Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Ophthalmology

A Study of Safety and Efficacy of Use of Iris Claw Lenses in Aphakic Patients

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DOI: 10.36347/sjams.2022.v10i08.001 | **Received:** 14.06.2022 | **Accepted:** 01.08.2022 | **Published:** 03.08.2022

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Abstract **Original Research Article**

Iris claw lenses have been widely used as a method of secondary intraocular lens implantation. Our study consists of evaluation of safety and efficacy of use of iris claw lenses along with the visual outcome in aphakic patients. A prospective study was carried out on 40 aphakic patients undergoing iris claw lens implantation. Aim of our study was to assess the visual outcome and complications of iris fixated intraocular lens implantation in aphakic patients and the objectives were to study the safety and efficacy of Iris claw intraocular lens, to study the visual outcome in patients undergoing iris claw intraocular lens implantation and the complications associated with it. Thorough evaluation of the patient was done prior to the procedure and it was found that iris claw implantation is a safe, effective and easy method with minimal complications to treat aphakia. The anatomical position of lens is well maintained.

Keywords: Iris claw, secondary intraocular lens, aphakia, subluxated lens, vitrectomy, primary iol implantation, secondary iol implantation.

INTRODUCTION

The development of intraocular lens (IOL) has been one of the greatest achievement in ophthalmology. Perhaps the most dramatic example of the benefit of an IOL is in the case of an aphakic patient especially a monocular aphakic patient [1].

Aphakia optically means absence of lens from the pupillary area. It causes lack of accommodation and hyperopia. It may result from dislocated or subluxated crystalline or cataractous lens, post traumatic cataract with profound damaged zonules and inadequate capsular support previous ICCE, previous ECCE with inadequate capsular support or profound zonular damage. The options for correction of aphakia include spectacle correction, contact lens correction and surgical methods of implantation of secondary IOL. Surgical procedure is generally recommended when traditional spectacle or contact lens correction of aphakia is unsuccessful. For bilateral aphakia corrected with aphakic spectacles, surgery is indicated when the patient cannot readily cope with the optical distortions produced by the glasses. For the unilateral aphake, spectacle correction usually is intolerable because of the large amount of anisometropia. Contact lenses can reduce the aberrations and aniseikonia produced by aphakic spectacles. However, many patients are unable to wear contact lenses because of an inability to handle or care for the contact lens, difficulty in fitting the lens, discomfort, contact lens-related complications such as giant papillary conjunctivitis or poor motivation for proper use [2]. For patients unable to use these devices, various surgical procedures have been investigated, including secondary IOL implantation, epikeratophakia, and intracorneal implants. Epikeratophakia and corneal inlays produced disappointing results because of irregular corneal surface changes and poor refractive predictability. These procedures are no longer used.In the absence of inadequate capsular support alternative options of fixing an intraocular lens have to be tried. To meet this requirement various methods have been described in literature namely, Anterior chamber IOL (ACIOL), Iris-fixated posterior chamber IOL and scleral fixated posterior chamber IOL (SFIOL). Although adopted by many surgeons, ACIOLs are fraught with some serious complications such as

corneal endothelial decompensation, uveitis–glaucoma–hyphema syndrome [4, 6].

Here we are mainly concerned about iris fixated intraocular lenses also known as iris claw. In this research work, we tried to study the safety, efficacy, post-operative visual outcome and complication rate in cases of iris claw intraocular lens implantation in aphakic patients. There are also a number of favourable reports on secondary IOL in the Literature.

AIMS AND OBJECTIVE

AIM: To study the visual outcome and complications of iris fixated intraocular lens implantation in aphakia.

OBJECTIVES

1. To study the safety and efficacy of Iris claw intraocular lens
2. To study the visual outcome in patients undergoing iris claw intraocular lens implantation.
3. To study the complications of iris claw intraocular lens implantation.

MATERIALS AND METHODS

Study duration of this study was 1 year. It was a prospective study including 40 aphakic eyes of 40 patients who visited the ophthalmology OPD of tertiary health care centre.

Methodology adopted in executing this scientific study was as follows-

1. Approval of the Hospital ethics committee was sought and obtained.
2. The procedure was explained in detail to the patients and their informed written consent was obtained.

Inclusion Criteria

- For Primary iris claw Implantation-Patients with dislocated or subluxated crystalline lens due to trauma/connective tissue disorders were included. Also the Patients with traumatic cataract and inadequate capsular support or minimal zonular damage and Patients with hyper mature cataract with >180 degree of zonular dehiscence were included in the study.
- For Secondary iris claw implantation, Patients who are aphakic and cannot tolerate spectacle or contact lens correction and whose occupations demand IOL implantation were included. Cases of previous ECCE and inadequate capsular support, previous ICCE, previous lensectomy were also included in the study.

