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Title: A clinical study of post-operative visual outcome and complications of iris claw intraocular lens implantation in aphakia

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I. INTRODUCTION

Aphakia management as a consequence of complicated cataract surgery is difficult for the cataract surgeon, mainly for the residents. Insufficient posterior capsular support makes it unfeasible to implant a conventional posterior chamber intraocular lens (PCIOL). The various IOLs available are 1) anterior chamber IOL (ACIOL), 2) scleral fixated IOL and 3) iris fixated IOL, both anterior and posterior.[1]

Prof. Jan Worst developed the iris claw IOL (IC-IOL) attached to the anterior iris in 1972[2]and modified by Brasse and Neuhann[3] by clipping the lens to the posterior iris which is the preferred procedure in cases where iris support is feasible.[4]

II. MATERIALS AND METHODS

This study was conducted at a tertiary hospital with a follow-up period of 6 weeks. It is a prospective interventional case series with 30 eyes of 30 aphakic patients of the age group 40-68 years.

Inclusion criteria were patients with aphakia following PC rent during cataract surgery where PCIOL could not be implanted and patients with compromised posterior capsule secondary to trauma were included in this study.Exclusion criteria wereinadequate iris tissue, aniridia,cornealedema, raised intraocular pressure (IOP), iritisand macular pathology such as cystoid macular edema (CME), etc., which would preclude a good visual outcome.

Pre – operative assessment included best-corrected visual acuity (BCVA) for distance using Snellen's chart, detailed slit-lamp examination, manual keratometryandA-scan biometry, IOL power calculation using SRK/T formula, fundus examination with +90 D lens and indirect ophthalmoscopy,intra-ocular pressure measurement using Goldmannapplanation tonometry and B-scan ultrasonography.

All the patients underwent retropupillary iris-claw IOL (Figure 1, 2) fixation by a single experienced surgeon using thestandard technique. Peribulbar anesthesia was given. Acorneoscleral tunnel of 5.5 mm length at 12 o'clock was made. It was followed by two paracenteses, at 3 and 9 o'clock to introduce the Sinskey hook. Intracameralpilocarpine was injected to constrict the pupil to a diameter of at least 5 mm or less, followed by a small amount of viscoelastic (2% HPMC) on the peripheral iris. A good anterior vitrectomy was done followed by implantation of Iris-claw IOL, a biconvex polymethylmethacrylate IOL with 9 mm length and 5.5 mm optical zone was consistently used for all the patients.Iris-claw lens was inserted into the anterior chamber using lens holding forceps, rotated such that the haptics were oriented toward 3 and 9 o'clock. The optic of the IOL was held and gently tilted and pushed behind the iris and enclaved to the peripheral iris at 3 and 9 o'clock with the help of Sinskey hook introduced simultaneously through the paracentesis. Peripheral iridotomyat 11 o' clock position was done during the surgery. Viscoelastic was subsequently removed, and sutures were placed with 10-0 Prolene in five patients based on the surgeon's discretion. Subconjunctival injection (0.5 ml) of gentamicin 20 mg and dexamethasone 2 mg was given immediately after surgery.

The postoperative regimen consisted of topical moxifloxacin hydrochloride 0.5% and prednisolone acetate 1% tapered over 1 month. Postoperative uncorrected visual acuity and slit lamp examination was performed on the day following surgery (Figure 3). BCVA, IOP, slit lamp examination and posterior segment evaluation was done at the end of 1 week, 4weeks, and 6

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weeks after the surgery to look for variouscomplications.

