



Original Research Article

Retropupillary fixated iris-claw lens – An alternative in aphakia management

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ABSTRACT

Introduction: To evaluate the safety, effectiveness and complications of retropupillary fixated iris-claw lens in aphakia management.**Results:** The mean age of the patient was 62.2 years. 21 patients underwent primary iris claw lens implantation. Out of them nine had hard cataract, four patients had subluxation >180 degree, four had non dilating pupil with pseudoexfoliation and one had traumatic cataract as preoperative risk factor. All patients had PCR or bag dialysis during surgery. Three patients underwent secondary IOL implantation. In the immediate postoperative period all patients had stable IOL with 71% patients showing improvement in visual acuity. Most common complication noted was pupillary distortion (seven). Others were corneal edema (six), raised IOP (three) and hypotony (two). All of them resolved following topical medications. At six weeks follow up 87.5% patients had BCVA ranged between 6/12-6/6. Two patients had macular edema.**Materials and Methods:** This is a prospective, interventional study conducted between February-2017 to May-2019. Total of 24 eyes of 24 patients were included and routine preoperative evaluation was done and risk factors evaluated. Posterior capsular rent was efficiently managed by anterior vitrectomy and placing retropupillary iris fixated lens. Postoperative visual acuity, intraocular pressure was recorded and assessed for complications.**Conclusion:** Our study shows retropupillary iris fixated lens is a simple procedure with less time consuming and lower incidence of visual threatening complications. Therefore it is a safe, effective option for management of aphakia in patients with inadequate capsular support.© 2019 Published by Innovative Publication. This is an open access article under the CC BY-NC-ND license (<https://creativecommons.org/licenses/by/4.0/>)

1. Introduction

Aphakia is defined by the absence of the natural crystalline lens in the eye. Many reasons can lead to aphakia without sufficient capsular support for a posterior chamber intraocular lens, most common being complicated cataract surgery. The management of aphakia without capsular support is a subject of frequent debate. Aphakia can be managed by optical and surgical methods. Aphakic spectacles are heavy and cause increased retinal image size, decreased field of view, image distortion. The aberrations,

prismatic effect and its consequences can be eliminated by using contact lenses and intra ocular implants. Successful contact lens correction includes fitting, wearing and regular follow up as well as educational level of the patient. In the bag implantation of intraocular lens is the basic standard of care in cataract surgery. However, in the absence of sufficient posterior capsular support, anterior chamber IOL, iris claw anterior and posterior IOL, scleral fixated IOL, glued IOL are the various surgical options available to correct aphakia.

Anterior chamber IOL have been used for decades with many modifications in design. However they cause

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iris chaffing, endothelial cell loss, bullous keratopathy, secondary glaucoma, uveitis, macular edema. IOL placed in sulcus can cause decentration, pupillary capture, posterior synechiae, erosion of ciliary body. Scleral fixated IOL closely resemble the anatomical position of the lens. But it has a steep learning curve and higher rates of IOL dislocation or tilt, suture erosion.

Iris fixated lens can be either anterior or posterior. Cornelius Binkhorst was an early advocate of iris supported lens. He introduced the first four loop iris clip lens in 1957. Jan worst introduced iris claw lens in 1970s. He implanted the lens into the anterior chamber clipping it to the anterior surface of iris.¹ Retro pupillary iris fixated IOL has the advantage of fixation of IOL in the posterior chamber with preservation of anterior segment anatomy. It is preferred in patients with healthy iris tissue.

2. Materials and Methods

A prospective interventional study conducted on 24 eyes of 24 patients in a tertiary care centre –Bowring and Lady Curzon hospital from February-2017 to May-2019.

Patients with subluxated lens, zonular dialysis >180deg, intraoperative complications precluding adequate capsular support, healthy iris tissue were included in the study. Those with glaucoma, intraocular inflammation, posterior segment pathology, iris sphincter tears, iridodialysis with inadequate support for iris claw lens were excluded from the study.

Baseline demographic data like name, age, gender, occupation, address and history of any previous surgery were noted. Preoperative assessment included distance vision recording, slit lamp examination, intraocular pressure recording using Perkin's applanation tonometry, dilated fundus examination using 20D. Pre-existing pathologies like subluxation, zonular dialysis, pseudo exfoliation was recorded. Ultrasound biometry in aphakic mode with IOL power calculation using SRK-II formula was used for cases with secondary IOL implantation. Primary implantation of iris fixated lens was under corrected by +0.5D in surgeries with intraoperative complications based on surgeons discretion.

