the bag or in the sulcus. The deficient capsular support was a result of the intraoperative complications such as posterior capsular rent or zonular dialysis of more than 5 clock hours

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that occurred during manual small incision cataract surgery. In both groups, following a thorough automated anterior vitrectomy, RPICL (Excelens – single piece, plano-convex) was placed in the anterior chamber and enclaved pushing the lens posterior to the iris and then a peripheral iridectomy was done. All the surgeons followed the same surgical procedure. The routine postoperative care was administered, including topical antibiotics and steroids in tapering doses (ofloxacin with dexamethasone combination starting from six times a day in tapering doses for 1 month). Topical cycloplegics, antiglaucoma medications, and oral steroids were administered wherever required. Visual outcome (best-corrected visual acuity in logMAR) and postoperative complications (on Day 1 and one month postoperative period) were analyzed in the two groups.

STATISTICS

Mean, standard deviation, frequency, and percentage are the descriptive statistics used. Inferential statistics used are chi-square test, Cramer’s V (crosstabs), ANOVA (repeated measure), and *t* test (independent samples).

RESULTS

There were 126 eyes of 126 patients, of which primary RPICL was implanted in 45 eyes by the consultants (group A) and 81 eyes by the residents (group B). The demographic details are given in Table 1.

Demography	Consultants (group A)	Residents (group B)
Males	30	37
Females	15	44
Mean age (years)	68.08	64.64
Right eye	20	41
Left eye	25	40

There were no significant intraoperative complications with respect to RPICL implantation, except in one of the eyes in group A, which had lens drop requiring pars plana vitrectomy. Overall ocular risk factors warranting a difficult surgery were more common in the consultant group (77.1%) when compared with the resident group (33.3%) (*P* = 0.001) [Table 2].

The most common risk factor was the unstable capsular bag, evident as phacodonesis, frank zonular dehiscence, or lens subluxation, seen in 26.6% and 13.5% of the patients in groups A and B, respectively. Pseudoexfoliation was seen in 20% and 11.1% of the patients in groups A and B, respectively. The details of the types and proportions of ocular risk factors in each group are presented in Table 2.

Mean preoperative vision was 0.899 and 1.137 in group A and group B, respectively. The final postoperative vision (postoperative period 1 month) was 0.246 and 0.332 in group A and group B, respectively. There is no statistically significant difference in the preoperative (*P* = 1.12) and final visual acuity (*P* = 0.153) between the two groups. There is a statistically significant improvement in the vision in both the groups (*P* = 0.01) following the surgery, as shown in Figure 1.

Postoperative complications on day 1 were more common in group B (71.6%) than group A (55.6%) (*P* = 0.054). However, most of them resolved within 1 month postoperative period.

The most common postoperative complication was corneal edema, which was more pronounced on Day 1 in group B. The frequency of corneal edema was 26% in group A and 43% in group B on the first postoperative day [Table 3]. Re-surgery rates were similar in both the groups (*P* = 0.454), the details of which are given in Table 4.

DISCUSSION

Visual refinement in complicated cataract surgery with deficient or absent capsular support is challenging. Options such as scleral fixated IOL, anterior chamber IOL (ACIOL), and iris fixated IOL have their own complications. Scleral

Ocular risk factors	Consultants (group A)	Consultant (%)	Residents (group B)	Residents (%)
Pseudoexfoliation	9	20%	9	11.11%
Phacodonesis/zonular dehiscence/lens subluxation	12	26.6%	11	13.5%
Small pupil (<5 mm dilatation)	2	4.4%	1	1.2%
Shallow anterior chamber	2	4.4%	1	1.2%
Anterior capsular calcification	1	2.2%	0	0%
Raised IOP/glaucoma	1	2.2%	2	2.4%
Silicon oil filled eye	2	4.4%	1	1.2%
Corneal opacities (macular/leucomatous, involving ≥1/3rd of cornea)	2	4.4%	1	1.2%
Posterior synechiae	1	2.2%	1	1.2%
Total	32 out of 45	71.1%	27	33.33%

