



Surgical Outcomes Of Retropupillary Iris Claw Intraocular Lens Implantation In Aphakic Eyes.

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Introduction: Iris-claw Intraocular Lens (IOL) is one of the alternatives to correct aphakia without sufficient capsular support. In this study we aimed to investigate the efficacy and safety of retropupillary iris claw intraocular lens implantation. This technique is preferred because it has a simple procedure.

Methods: This is a prospective study, including 16 aphakic eyes with inadequate capsular support from July 2019-July 2022. All the patients were evaluated properly and subsequently retropupillary iris-claw lens implantation was done.

Results: Postoperatively out of 16 patients 2(12.5%) patients had visual acuity of 6/12, 4(25%) patients had visual acuity of 6/18, 7(43.75%) patients had visual acuity of 6/24, 2(12.5%) patients had visual acuity of 6/36 and 1(6.24%) patient had perception of light and projection of rays in the follow up. The most common complication was subcobjunctival hemorrhage which was present in 6(37.5%) patients.

Conclusion: Our results showed that the procedures is effective and safe for managing cases of aphakia with inadequate capsular support and provides a good visual outcome and high safety profile.

Keywords: NIL

Introduction

Aphakia comes from two Greek words: "a" meaning "none" and "phacos" meaning "lens." In aphakia, there is no crystalline lens inside the eye. [1] Options available for the surgeon to correct aphakia are glasses, contact lens, keratorefractive surgery, and intraocular lens (IOL). The various IOLs available are 1) anterior chamber IOL (ACIOL), 2) scleral fixated IOL and 3) iris fixated IOL, both anterior and posterior. [2],[3]

Iris-claw IOL was initially designed by Jan Worst in 1978[4]. It is a one-piece biconvex lens made of poly-methyl methacrylate. It has a total length of 8.5 mm (7.5 mm for pediatric patients), and an optic diameter of 5.4 mm with a 5 mm clear optical zone. Two unique flexible haptic 'claws' support the central optic. They are used to fix the lens to the mid-peripheral iris by a technique known as enclavation. It is available in refractive powers ranging from 2 D

to 30 D in 1D increments, and from 14.5 D to 24.5 D in 0.5 D increments[5].

Materials and Methods

This is a descriptive case series study. The patients were selected from the Ophthalmology Outpatient Clinic, government medical college and associate Hospital, between July 2019 and July 2022. A written informed consent was obtained from all participants after these patients were informed in detail about the procedure, its risks and advantages.

Inclusion Criteria:

16 eyes of 16 patients without capsular support were included in the study. Only patients who developed aphakia due to intra operative complications of the cataract surgery were included in the study.

Exclusion Criteria:

Patients developed aphakia due to other causes other than cataract surgery

total aniridia

rubeosis iridis

decompensated corneas

posterior segment pathologies like choroidal neovascular membrane, proliferative diabetic retinopathy, and optic atrophy

Preoperative Evaluation

Detailed history was taken from each patient including history of etiology of aphakia. Demographic data was collected from the patients. Past history and history of any other ocular pathology was taken. Complete ophthalmic examination was done of the patients. Visual acuity measured by snellen's chart, slit lam examination of the anterior segment and pupil. Fundus examination with 90D and indirect ophthalmoscopy.

Surgical Procedure

Peribulbar anesthesia was given using xylocaine 2% with adrenaline. Superior or temporal 5.5 mm sclerocorneal incision was done. In addition two paracentesis at 9'oclock and 3' o clock positions were made. Intracameral pilocarpine was injected for miosis. A small amount of viscoelastic was injected into the AC. IC-IOL was inserted in the anterior chamber with the help of a lens forceps. The lens was maintained horizontally with the forceps, then reentered over the pupil behind the iris plane with the haptics positioned again at 3 and 9' o clock. At the same time through the paracentesis an enclavation needle was introduced and the haptic was enclaved. The maneuver then was repeated on the other side. Peripheral iridectomies were performed in majority of cases. Finally, all the OVD was removed and the wound was closed with nylon 10-0. Finally antibiotic and steroid were injected sub-conjunctively. Afterwards postoperatively steroid and antibiotics were given to all patients four times daily for few days.

Postoperative Evaluation

Post operative analysis was performed on day 1,1 week,1 month and 6 month. Postoperative examination included BCVA, IOP measurement

,anterior segment examination, fundus examination with 90 D lens.