All the patients underwent retropupillary iris claw IOL fixation by a single experienced surgeon using the same standard technique – small incision cataract surgery. Peribulbar anaesthesia was given and sclera corneal tunnel of 5.5 -6mm was made with two side ports at 3 and 9 ' o clock position. Thorough anterior vitrectomy was done manually. Pilocarpine was injected intracamerally for a good pupillary constriction. Iris claw model with biconvex polymethylmethacrylate IOL with 8.50mm overall length and 5.00mm optical zone with A constant 117.4 was used for all patients. It was introduced into the anterior chamber using iris-claw holding forceps and one of the haptics was brought behind the iris and enclaved using a blunt tipped instrument taking care avoiding too much pressure.

Similarly the second haptic was brought under iris and enclaved. The IOL was gently tapped at centre to ensure its clipping. Surgical PI was done. Wound closed with 10-0 ethilon suture. Postoperative regimen consisted of topical moxifloxacin and dexamethasone eye drops tapered over a month. Postoperative follow up was done on day one, week one and week six and results tabulated.

3. Results

Twenty four eyes of twenty four patients were included in the study. Out of them sixteen were male and eight were female (Figure 1).

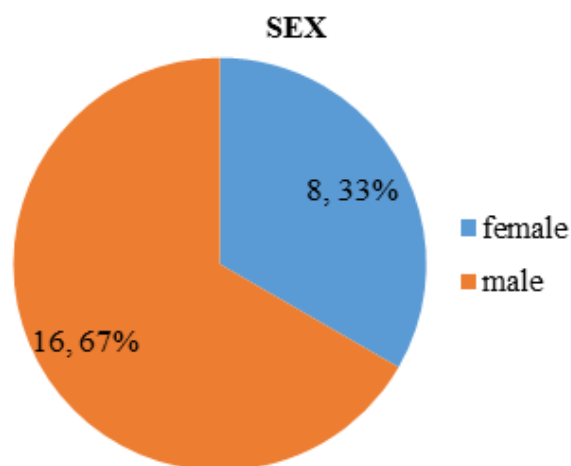


Fig. 1: Pie chart showing sex distribution of patients

The mean age of the patient was 62.2 years. Majority were aged between 50-55 years (Figure 2).

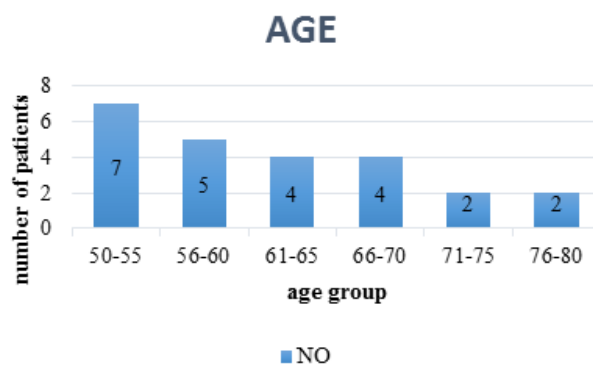


Fig. 2: Bar diagram showing age-wise distribution

Twenty-one patients underwent primary iris claw lens implantation and three patients had secondary IOL implantation. Out of twenty four patients, nine had hard cataract, four patients had subluxation >180 degree, four had non dilating pupil with pseudoexfoliation and one had

traumatic cataract as preoperative risk factor for inadequate capsular support (Figure 3)

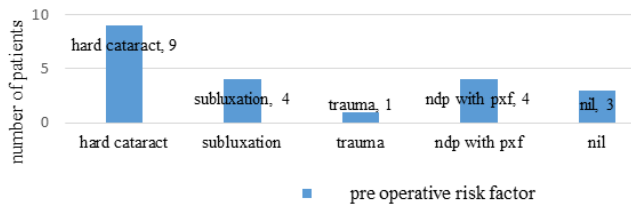


Fig. 3: Bar diagram showing pre-operative risk factor

Among twenty one patients who underwent primary implantation of iris claw lens, seventeen patients had posterior capsular tear and four patients had zonular dialysis leading to inadequate posterior capsular support for the implantation of PCIOL (Table 1).

Table 1: Showing intraoperative complications leading to aphakia

Intraoperative complications leading to aphakia	Number of cases
Posterior capsular rupture	17
Zonular dialysis	4

Postoperatively, IOL was well centered in all patients. Seventeen patients had improvement in visual acuity with three patients showing deterioration in visual acuity in the immediate postoperative period (Figure 4).

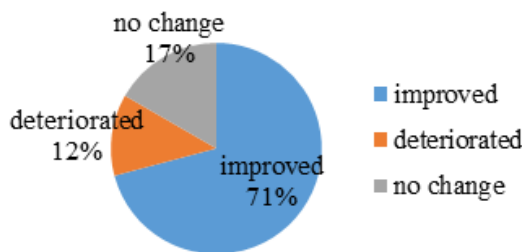


Fig. 4: Pie chart showing visual acuity in the immediate post-operative period

Most common early complication noted was pupillary distortion (seven). Others were corneal edema (six) and raised IOP (three), hypotony (two). (Figure 5)

At 6 weeks follow up 87.5% of patients had BCVA ranged between 6\12-6\6. Only one patient had 6\60 BCVA and two patients had vision in the range of 6\24-6\18. (Figure 6) All three patients who had low vision had cystoid macular edema.