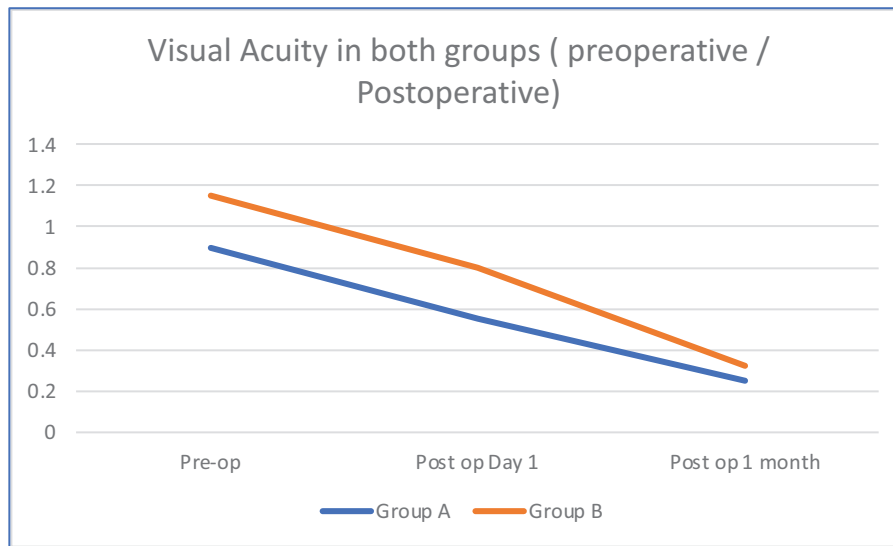


Figure 1: Pre- and postoperative visual acuity (logMAR) in the two groups

Table 3: Postoperative complications (Day 1) in the two groups

Postoperative complications	Consultants (group A)	Residents (group B)
Corneal edema/descemet membrane detachment	12 (26%)	35 (43%)
RPICL displacement	2 (4.4%)	3 (3.7%)
Raised intraocular pressure	2 (4.4%)	1(1.2%)
Hyphema/vitreous hemorrhage	1 (2.2%)	3 (3.7%)
Anterior chamber reaction (>= +3 cells)	1 (2.2%)	3 (3.7%)
Lens matter remnant	1 (2.2%)	3 (3.7%)
Vitreous in anterior chamber/pupillary area	1 (2.2%)	2 (2.4%)
Iris in tunnel/chaffing	1 (2.2%)	1 (1.2%)
Cystoid macular edema	4 (8.8%)	7 (8.6%)

RPICL, retro-pupillary fixated iris-claw lens.

Table 4: Reasons for reoperations in the two groups

Reasons	Consultants	Residents
Descemet membrane detachment	1	4
Vitreous in anterior chamber/pupillary area	1	2
RPICL displacement	2	3
Hyphema/ vitreous hemorrhage	0	3
Wound reconstruction	1	0
Lens matter remnant	1	3

RPICL, retro-pupillary fixated iris-claw lens.

fixation of IOLs is a technically difficult procedure with a high risk of complications.^[3,4] Though the angle-supported ACIOL implantation is easier, they are related to angle-related problems and the corneal endothelial decompensation.^[5] The implantation of an iris-claw lens in the retro-pupillary area provides the advantages of a posterior chamber lens.

Our retrospective study is on 126 eyes where RPICL has been implanted during primary cataract surgery with deficient capsular support, either by an experienced consultant or a resident. Our results are in accordance with other similar

studies with RPICL implantation. There was a significant improvement in mean postoperative vision when compared with the mean preoperative vision in both the groups. Gonnermann *et al.*^[6] and Forlini *et al.*^[7] also showed similar improvement in the visual outcome following RPICL implantation.

Though the complication rates immediately following surgery were more in group B than in A, the postoperative vision at the end of 1 month improved in both groups. Corneal edema was the most common complication in both the groups, owing to the corneal insult during the complicated cataract surgery. Though there have been descriptions of endothelial cell loss following RPICL implantation, the prevalence is lower when compared with the ACIOL or pre-pupillary iris-claw lens implantation due to the proximity of the lenses to the corneal endothelium in the latter cases.^[8-10] Anbari and Lake,^[11] Ganesh *et al.*,^[12] and Anglada-Escalona *et al.*^[13] reported an endothelial cell loss of around 11% at the end of 2 years with RPICL implantation. However, in our study, we didn't intend to look into this aspect.

In our study, though the corneal edema was seen more in group B than group A on the first postoperative day, it improved by the end of the first month postoperative period.

Gonnermann *et al.*^[6] and Martinez *et al.*^[14] described ovalization of the pupil as their most common complication; however, we considered it as a common routine outcome following RPICL implantation, related to excessive peripheral enclavation of the haptics. They also reported the occurrence of cystoid macular edema (CME) as a significant complication in their study. We had 8.9% and 8.6% cases of CME in groups A and B, respectively, which is in accordance with other studies.^[6,14,15]

Two of the cases in group A and three in group B had RPICL displacements, where there was spontaneous disenclavation of one of the haptics postoperatively and required reoperation to re-enclave the same. Similar complications have been described by other researchers.^[16-18] IOL exchange has been proposed as the best way to manage instead of trying to re-enclave the same RPICL, with the haptics likely to be permanently damaged.^[7] However, no such complications have been described with the use of Excelens by Jare *et al.*^[10]

Few cases with a postoperative spike in intraocular pressure, vitreous hemorrhage, and uveitis were also seen as described in other similar studies and were effectively managed.^[6,8,19]

Creating a peripheral iridectomy in patients with RPICL implantation is still controversial. Güell *et al.*^[19] reported the occurrence of pupillary block in 1.56% with Artisan iris-claw lens. The design of the Artisan iris-claw IOL is supposed to give a protective effect against the risk of pupillary block.^[8] However, Jare *et al.*^[10] have performed surgical iridectomy during the RPICL implantation (Excelens), as a safer technique to prevent postoperative pupillary block. We also performed the peripheral iridectomy in all our cases.

The postoperative visual outcomes (at the end of 1 month) and the complication rates in both the groups in our study were almost similar. This may suggest that the learning curve with RPICL implantation is short.

To the best of our knowledge, this is the first ever study done on evaluating the learning curve, safety, and efficacy involved in primary RPICL implantation. To summarize, the visual outcome, complication rates at the end of 1 month, and reoperation rates were similar in both the groups, which suggests a short learning curve with RPICL implantation.

Limitations of the study include its retrospective nature, the short duration of follow-up, and unequal distribution of cases between the two groups. No quantitative assessment of astigmatism, corneal endothelial cell count, or macular thickness in cases with CME was done.

CONCLUSION

Primary RPICL implantation is an effective modality of visual rehabilitation in complicated cataract surgery with deficient capsular support and is a boon for young budding cataract surgeons with an apparently short learning curve.

What was known:

Implantation of the iris-claw IOL is a safe alternative method in eyes without capsule support.

What this paper adds:

Primary RPICL implantation is safe with an apparently short learning curve, giving early visual rehabilitation in complicated cataract surgeries.

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Conflicts of interest

There are no conflicts of interest.

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