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Iris Claw Lens – Our Experience in Regional Eye Hospital, Kurnool Medical College, Kurnool, Andhra Pradesh

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ABSTRACT

Background

An iris-claw intraocular lens (IOL) has been widely used as a secondary implant in aphakic patients and insufficient capsular or zonular support. They have gained popularity due to their simple fast technique, favourable functional outcomes, and safety

Methods

A non-comparative prospective interventional case series study about IOL implantation was conducted for a period of 1 year, by convenience sampling method. In our centre 3000 IOL implantations were done in 2022-2023 (1 year). Out of them 70 were Retro pupillary Iris Claw IOL implantations done at Dr. P.S.R Regional eye hospital, Kurnool medical college, Kurnool

Results

Out of 70 patients 8 have some complications after iris claw implantation. 11.2% have complications and 88.8% have good outcome with iris claw implantation. The observed complications are as follows abnormal pupil, decreased in visual acuity, raised intra ocular pressure, significant Anterior chamber reaction, iris abnormalities, post operative glaucoma, cystoid macular edema, endothelial decompensation.

Conclusion

Both primary and secondary retropupillary iris claw implantation is a viable option for the eyes without capsular support with less complications post operatively; it is safest and easiest method. we can overcome the problems of surgical aphakia and also aphakia due to trauma.

Keywords: Iris claw lens, posterior capsule rupture, anterior vitrectomy, aphakia, complications

Original Research Article**INTRODUCTION**

Cataract blindness in India is 66.2% of total avoidable BLINDNESS [1], Aphakia – 1.7%. As now we are in a new generation with intra ocular lenses modifying every day visual needs, necessity of curbing the incidence and prevalence of aphakia secondary to per operative complications during cataract surgery is the need of the hour. The solution is ARTISAN Retro Iris claw IOL implantation [2,3] / Anterior chamber IOL implantation/ Scleral fixating IOL implantation in patients with poor posterior capsular support.

The Artisan IOLs are associated with fewer complications [4]. They are easy to place and are associated with a good visual outcome and a low incidence of intraoperative and postoperative complications. Complications associated with the size of the IOL, like damage to the iris root and angle, are prevented, as it is fixed to the mid-periphery of the iris. The distinctive enclavation technique allows IOL centration on the pupillary axis, which is vital in eyes [5]

AIMS AND OBJECTIVES

1. To assess the incidence of poor posterior capsular support due to PCR / zonular weakness during cataract surgery and need for RETROPUPILLARY IRIS CLAW lens implantation as a primary/ secondary procedure.
2. To assess the complications and visual outcomes with Retro pupillary Iris claw IOLs.
3. To assess the technical feasibility of implanting Retro pupillary iris claw IOLs as a primary / secondary modality of managing aphakia surgically

MATERIALS & METHODS

A non-comparative prospective interventional case series study on Retro pupillary Iris Claw IOL implantation was conducted for a period of 1 year, by convenience sampling method. In our centre 3000 IOL implantations were done in 2022-2023 (1 year). Out of them 70 were Retro pupillary Iris Claw IOL implantations were done at Dr. P.S.R Regional eye hospital, Kurnool Medical College, Kurnool, Andhra Pradesh.

Ours being teaching institute, we have residents, trainees doing surgeries with increasing chances of per operative complications like PCRs/ zonular dialysis with vitreous disturbance leading to poor support for PCIOL implantation. In such cases with posterior capsular rent per operatively Retro fixated Iris claw IOL implantation can be done in the same sitting as a primary procedure after thorough anterior vitrectomy, which reduces the risk of postoperative aphakia and its complications

Inclusion criteria

- Patients with no capsular support or extensive posterior capsular rents
- Patients with zonular weakness/ dehiscence
- Aphakic patients referred from other centres
- Patients with PCR secondary to external ocular trauma

Exclusion criteria

- Patients with Insufficient iris tissue
- Patients with Neovascularisation of iris
- Decompensated corneas
- Patients with posterior segment pathologies

Original Research Article**Preoperative examination**

BCVA, slit lamp examination, Keratometry, A scan srk/T formula, IOL POWER = aphakic refraction x2.01(in aphakics) and can compared with opposite eye power, Retinal evaluation, IOP evaluation.