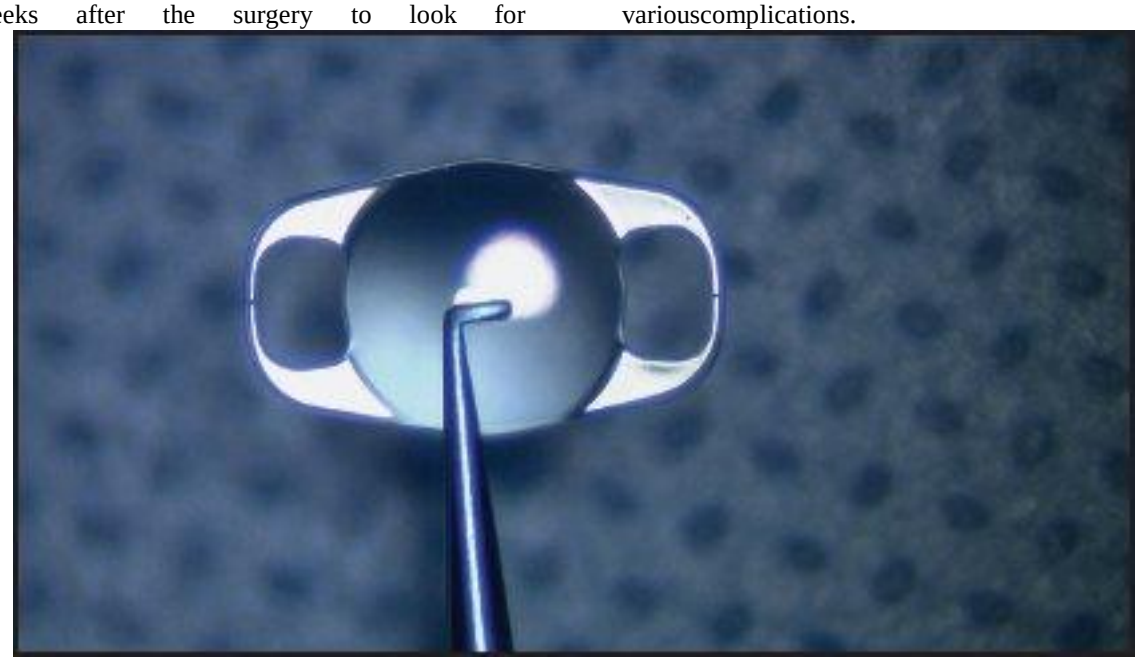

Figure 1: Iris claw IOL

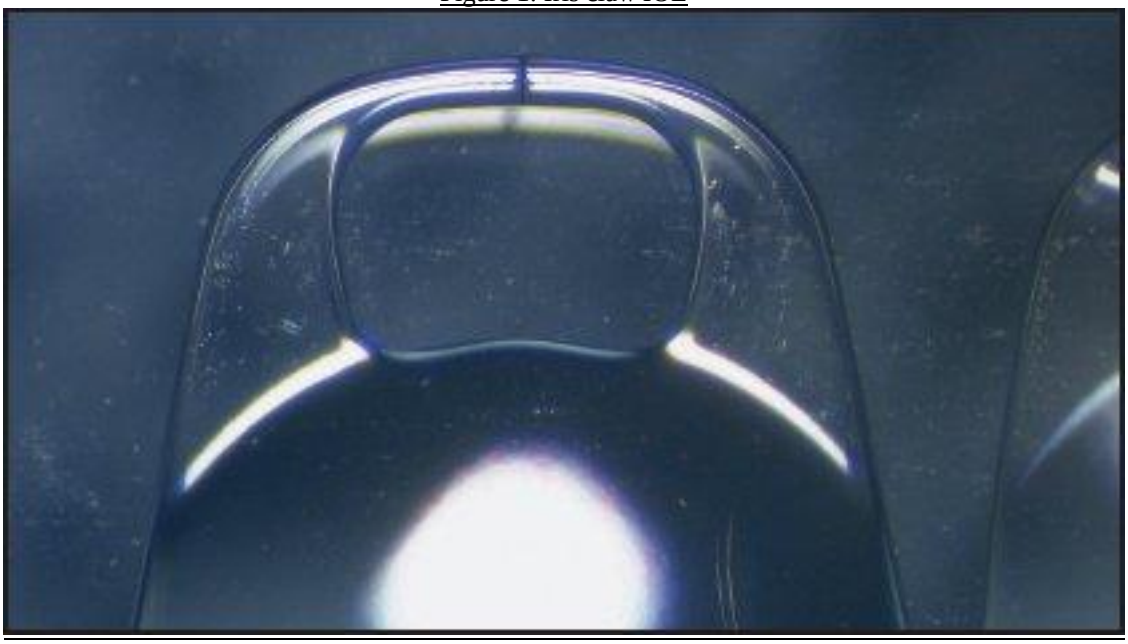

Figure 2: Magnified view of claw mechanism

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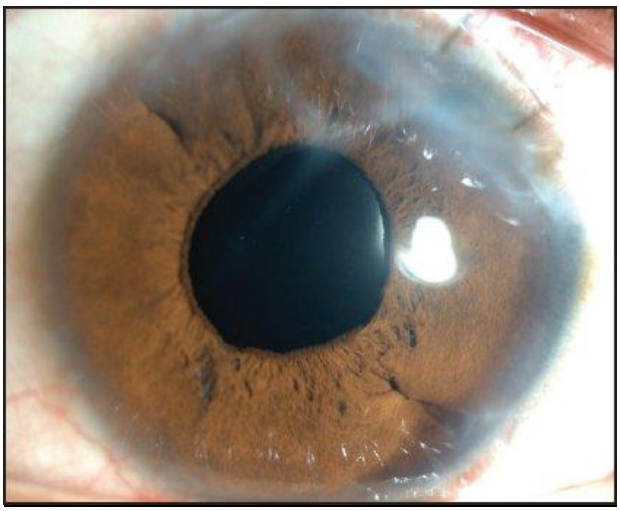

Figure 3: Retro-pupillary fixated iris claw IOL

III. RESULTS

Thirty eyes of thirty patients were analyzed in our study. The age group of the patients ranged between 40 years and 68 years with a mean of 56.46 years. Males comprised 18 and females 12. There were 11 (36.6%) right eyes and 19 (63.3%) left eyes.