Exclusion Criteria

- Patients with pre-existing retinopathy, maculopathy, uveitis, amblyopia, glaucoma and patients belonging to paediatric age group were excluded from the study.

Preoperative evaluation consisted of:

- Complete ophthalmic history
- Indication for iris claw implantation
- Uncorrected visual acuity (UCVA) using Snellen's chart
- Automated refractometry (AR)/ Retinoscopy
- Best corrected visual acuity (BCVA) using Snellen's chart
- Slit lamp examination
- Intraocular pressure measurement
- Dilated fundoscopy
- Automated keratometry /manual keratometry
- 'A' scan for calculation of axial length and IOL power. axial length is measured using the aphakic mode with indentation method using A-scan machine. SRK-T formula is used to calculate the IOL power.

The surgeries were performed by experienced senior faculty member of tertiary health care centre.

OCULAR EXAMINTAION:

- Head position:
- Ocular position:
- Extra ocular movements:

UCVA
Automated Refractometry (AR):
Retinoscopy:
BCVA
NEAR VISION
Slit lamp examination -
Lid - position
Conjunctiva-
Cornea –
Anterior chamber-
Iris and pupil:
Lens
Anterior vitreous
Applanation tonometry
Dilated fundus examination
Automated Keratometry / Manual Keratometry
A scan biometry: to find axial length and IOL power.
lacrimal sac syringing:

Postoperative e/d (antibiotic steroid) 2 hourly for one day followed by qid for 1wk and tapering over a period of week for 45 days. Eye ointment with the same combination was also given for night use for 45 days. Patients were followed up postop day 1, 1 week, 3 weeks, 6 weeks and 6 months.

Follow up visit at each time included: Recent complaints

- Visual acuity using SNELLENS chart
- Slit lamp examination to assess the position of iris claw
- Intraocular pressure measurement
- Fundoscopy was done at each visit.

After 6 weeks Refraction was given to patients and assessed for BCVA

Statistical analysis: -all data was analysed using appropriate statistical tests and compared with previous studies.

RESULTS

Table-1: Age Distribution: Age limit 33-80 years

Age (years)	Number of patients
31-40	3
41-50	2
51-60	8
61-70	16
71-80	11

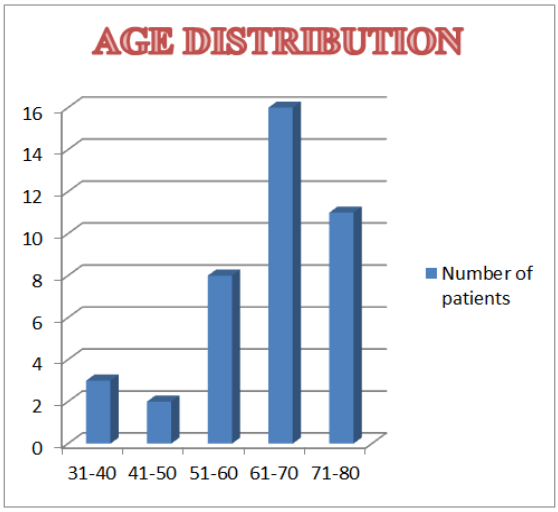


Fig 1: Age Distribution: Age limit 33-80 years

Table-2: Gender Wise Distribution

Sex	Number
Females	16(40%)
Males	24(60%)

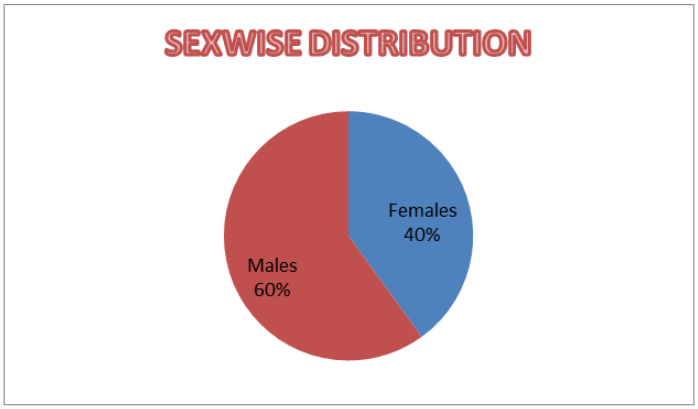


Fig 2: Sex Wise Distribution

Table-3: Distribution of Etiology

Etiology	Number
Subluxated hypermeture cataract	1(2.5%)
Traumatic subluxated lens	6(15%)
Surgical aphakia(previous complicated cataract surgery)	33(82.5%)