Intraoperative Approach

Peribulbar, subtenon, or retrobulbar anaesthesia is preferred while implanting ICIOL, as the surgical manoeuvres, including iris-touch and enclavation, may induce pain. The pupil should neither be dilated nor constricted. Mohr et al suggested a pupil size of 4–5 mm, optimal for secondary IOL implantation. However, in cases of primary implantation of IOL or exchange of IOL, which require dilated pupil, a constrictive agent like carbachol or pilocarpine must be injected intracamerally before enclavating the haptics of IOL. The size of the pupil should be assessed before injecting the constricting drug, and one should proceed cautiously to avoid sphincter trauma while enclavating the haptics.[6]

PCR can be recognised by

Pupillary snap sign, Sudden deepening of anterior chamber, Loss of follow ability of lens in case of phacoemulsification, Side way tilt of lens, Difficulty in rotating the nucleus or prolapse into AC, wrinkling of capsule, Torn capsule and vitreous is clearly visible Vitreous loss and prolapse into the wound.

Things we should do following PCR per operatively

Reduce bottle height, vacuum, power, flow, when nucleus drop is beyond vitrectomy the wound should be sutured and it should not be meddled much. case should be referred to VR surgeon as they can manage dropped nucleus efficiently

If it is a phaco emulsification the incision must be converted to SICS incision, if it is SICS no need of conversion. The size of the IOL demands a 5.4 mm incision, Hence, making a sclero-corneal tunnel is preferable as it reduces the surgically induced astigmatism (SIA) and chances of wound leakage and endophthalmitis. In glaucoma patients, the superior site should be better reserved for trabeculectomy and other filtering surgeries that may become obligatory in the future. Fashioning a scleral tunnel requires surgical skills and experience, though it is easier in the hands of those who practice manual small incision cataract surgery (SICS). The tunnel should be one-third to half of the width of the thickness of the sclera extending 1.5 mm into the cornea. A thin flap tends to tear or gives way to a button-hole formation. If the button-hole is on one side, the other end is dissected further to continue with the same incision. If the button-hole is in the centre, the original site is abandoned, and another site is chosen, or dissection is carried out at a deeper plane in the same location. A thick deep flap may lead to premature entry, resulting in prolapse of the uveal tissue and increased bleeding into the anterior chamber. A different site should be chosen for scleral incision then, and proper closure of the premature tunnel using multiple 10-0 nylon sutures should be done. On the other hand, a corneal incision can be preferred in cases of thin, brittle conjunctiva or marked conjunctiva-episcleral adherence. After the delivery of nucleus, thorough anterior vitrectomy has to be done with vitrectomy probe or with vannus scissor. Anterior or posterior vitrectomy must be done whenever required. Remnants of the capsule must be removed before implanting ICIOL as postoperative capsular fibrosis may cause IOL instability. Miotics like carbochol or pilocarpine can be given intracamerally to constrict the pupil. Form the AC with viscoelastic substance. 2 side ports are made at 9 and 3 o' clock position. Iris claw lens is introduced into AC such that haptics was in line with side ports. Hold the optic of lens with artisan designed iris claw lens forceps. Simultaneously an