There was persistence of pupillary distortion (horizontal oval pupil) at six weeks which did not hamper vision. All

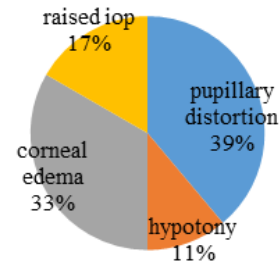


Fig. 5: Pie chart showing early post-operative complication.

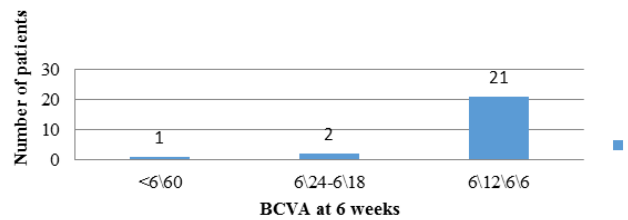


Fig. 6: Bar graph showing BCVA at 6 weeks.

patients had stable IOL position. No patients had retinal detachment, subluxation or dislocation of IOL.

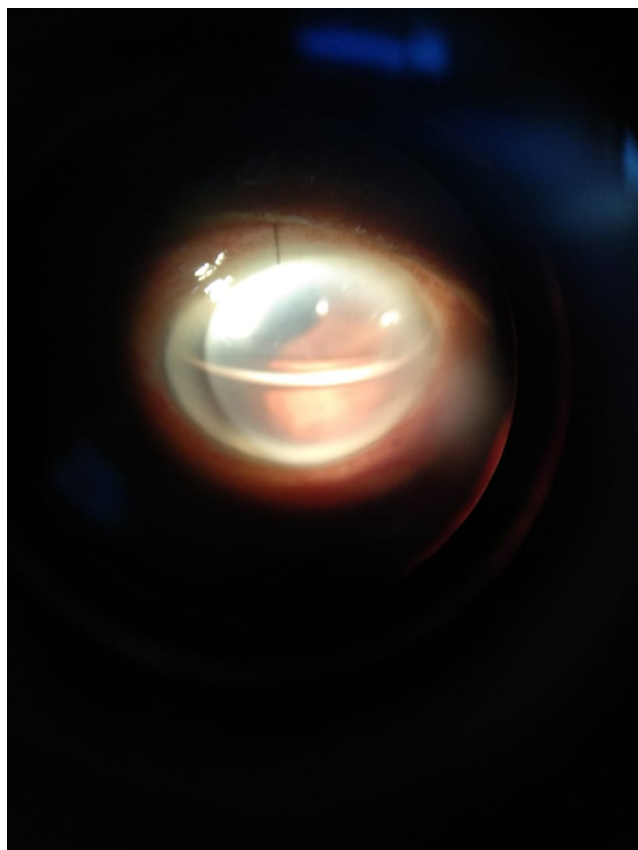


Fig. 7: Slit lamp picture of POD1

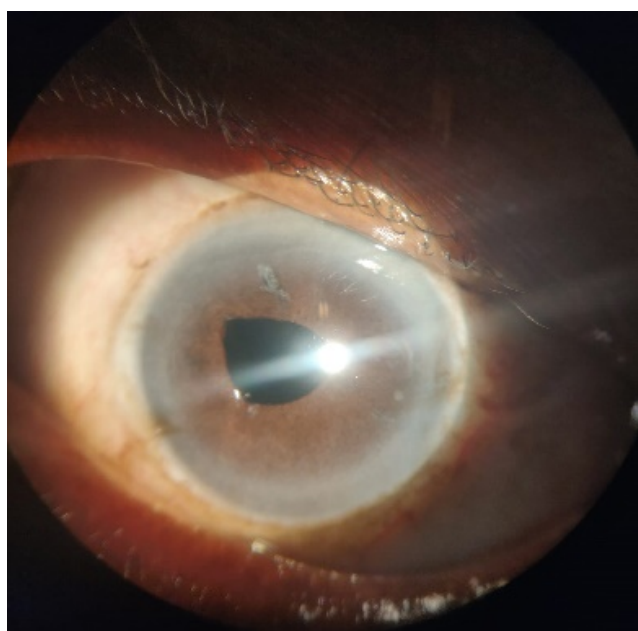


Fig. 8: Slit lamp picture at 6 weeks

4. Discussion

Aphakia comes from the Greek word 'a' meaning 'none' and 'phacos' meaning 'lens'.² It is defined by the absence of the natural crystalline lens in the eye. Aphakia due to any cause is a crippling condition which severely hampers the activities and lifestyle of the subject. Management of aphakia is still a topic of deliberation among ophthalmologists. There is still no established consensus on the best choice of treatment to manage aphakia without adequate capsular support. Angle supported ACIOL, trans-sclerally fixated IOL, iris fixated IOL are the surgical options available.³

