



Research Article

ASSESSMENT OF OUTCOME AND COMPLICATIONS OF RETRO PUPILLARY FIXATED IRIS-CLAW INTRAOCULAR LENSES IN A PEDIATRIC POPULATION

Abhijeet Rajendra Misal., Milind Killedar and Gauri Khade

Anuradha Superspeciality Eye Hospital, Nishant Colony, Vishrambaug, Sangli

ARTICLE INFO

Article History:

Received 10th February, 2021

Received in revised form 2nd

March, 2021

Accepted 26th April, 2021

Published online 28th May, 2021

Key words:

Retro Pupillary Fixated Irisclaw Intraocular Lense

ABSTRACT

The purpose of this study was to report outcome and complications of retro pupillary fixated iris- claw intraocular lenses in a paediatric population (12 year and less).

Design: Retrospective study. 23 paediatric patients (34eyes) who underwent retro pupillary iris claw lens implantation between July 2012 to Sept 2018 at Anuradhasuperspeciality eye Hospital, Sangli, Maharashtra. Post-operative visual acuity and complications were analysed.

Result: The average follow-up time was 20 months, and the average age of the patients was 67months (5m to 12 years). Almost 70% patients were in age group of 2 to 8 years. Best-corrected median visual acuity values were increased from less than 6/60 to 6/36 On Snellen's chart [vision was checked with age specific methods]. In which, 40% eyes have improved visual acuity up to 6/24 or better. 70% have visual acuity 6/36 and better. Most common complication observed were hyphema, corneal oedema and anterior chamber reaction. Other complication observed were hypotony, fish mouthing, subluxated IOL, RD and CD.

Conclusion: Compared with previous similar studies, this study utilized the largest Paediatric patient group under 12 year of age lowest mean age of patient. Our study demonstrates that iris-claw intraocular lens implantation behind the iris is safe and easy technique in children with ectopia lentis and children with lack of capsular support with good visual outcome and low complication rate.

Copyright©2021 *Abhijeet Rajendra Misal et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Aim

To report outcome and complications of retro pupillary fixated iris-claw intraocular lenses in a paediatric population (12 year and less). Ectopia lentis, a condition in which the lens is displaced due to broken or loose lens zonules. The possibility of co-existing genetic diseases should be considered, whenever ectopia lentis without evident trauma is observed in a clinical setting, especially related to connective tissue metabolism, such as Marfan syndrome, homocystinuria, hyperlysinemia, and sulfite oxidase deficiency, Weill-Marchesani syndrome.^{1,2}

Ectopia lentis causes higher or derabberations, which is difficult to correct by contact lenses or spectacles, so IOL implantation is only option.³ Of tenectopia lentis in children is associated with very weak zonules and marked sub luxation. It is not easy to achieve the pro percent ration using the capsule supported IOL.

*Corresponding author: **Abhijeet Rajendra Misal**
Anuradha Superspeciality Eye Hospital, Nishant Colony,
Vishrambaug, Sangli

second setting, because if we use spectacles then due to aniseikonia binocularity affects and then problem of amblyopia also occurs. Currently to correct aphakia in children the most accepted method is Contact lens. Lenses are non-invasive and provide acceptable quality of refraction. However, their use requires constant vigilance to make sure compliance and avoid contact lens related complications. The cost of maintenance and quality care is often beyond the means of many households and carries an added risk of infection. Options available are ACIOL, iris claw lens fixation anteriorly to iris or posteriorly and SFIOL.

Implantation of an IOL in the anterior chamber can be associated with complications such as corneal endothelial cell damage, corneal decompensation, iris ischemia, hyphema, secondary glaucoma, cystoid macular oedema or iritis.⁴

Suturing the IOL to the sclera or to the iris has the risk of suture breakage, resulting in IOL dislocation or tilt. Patients with scleral sutured IOLs are also at a higher risk for vitreous haemorrhage and endophthalmitis.^{5,16} Their iris-claw IOL was developed in the seventies by Jan Worst for the correction of aphakia.⁶ Siddiqui *et al.* have recently published data on iris-

claw IOL fixation in the anterior chamber and noticed endothelial cell loss of 17% in children aged 8 to 15 years during a follow up period of 12months.⁷

Rijneveld *et al.* described the option of retro-pupillary fixation of an iris-claw IOL in adults in 1994⁸ interest have been revived in retro-pupillary iris claw lenses due to its relatively good result and ease.