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enclaving rod is passed through the same side port. Take the haptic below the iris and enslave with a gentle push with enclaving rod. While enclaving we can see a dimple in iris. The same manoeuvre must be done on opposite side by exchanging instruments in hands. Visco elastic substance was aspirated and through bimanual irrigation and aspiration Peripheral Iridectomy must be done at 12 o' clock position to prevent pupillary block glaucoma and should be avoided in place of enclavation. one should proceed cautiously to avoid sphincter trauma while enclavating the haptics. Moreover, the excessive iris tissue enclavation may lead to ovalization of the pupil. Finally, the two dimples in the iris due to haptic enclavation should be identified to ensure the appropriate fixation of the ICIOL. Thorough Irrigation and aspiration have to be done to remove visco elastic substance. Formation of AC with balanced salt solution, section was sutured with one interrupted 10-0 nylon and reposition the conjunctiva. Postoperatively, topical steroid antibiotics in a tapering schedule over 6 weeks were given. Topical non-steroidal anti-inflammatory drugs (NSAIDs) can be used postoperatively to reduce the risk of CME.

Lens design

A vaulted design of the ARTISAN Aphakic Lens was introduced. The lens configuration was made vaulted to create distance to iris. Enclavation is easier by using a lens with a larger and oval aperture between optic and haptic. The haptics that are enclaved and attached to the virtually immobile midperipheral iris stroma, thus allowing the unrestricted ability of pupil to dilate and constrict



Statistical Analysis:

Data was collected and entered in MS excel 2023, statistical analysis was done using SPSS version 2023. Descriptive statistical analysis was expressed in frequency and percentage.

RESULTS

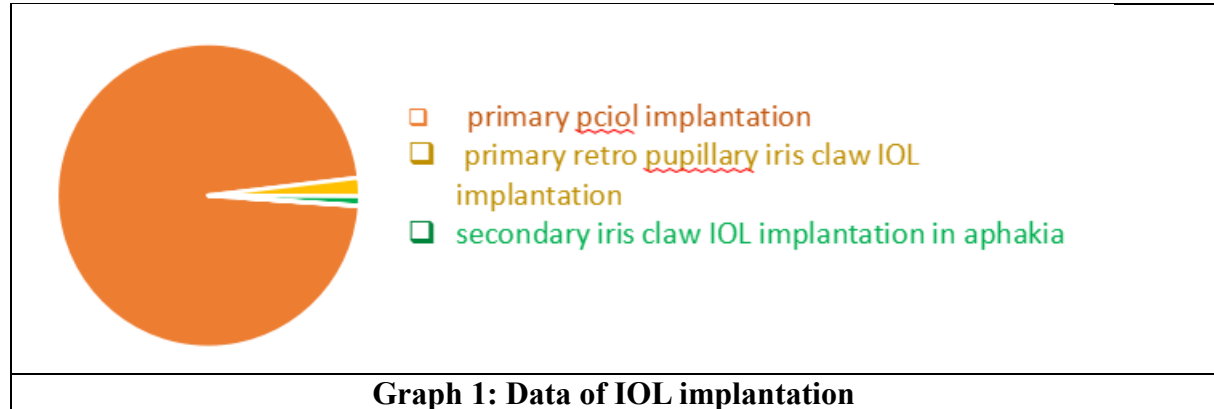
In our centre 3000 IOL implantations were done in 2022-2023 (1 year). Out of them 70(2.3%, n=3000) were Retro pupillary Iris Claw IOL implantations. Out of 70 patients, 59 (84%) patients had Posterior Capsular Rupture with vitreous disturbance per operatively and were managed with primary Retro pupillary Iris Claw IOL implantation after thorough anterior vitrectomy. 11 (15.7%) patients were aphakias operated earlier underwent secondary IOL implantation with Retro pupillary Iris Claw IOL implantation. (GRAPH 1)

Majority of people were in age group 50-80 years.