Angle supported IOL can lead to corneal decompensation, secondary glaucoma, macular edema. Even though SFIOL and iris fixated IOL have similar visual outcome,⁴ iris fixated IOL are preferred by surgeons since it is less invasive and can be performed in a shorter surgical time and shorter learning curve.^{4,5}

In our study we have emphasized the safety and effectiveness of posterior iris fixation lens for treating aphakia in patients without adequate capsular support. Twenty four eyes of twenty four patients underwent retropupillary fixation of iris claw lens. Out of them sixteen were male and eight were female. Patients were aged between 50-80 years with mean age of 62.2 years. Majority were aged between 50-55 years. After thorough examination, nine patients were found to have hard cataract, four patients had subluxation and four patients had non dilating pupil with pseudo exfoliation, one patient had traumatic cataract. All these were considered as risk factor for intraoperative posterior capsular tear.⁶

Three patients underwent secondary iris claw fixation. Among twenty one patients who underwent primary implantation of iris claw lens, seventeen patients had posterior capsular tear and four patients had zonular dialysis leading to inadequate posterior capsular support for the implantation of PCIOL. Complications secondary to tissue manipulation was the commonest early complication. Seven patients had pupillary distortion which occurs due to asymmetrical fixation of the haptics. Six patients developed corneal edema and three patients had raised intraocular pressure in the immediate post-operative period. However it subsided following anti glaucoma medication. Excessive vitreous loss during surgery led to hypotony in two patients which improved after systemic steroids. All patients had stable IOL position post operatively.

In the immediate postoperative period, 71% of patients showed improvement in visual acuity. Three patients had deterioration in visual acuity. All three of them had hard cataract and developed corneal edema with raised IOP which reduced after medication. No serious complications like iridial synechiae, iris perforation or necrosis occurred in any patient. None of the patients had posterior segment complications.

At 6 weeks follow up 87.5% of patients had BCVA ranged between 6\12-6\6. Only one patient had 6\60 BCVA and two patients had vision in the range of 6\24-6\18 (Figure 6). All three patients who had low vision had cystoid macular edema. There was persistence of pupillary distortion (horizontal oval pupil) at six weeks which did not hamper vision. All patients had stable IOL position. No patients had retinal detachment, subluxation or dislocation of IOL.

Above table shows similar complication rates with other studies.

Our results showed no difference in complications or outcomes with primary or secondary iris claw implantation. However primary fixation is desirable due to surgical ease and additional surgery can be forestalled.^{9,10}

Nonrandomised nature of the study, small sample size, relatively short follow up are the limitations of the study.

Table 2:

Study	No of cases	Pupil distortion	Corneal edema	Secondary glaucoma	Hypotony	Posterior segment complication
Our study	24	7	6	3	2	3
Proddatoori KK et al. ⁷	50	34	-	16	-	2
Madhivanan N et al ⁸	48	8	1	5	9	2

5. Conclusion

Our study shows retropupillary iris fixated lens is a simple procedure with less time consuming and lower incidence of visual threatening complications. Therefore it is a safe, effective option for management of aphakia in patients with inadequate capsular support.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Worst J, Massaro RG, Ludwig H. The introduction of an artificial lens into the eye using Binkhorsts technique. *Ophthalmol.* 1972;164:387–391.
2. J A. Present state of management of aphakia; future of spectacles and contact lenses. *Indian J Ophthalmol.* 1989;37:54–57.
3. Cheng CS, Ghanam AA, Dhawahir-Scala. Abu Al Ghanam, Dhawahir-Scala. Managing aphakia without capsular support. *Retina Specialist.* 2017;.
4. Guanlu JW, Qianyin Z. Iris-claw intraocular lens and scleral-fixated posterior chamber intraocular lens implantation in correcting aphakia:

A meta-analysis. *Invest Ophthalmol Vis Sci.* 2017;58:3530–3536.

5. Toro MD, Longo A, Avitabile T, Nowomiejska K, Gagliano C, et al. Five-year follow up of secondary iris claw intraocular lens implantation for the treatment of aphakia: Anterior chamber versus retropupillary implantation. *PLoS One.* 2019;(4):14.
6. Chakrabarti A, Nazm N. Posterior capsular rent: Prevention and management. *Indian J Ophthalmol.* 2017;65:1359–1369.

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