We selected retro-pupillary fixation to keep the IOL in the posterior chamber, a safe place, which gives protection to the corneal endothelium.⁹ It eliminates the need of sutures and the complications associated with it and has been safely used even in phakic eyes.¹⁰ The possible complications of iris claw lenses include decentration, IOL tilting, iris chaffing, disenclavation, secondary glaucoma and endothelial decompensation.¹¹ We carried out this study to understand the long-term efficacy and safety of posterior iris claw lens and establish it as a viable option for ectopialentis management.



Design

It is a Retrospective study of paediatric patients age less than or equal to 12 years, conducted in accordance with tenets of the declaration of Helsinki by world medical association. Informed consent was taken from all participants i.e. from their parents or guardian Surgery done by single surgeon at Anuradha eye Hospital, Sangli 23 paediatric patients (34eyes) were included in study. Duration of study was from July2012 to Sept2018.All patients were examined with details. All children had complete preoperative and postoperative ophthalmologic evaluation including age appropriate assessment of visual acuity (Lea test, Snellen), cycloplegic refraction, slitlamp examination, intraocular pressure measurements and dilated funduscopy.

Unilateral Amblyopia was defined as at least 2 Snellen lines difference in visual acuity between the eyes. Bilateral amblyopia was defined as bilateral subnormal best-corrected visual acuity worse than 6/12. Non cooperative children’s preoperative evaluation was done under general anaesthesia. The corneal endothelial cell count could not be measured for all patients, since younger children were not much cooperative. We did not analyse this factor due to insufficient data for valid analysis.IOL calculation was always performed with the SRK/T formula using an A-constant of 116.9. Postoperative evaluations were mainly focused on clinical complications.

Surgery Method

One surgeon, using the same surgical technique, operated on all patients. Under general anesthesia, a 2.8 mm scleral tunnel incision was made at the 12 o’clock position, and 2 side ports at 9 o’clock & 3 o’clock position. The anterior chamber was filled with a cohesive ophthalmic viscoelastic device. The crystalline lens was extracted by making a capsulotomy

opening with needle and I/A done through side ports. A diluted 1% pilocarpine was injected into the anterior chamber. The iris-claw IOL was inserted through the scleral tunnel. With the aid of the for ceps, their is-claw IOL was slipped through the pupil area, maintained horizontally with the forceps, and then re-centered over the pupil behind the iris plane with the haptics positioned again at 3 and 9 o’clock. At the same time, fine sinskey hook was introduced, and by applying gentle pressure through the lenshaptic, there is was entrapped. The procedure was repeated on the other side, achieving perfect iris-claw IOL centration under the pupil. Peripheral iridectomy was performed with vitrectomy cutter. All the viscoelastic material was removed carefully through manual aspiration the corneoscleral incision closed with one nylon suture. The conjunctiva was fixed with two 8–0 vicryl sutures at the end of the operation.

Post-operatively topical prednisoloneacetate 1% eye drops and of loxac in 0.3% eye drops were prescribed 4 to 6 times daily with a tapering schedule over 2 months. Topical ketorolac eye drops were prescribed twice daily for 3 months. The patients were followed-upon1stday, 5th day, 1 month and every 3 months there after for1year. A teach follow-up, detailedslitlamp examination, intraocular pressure by noncontact tonometer, visual acuity and best spectacle corrected visual acuity was recorded.

RESULT

The average follow-up time was 20 months, and the average age of the patients was 67 months youngest is of 5 months and oldest is of 12 years. 70.59% patients were in age group of 2 to 8 years. [Table 1] 12 were unilateral and 11 balateral cases were included. Male: female ratio was 14:9.The mean BCVA pre-operatively was less than 6/60. Visual acuity could not be obtained in one patient because of very young age and poor co-operation. Subjective improvement in visual function was noted from parents. The mean post-operative BCVA at the end of 2 months was 6/36. In which, 40% eyes have improved visual acuity up to 6/24 or better. 70% have visual acuity 6/36 and better.[table4]

Table 1

Age Group	No. Out of 34	Percentage
0-2	3	8.82%
2-8	24	70.59%
8-12	7	20.59%

Table 2

Cause	Number	Percentage
Subluxated Lens (with Syndrome)	12	35.30%
Subluxated Lens	10	29.40%
Cataract	9	26.47%
Aphakia	2	5.80%
Buphthalmous	1	2.90%

Percentage according to cause Most of the patients were having predisposed genetic condition like Marfan’s syndrome in 23.5% children and homocystinuria in 11.76% children,

Table 3

Systemic Conditions	No out of 34	Percentage
Autism	1	2.94%
Marfan's syndrome	8	23.53%
Homocystinurea	4	11.76%
Rubella	2	5.88%
No any condition	19	55.88%

Table 4

Vision	No out of 34	Percentage
UP TO 6/24	13	38.24%
6/36 TO 6/60	11	32.35%
LESS THAN 6/60	7	20.59%
NO RECORD	3	8.82%

Most common complication observed were hyphema, corneal oedema and anterior chamber reaction. Other complication observed were hypotony, fish mouthing, sub luxated IOL, RD and CD. Hyphema, corneal edema, AC reaction subsided with appropriate treatment with topical drops.