During follow up period we observed, Visual acuity between 6/9 to 6/18 in 65 patients, normal intra ocular pressure in 67 patients and some complications like raised IOP

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among 3 patients, decreased visual acuity in 3 members, endothelial decompensation in 1, irregular pupil in 7 patients, iritis observed in 3 patients, cystoid macular edema in 2 members, iris holes at enclavation site and iris atrophy in 3 members. Though there are some complications most of the patients were well tolerated and have good outcome (table 1)



Follow up period: 3 months. Number of eyes: 70

Table 1: post operative findings of iris claw lens implantation		
Intra ocular pressure	14 +/- 2 mmhg in 67 patients	25 mmhg in 1 patient 32 mmhg in 1 patient 28 mmhg in 1 patient
Visual outcome	6/18- 6/9 in 65 patients	6/36 in 2 patients 6/60 in 1 patient Cf 5 metres in 1 patient Cf 1 metres in 1 patient
Abnormal pupil (gross ovalisation and irregular pupil)	In 7 patients	
Significant AC reaction	In 3 patients	
Endothelial decompensation	In 1 patient	
Cystoid macular edema	In 2 patients	
Iris abnormalities (holes in enclavation site with exposed haptics and iris atrophy)	In 3 patients	

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Figure 1: shows instruments like iris claw lens holding forceps and enclaving rod which has flat end



Figure 2 shows the placing of iris claw lens via sclero corneal tunnel

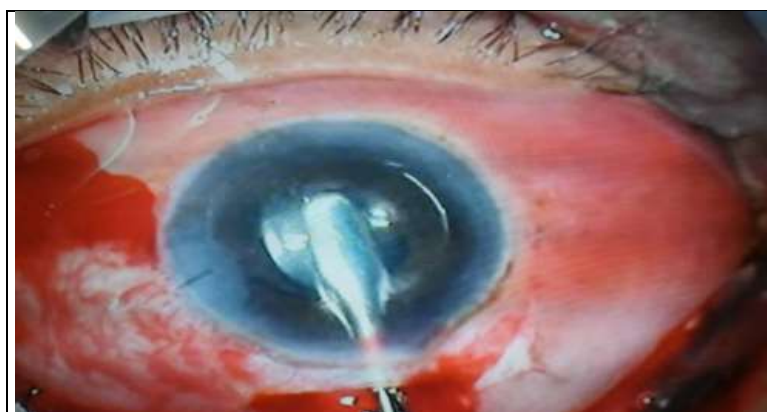


Figure 3 shows the holding of iris claw lens with iris claw lens holding lens forceps

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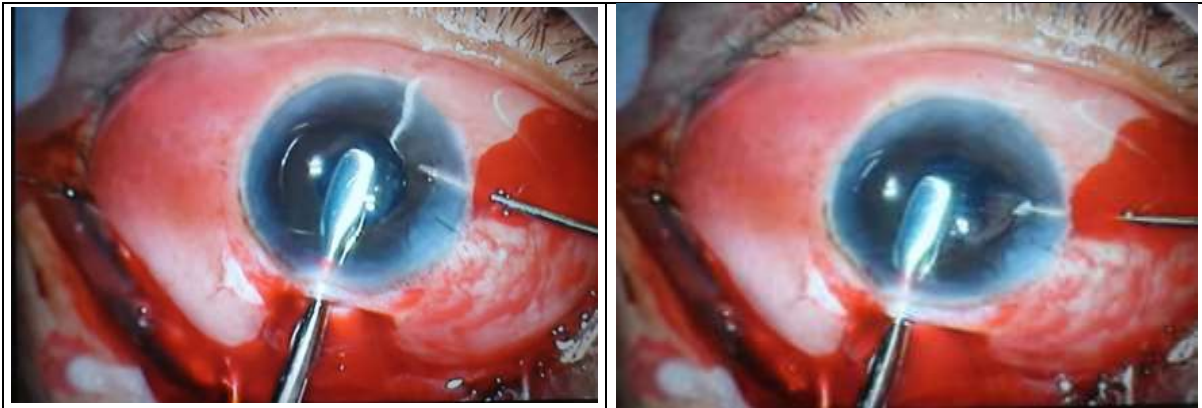


Figure 4 and 5 shows enclaving the haptic of IOL via side port entry with enclaving rod at iris mid stroma