Of the total 30 eyes studied, 8 patients had traumatic cataract with posterior capsular tear and 22 patients had intraoperative posterior capsular rent. Table 1 shows the indications of iris-claw IOL implantation in this study.

Table 1: Indications for primary iris-claw intraocular lens

Cause of primary implantation	Percentage (n=30)
Traumatic cataract with posterior capsular tear	26.66% (8)
Intraoperative posterior capsular rent	73.33% (22)

The preoperative BCVA ranged from hand movements + to 6/36. BCVA levels measured preoperatively and postoperatively during 1 and 6 weeks of follow-up are elucidated in Table 2. All the data were analyzed using Statistical Package for Social Sciences (SPSS) version 17.0 to compare the preoperative and postoperative BCVA, with statistical significance considered as $P < 0.05$. When BCVA was compared pre- and post-operatively at 6 weeks, P value was < 0.001. A significant increase in BCVA was noted in 27 patients between pre- and post-operative values while 3 patients had the same BCVA as preoperative data.

Table 2: Best-corrected visual acuity (BCVA) before and after the surgery

Number of patients	<6/60	≧6/60	≧6/36	≧6/24	≧6/12	≧6/9	6/6
Preoperative BCVA	13	8	9	0	0	0	0
BCVA at 1 week	5	0	0	0	8	10	7
BCVA at 6 weeks	2	1	0	2	5	9	11

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Preoperative IOP ranged between 9 and 24 mmHg with a mean of 15.4 mmHg. The mean postoperative IOP at 1 week was 14.6 mmHg and ranged between 10 and 34 mmHg. The mean postoperative IOP at 6 weeks was 13.9 mmHg with a range of 10–20 mmHg.

The intraoperative complications faced were iris tear in 1 eye (3.33%) and IOL drop in 1 eye (3.33%). Post-operative complications included decentration of IOL and secondary glaucoma in 2 eyes (6.66%) and 1 eye (3.33%) respectively as depicted in Table 3. No other complications such as cystoid macular edema, bullous keratopathy, pigment dispersion or retinal detachment were encountered in our study during the 6 weeks follow-up.

Table 3: Postoperative complications

Complications	Percentage of cases (n=30)
Iris tear	3.33% (1)
IOL drop	3.33% (1)
Decentration of IOL	6.66% (2)
Secondary glaucoma	3.33% (1)

IV. DISCUSSION

Surgical correction of aphakia is associated with better visual quality than aphakic spectacle correction or contact lens use.[5] Various options of IOLs available for aphakia are ACIOL, SFIOL, and iris-supported IOLs. ACIOLs have a higher risk of corneal decompensation, uveitis, and raised IOP. Implantation of SFIOL is technically more difficult to perform even though the results are good.[6]

According to Hazar et al. study,retropupillary iris-claw IOL was used to lower the risk of` corneal decompensation.[7] Patients were followed-up for 6 weeks. The two main parameters measured were BCVA and the rate of complications.P value was <0.001 when BCVA was compared pre- and post-operatively at 6 weeks. A significant increase in BCVA was noted in 90% of the patients between pre- and post-operative values.

Iris tear and decentration of IOL was noted in 1 eye and 2 eyes respectively, which occurs due to asymmetrical fixation of haptic, tight fixation of haptic, or a difference of iris tissue volume that was clamped with both haptics.[8]Iris-claw IOL should be fixed in the peripheral part of the iris and both the claws should clamp symmetrically on the iris with equal volume of iris tissue to prevent such complication.[9,10,11]

There was no significant difference in the mean preoperative IOP and the mean postoperative IOP at 6 weeks. A peripheral iridotomy was made at 11 o' clock position for all the patients to prevent rise in IOP. Secondary glaucoma was noted in 1 patient for which peripheral iridotomy was made using Nd: YAG laser at a tertiary center. IOL drop was noted in 1 patient for whom a good anterior vitrectomy was done, appropriate treatment was given in a tertiary center followed by secondary IOL implantation.

Limitations to our study were that the endothelial cell density was not looked for pre- and postoperatively and endothelial decompensation could not be evaluated, and there is short duration of follow-up of 6 weeks after the surgery.

The retropupillary iris claw lens has the advantages of a true posterior chamber IOL with low intra- and postoperative complications when a good anterior vitrectomy and a patent peripheral iridotomy is made in cases of posterior capsular rent for surgeons in the early learning curve.

V. CONCLUSION

Iris claw intraocular lens implantation for aphakia gives a good visual outcome and is a safe and viable surgical procedure with very minimal vision-threatening complications.

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CONFLICTS OF INTEREST: There are no conflicts of interest.

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