Disenclavation of IOL occurred in 2 eyes but re-enclavation done after noticing it and now those IOLs are stable. Vitreous haemorrhage occurred in 2 eyes but subsequently got absorbed. One patient showed increased IOP on post operative day one. RD and CD occurred in one eye each. Patient with CD even after extensive treatment, went in to phthisis.

Table 5 Complications

Complications	Numbers	percentage
Hyphema	5	14.70%
Hypotony	3	8.80%
Fish Mouthing	1	2.90%
Ant chamber Reaction	6	17.64%
Shallow AC	2	5.80%
Corneal Edema/Corneal Decompensation	6	17.64%
Subluxated IOL	2	5.80%
VH	2	5.80%
Increased IOP	1	2.90%
RD	1	2.90%
CD	1	2.90%
Phthisical eye	1	2.90%

DISCUSSION

Our aim was to share our experience in an effort to contribute to the knowledge of medical practitioner in this area. Surgical management of paediatric cataract without sufficient capsular support presents a surgical challenge. The implant has to last for several years, stay centred and should not damage the adjacent tissue. Anterior and scleral-fixated IOLs have been the most popular type of IOLs used in implantation in the absence of sufficient capsule support and they avoid the need for aphakic spectacles or contact lenses. However, there is much discussion on the best procedure for secondary IOL implantation that offers the lowest complication rate and best visual rehabilitation over many years. Retro-pupillary iris claw lens has advantage of that it is true posterior chamber lens, so that result in deeper anterior chamber and safe distance from corneal endothelium, so its profile of safety is better than anteriorly fixated iris claw lenses.

From a surgical technique perspective, placing iris-claw lenses either in front or behind the iris has been shown to be equally easy and safe for paediatric and adult patients. Smina *et al.*¹² placed iris-claw lenses in front of the irises, 20 eyes of 10 patients with congenital cataracts, and reported that, after an average follow up of 12.3 years, the endothelial cell density of these patients was found to be as expected according to their age group. In addition, Gawdat *et al.*¹³ placed the IOL anteriorly to iris in 25 paediatric patients, 3 with Marfan syndrome and 1 with homocystinuria; the rest of the patients were normal, and only two patients (8%) developed traumatic dislocation during the 1 year of surgery.

Nearly 33% patients of our study showed visual acuity 6/12 and better. Bhandari *et al.* showed³, 70% of patients achieving a final visual acuity of 6/12 and 60% reported by De Silva *et al.* in their study¹⁴ and about 63.5% reported by Gonnermann *et al.*¹⁵

We have recorded lesser visual acuity than other studies, as our study included patients less than 12 years of age, 80% are from less than 8 years of age, and also many of them with some genetic disease. Visual acuity testing in such group is very difficult as they also have learning difficulty associated. Also visual deprivation amblyopia takes some time to improve and in little older children it may be permanent too.

We also found that complications were equal in patients with syndrome/systemic condition or without any systemic condition, and visual acuity is little better but not significantly in patients without systemic conditions. As per age groups complications are equal in all age groups but we have found that visual acuity improvement is better in 2-8 age groups, no any specific cause found. The most common complication reported by Bhandari *et al.* is ovalisation of pupil (10%) and decentration of IOL. We only found ovalisation in 1 patient (3%) and no decentered IOL. Gonnermann *et al.* reported pupil ovalization in 13.9% cases.¹⁵ In our series Ant chamber reaction and corneal edema which is 17% was most common complication. De Silva *et al.*¹⁴ reported the most common complication to be wound leak about 6% and iris claw dislocation 6%. Our series had no wound leak and one disenclavation, which was fixed. Cystoid macular edema or endophthalmitis were not seen in any of our cases.

In the study by Ceviketal¹⁷ spontaneous dislocation occurred in 37% of the cases, in our study no dislocation but only 1 disenclavation (3%) observed. Hypotony was observed in 10% of cases in both studies. As results are always depends on surgeons' skill whether it is SFIOL or Iris claw. Whichever procedure surgeon knows best with his skill gives best results for the patient. In this era where subspecialties developed so much as super speciality, one cannot learn everything as SFIOL is technically more difficult to learn than Iris claw, not everyone get to do it in their learning time. In contrast Iris claw is relatively easy to learn and with comparable results in term of visual acuity improvement or complications. Also need of second surgery is reduced in contrast to SFIOL, Iris claw can be done in same setting. Pediatric patients almost all time needs GA, so it is better to do lens implantation in same setting. Limitations of study is its retrospective nature, non-comparative nature, lack of endothelial cell analysis.