DISCUSSION

In aphakic patients, spectacle correction is associated with reduced peripheral vision, according to Gicquel JJ et.al., 2009, image magnification of 20–35%, etc. Surgical correction with IOL implantation can overcome these problems. Over the years, surgical aphakia has become less common. However, aphakia can still be encountered as a complication of cataract surgery where there is insufficient capsular support to place posterior chamber IOL. Among the IOLs in cases of no capsular support, ACIOLs have high risk of corneal decompensation, and with scleral fixated lenses, surgery is technically more difficult even though they show good results according to De Silva SR et.al., 2011. we used the posterior chamber iris fixated IOL because of retro pupillary position and lower risk of endothelial decompensation.

Patients were followed up for 3 months; Postoperatively, at the end of 3 months, majority of our patients, i.e. 92%, had BCVA vision of 6/9 to 6/18, Güell *et al*[7] reported satisfactory results of Artisan IOL implantations in 16 aphakic patients. After 36mo follow-up, CDVA was 20/40 or better in 31.25% and mean SE was 0.46D. Lorencová *et al*[8] performed Artisan IOL implantation in 51 aphakic eyes, also showed good visual outcome after 13mo period of follow up. In our study also majority showed good visual outcome

Significant surgical complications like Decreased visual outcome in 8%, abnormal pupil in 10%, raised intraocular pressure 4 %, significant AC reaction in 4%, iris abnormalities like holes in enclavation site and iris atrophy in 4%, post operative glaucoma in 4% cystoid macular edema in 2.8%, endothelial decompensation in 1.4% were seen in our series [table 1]. Vote *et al*[9] and Bading *et al*[10] found a rate of 6.3%-8.2% for RD and 3.2% for choroidal haemorrhage in their cases after the implantation of a trans-sclerally sutured PCIOL, 1 case (7.69%) of RD was found 3 months postoperatively, Transient hyphema and vitreous haemorrhage was observed in 2 cases (15.38%). No choroidal haemorrhage was found in our study, the reasons might be the combination of pars plana vitrectomy perfusion which effectively maintains the dynamic balance of intraocular pressure. In all our cases, IOL remained well centered until the end of the follow-up period. Some limitations of our study were short follow-up. The retro pupillary iris claw lens has the advantages of a true posterior chamber IOL with low intra- and postoperative complications. The implantation process with this technique is simple. We believe it is a better option than a scleral-fixated or an angle-fixated IOL according to Rao Ret.al., 2013. Anterior chamber and posterior chamber iris-claw IOL fixations proved equally effective and safe for aphakic correction in eyes with inadequate capsular support.[1] Indications are Extensive Zonular

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dialysis, Posterior capsular rent with vitreous disturbance and poor capsular support for PCIOL[11,6], Subluxation of lens ,Traumatic cataract with extensive loss of zonular support, Secondary implantation in aphakia (with no capsular support). Contraindications are Chronic iritis, Corneal dystrophy, Acute inflammation, Severe iris atrophy, Neovascular glaucoma, Uncontrolled chronic glaucoma. [6]

CONCLUSION

Retro pupillary iris claw IOL implantation is a suitable primary procedure in eyes with insufficient capsular or zonular support during cataract surgery and as a secondary IOL implantation procedure in Aphakia with poor capsular support. This technique is simple, safe and less time consuming. Less learning curves. Decreases the need for cumbersome SFIOL (Sutured/Glued) and ACIOL complications. Decreases the complications of aphakia and anisometropia post operatively. Decreases the endothelial decompensation.

The disenclavation of ICIOL happens mainly due to incorrect primary haptic enclavation or atrophic iris at the site of enclavation, which can be easily re-enclavated with proper techniques. The chance of redislocation tends to be more among the paediatric age group and those with a trauma history.

DISCLOSURE

No financial disclosure or no conflicts of interest with the presenting material in this presentation.

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