Results:

In this study 16 aphakic eyes of 16 patients were included. Out of 16 patients 9(56.25%) patients were males and 7(43.75%)patients were females. The age of the patients ranged from 40 years to 70 years of age.

Postoperatively out of 16 patients 2(12.5%)patients had visual acuity of 6/12, 4(25%) patients had visual acuity of 6/18, 7(43.75%)patients had visual acuity of 6/24, 2(12.5%) patients had visual acuity of 6/36 and 1(6.24%) patient had perception of light and projection of rays in the follow up. The mean intraocular pressure at the end of follow-up was 14.28 ± 4.07 mmHg.

Regarding the postoperative complications, during the early postoperative period,the most common complication was subconjunctival hemorrhage which was present in 6(37.5%)patients. Five (31.25%) eyes showed superficial keratitis. Four (25%) eyes showed irregular pupillary and one (6.25%)eye had retinal detachment. During the late postoperative period, one (6.25%) eye had iris atrophy at the IOL enclavation site. Lens surface pigment dispersion was present in 3(18.75%) patients.

Discussion:

This was a prospective study in which 16 eyes were included from 2019- 2022. IC-IOL implantation is an effective method for the correction of aphakia in the absence of capsular support. Several studies have demonstrated it has several advantages and fewer complications, with its easy placement and good visual outcome, when compared with the trans-scleral sutured PC-IOLs and angle-supported AC-IOLs[6].

Being fixated to the mid-peripheral iris, in a location that is away from the AC angle, it is less likely to damage the angle structures. The optic vaults away from the iris to reduce the risk of pupil block and pigment dispersion. No sutures are required to support the lens. The lens is implanted at a safe distance from the corneal endothelium reducing the risk of endothelial damage[7].

Furthermore, retropupillary implantation has recently become popular, allowing the iris to act as barrier protecting the corneal endothelium from damage by

the IOL and preserving the anatomy of the anterior segment[8],[9],[10],[11].

In this study, mean postoperative CDVA was significantly better than preoperative value at 1 and 6 months postoperatively. Previous studies reported that aphakia iris-claw Artisan IOL implantation significantly improves visual acuity after surgery. Helvaci et al. reported that all two groups obtained a significant improvement in BCVA ($p < 0.05$) [5]. Mora et al. also reported that the groups showed comparable improvements in BCDVA after surgery (final BCVA: 0.34 ± 0.45 vs. 0.37 ± 0.50 logMAR in the anterior and retropupillary placement groups, respectively) [12]. Toro et al. reported CDVA improved significantly in both groups ($p < 0.001$, ANOVA), from the first week and during the entire follow-up ($p < 0.001$, Tukey HSD) [13].

Mean preoperative IOP was 12.79 ± 3.17 mmHg (range: 11.72–13.86 mmHg) and mean postoperative IOP on day 1 was 14.28 ± 4.07 mmHg (range: 12.90–15.65 mmHg). In the study done by Nana Madhukar Jare et al., [14] 3 out of 108 eyes had raised IOP in the first week postoperatively which were managed with Nd:YAG peripheral iridectomy.

The incidence of transient IOP elevation was also reported by Schallenberg et al. [9] in only one (3.03%) patient, Jare et al. [14] in three (2.78%) eyes, and Kelkar et al. [15] in seven (6.73%) eyes. Helvaci et al. [5] reported that four (20%) patients in group 1 (AC-IC-IOL) and five (25%) patients in group 2 (RPIC-IOL) had significant but nonpermanent increase at IOP values.

The most common complication in our study was minor subconjunctival hemorrhage, which disappeared within few days without any further treatment. 19 studies regarding implantation of retropupillary iris-claw intraocular lens noted pigment dispersion as a complication. [16,17] Our study also showed pigment dispersion in two patients which was at par with these studies.

Few studies have correlated retinal detachment though rarely with implantation of iris-claw intraocular lens. [18,8] In our series of cases we had one case of retinal detachment till last follow-up. We had to refer the patient to vitreoretinal surgeon for further management as the same was not available in our hospital.

In one eye we recorded iris atrophy at the site of enclavation. Many studies have shown that iris atrophy is most common in places of enclavation. [19]

Conclusion:

Our results showed that the procedures is effective and safe for managing cases of aphakia with inadequate capsular support and provides a good visual outcome and high safety profile.