CONCLUSION

Compared with previous similar studies, this study utilized the largest Paediatric patient group under 12 year of age lowest mean age of patient. Our study demonstrates that iris-claw intraocular lens implantation behind the iris is safe and easy technique in children with ectopia lentis and children with lack of capsular support with good visual outcome and low complication rate.

References

1. Chandra A, Charteris D. Molecular pathogenesis and management strategies of ectopia lentis. Eye (Lond). 2014; 28(2):162-8.
2. Traboulsi EI, editor. Genetic diseases of the eye. 2nd ed.

- New York: Oxford University Press; 2012. p.704-6. (Oxford Monographs on Medical Genetics).
3. Bhandari V, Reddy JK, Karandikar S, Mishra I. Retropupillary iris fixated intraocular lens in pediatric subluxated lens. *J Clin Ophthalmol Res* 2013;1:151
 4. Morrison D, Sternberg P, Donahue S. Anterior chamber intraocular lens (ACIOL) placement after pars planalensectomy in pediatric Marfan syndrome. *J Aapos*. 2005;9(3):240–2
 5. Buckley EG. Safety of transscleral-sutured intraocular lenses in children. *J Aapos*. 2008; 12(5):431 9.
 6. Worst JG. Extracapsular surgery and lens implantation. *Ophthalmic Surg*. 1977; 8(3):33–6.PMID
 7. Siddiqui SN, Khan A. Visual Outcome and Changes in Corneal Endothelial Cell Density Following Aphakic Iris-Fixated Intraocular Lens Implantation in Pediatric Eyes With Subluxated Lenses. *J Pediatr Ophthalmol Strabismus*. 2013:1–5. PMID: 23316948.
 8. Rijnveld WJ, Beekhuis WH, Hassman EF, Dellaert MM, Geerards AJ. Iris claw lens: anterior and posterior iris surface fixation in the absence of capsular support during penetrating keratoplasty. *J Refract Corneal Surg*. 1994; 10(1):14–9. PMID:
 9. Odenthal MT, Sminia ML, Prick LJ, Gortzak-Moorstein N, Völker-Dieben HJ. Long-term follow-up of the corneal endothelium after artisan lens implantation for unilateral traumatic and unilateral congenital cataract in children: Two case series. *Cornea*2006;25:1173-7.
 10. Jacobi PC, Dietlein TS, Jacobi FK. Scleral fixation of secondary foldable multifocal intraocular lens implants in children and young adults. *Ophthalmology* 2002; 109:2315-24.
 11. Dick HB, Augustin AJ. Lens implant selection with absence of capsular support. *Curr Opin Ophthalmol* 2001; 12:47-5
 12. Sminia ML, Odenthal MT, Prick LJ, Mourits MP. Long-term follow-up of the corneal endothelium after aphakic iris-fixated IOL implantation for bilateral cataract in children. *J Cataract Refract Surg*. 2011; 37(5):866-72.
 13. Gawdat GI, Taher SG, Salama MM, Ali AA. Evaluation of artisan aphakic intraocular lens in cases of pediatric aphakia with insufficient capsular support. *J AAPOS*. 2005; 19(3):242-6
 14. De Silva SR, Arun K, Anandan M, Glover N, Patel CK, Rosen P. Iris-claw intraocular lenses to correct aphakia in the absence of capsule support. *J Cataract Refract Surg* 2011;37:1667-72.
 15. Gonnermann J, Klamann M K, Maier A K. Visual outcome and complications after posterior iris-claw aphakic intraocular lens implantation. *J Cataract Refract Surg*.2012; 38(12):2139-43.
 16. Sen P, SVK, Bhende P, et al. Surgical outcomes and complications of sutured scleral fixated intraocular lenses in pediatric eyes. *Can J Ophthalmol*. 2018; 53(1):49-55. doi:10.1016/j.jcjo.2017.07.015
 17. Cevik SG, Cevik MO, Ozmen AT. Iris-claw intraocular lens implantation in children with ectopia lentis. *Arq Bras Oftalmol*2017;80:114-117

How to cite this article:

Abhijeet Rajendra Misal *et al* (2021) 'Assessment of Outcome And Complications of Retro Papillary Fixated Iris-Claw Intraocular Lenses In A Pediatric Population', *International Journal of Current Advanced Research*, 10(05), pp. 24295-24298. DOI: <http://dx.doi.org/10.24327/ijcar.2021.24298.4817>