References:

1. Alpar J. Present state of management of aphakia. Future of spectacles and contact lenses. *Indian J Ophthalmol* 1989;37:54-7.
2. Gicquel JJ, Langman ME, Dua HS. Iris claw lenses in aphakia. *Br J Ophthalmol* 2009;93:1273-5.
3. Heng LK, Tseng PS, Yong V. Current and future trends in the correction of aphakia. *Ann Acad Med Singapore* 1989;18:171-3.
4. Acar N, Kapran Z, Altan T, Kucuksumer Y, Unver YB, Polat E. Secondary iris claw intraocular lens implantation for the correction of aphakia after pars plana vitrectomy. *Retina* 2010; 30 :131-139.
5. Helvaci, S., Demirduzen, S. and Oksuz, H. (2016) Iris-Claw Intraocular Lens Implantation: Anterior Chamber versus Retropupillary Implantation. *Indian Journal of Ophthalmology*, 64, 45-49.
6. Dick HB, Augustin AJ. Lens implant selection with absence of capsular support. *Curr Opin Ophthalmol* 2001; 12 :47-57.
7. Teichman JC, Ahmed IIK. Improved technique with the Artisan aphakic IOL. *Rev Ophthalmol* 2007; 14 :59.
8. Forlini M, Soliman W, Bratu A, Rossini P, Cavallini G, Mand Forlini C. Long-term follow up of retro-pupillary iris-claw intraocular lens implantation: a retrospective analysis. *BMC Ophthalmol* 2015; 15 :143.
9. Schallenberg M, Dekowski D, Hahn A, Laube T, Steuhl KP, Meller D. Aphakia correction with retro-pupillary fixated iris-claw lens (Artisan) - long-term results. *Clin Ophthalmol* 2014; 8 :137-141.
10. Hsing YE, Lee GA. Retro-pupillary iris claw intraocular lens for aphakia. *Clin Exp Ophthalmol*. 2012; 40 :849-854.

11. Faria MY, Ferreira NP, Pinto JM, Sousa DC, Leal I, Neto E, et al . Retro-pupillary iris claw intraocular lens implantation in aphakia for dislocated intraocular lens. *Int Med Case Rep J* 2016; 9 :261-265.
12. Mora, P., Calzetti, G., Favilla, S., Forlini, M., Tedesco, S., Date, P., et al. (2018) Comparative Analysis of the Safety and Functional Outcomes of Anterior versus Retropupillary Iris-Claw IOL Fixation. *Journal of Ophthalmology*, 2018, Article ID: 8463569.
13. Toro, M.D., Longo, A., Avitabile, T., Nowomiejska, K., Gagliano, C., Tripodi, S., et al. (2019) Five-Year Follow-Up of Secondary Iris-Claw Intraocular LENS implantation for the Treatment of Aphakia: Anterior Chamber versus Retropupillary Implantation. *PLoS ONE*, 14, e0214140. <https://doi.org/10.1371/journal.pone.0214140>
14. Jare NM, Kesari AG, Gadkari SS, Deshpande MD. The posterior iris-claw lens outcome study: 6 month follow-up. *Indian J Ophthalmol* 2016;64:878-83.
15. Kelkar A, Shah R, Vasavda V, Kelkar J, Kelkar S. Primary iris claw IOL retrofixation with intravitreal triamcinolone acetonide in cases of inadequate capsular support. *Int Ophthalmol* 2018; 38 :111-117.
16. Wolter-Roessler M, Kuchle M. [Correction of aphakia with retroiridally fixated IOL]. *Klin. Monbl. Augenheilkd.* 2008;225:1041–4.
17. Baykara M, Ozcetin H, Yilmaz S, Timucin OB. Posterior iris fixation of the iris-claw intraocular lens implantation through a scleral tunnel incision. *AmJ Ophthalmol.* 2007; 144: 586–91
18. S. R. De Silva, K. Arun, M. Anandan, N. Glover, C. K. Patel, and P. Rosen, “Iris-claw intraocular lenses to correct aphakia in the absence of capsule support,” *Journal of Cataract and Refractive Surgery*, vol. 37, no. 9, pp. 1667–1672, 2011.
19. A. Mohr, F. Hengerer, and C. Eckardt, “Retropupillary fixation of the iris claw lens in aphakia. 1 year outcome of a new implantation techniques,” *Der Ophthalmologe*, vol. 99, no. 7, pp. 580–583, 2002.