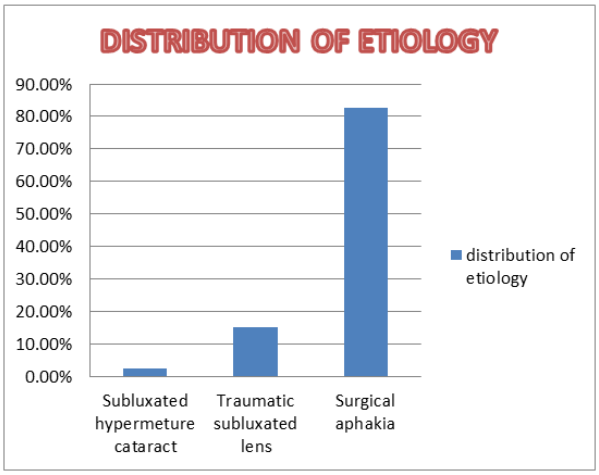


Fig 3: Distribution of Etiology

Table-4: Visual Acuity: Uncorrected Visual Acuity (UCVA)

	PRE-OP	POST-OP DAY1
FCCF-2/60	38(95%)	0
3/60-5/60	2(5%)	2(5%)
6/60-6/24	0	38(95.%)
6/18-6/9	0	0

Table-5: Best Corrected Visual Acuity (BCVA)

BCVA	PRE-OP	POST-OP(DAY45)	POST-OP(DAY180)
FCCF-2/60	0	0	0
3-60-5/60	3(7.5%)	2(5%)	2(5%)
6/60-6/24	32(80%)	4(10%)	4(10%)
6/18-6/9	5(12.5%)	34(85%)	34(85%)

COMPLICATIONS:

Intra-operative: - There was no intra-operative complication noted in our study.

Table-6: Post-operative complications

Complication	Number
Anterior uveitis	2(5%)
Decentered IOL	1(2.5%)
Choroidal detachment	1(2.5%)
Corneal decompensation	1(2.5%)

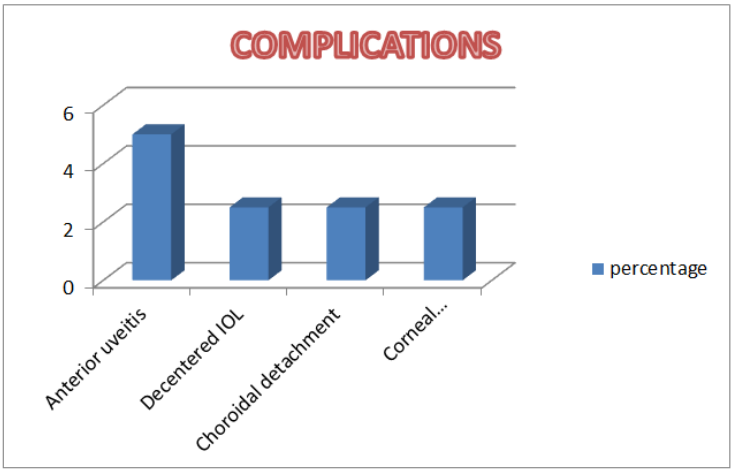
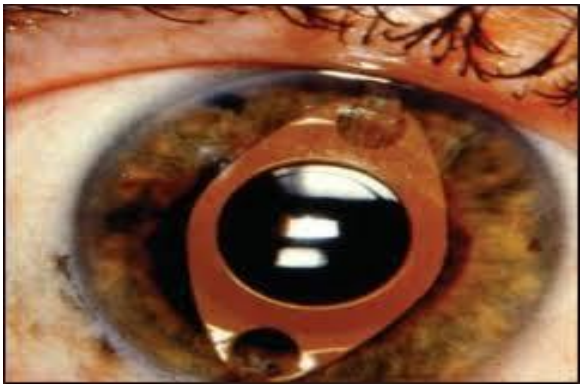


Fig 4: Post-operative complications

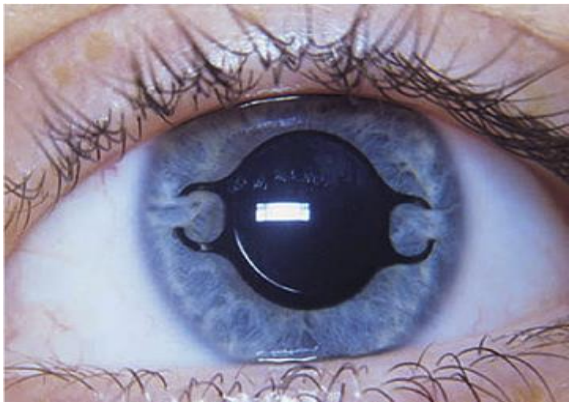
The visual outcome in 38 out of 40 cases (95%) was satisfactory. Out of 40, 34 patients had vision of 6/18-6/9 after 6 months, 4 patients had vision of 6/36-6/24 and only 2 patients had vision less than finger counting 6 m. Thus our study showed very good visual outcomes and no complications. No intraoperative complication was noted in our study. Postoperative Complications-We observed 2 eyes (5%) with anterior uveitis, 1 eye (2.5%) with corneal decompensation ,1 eye (2.5%) with decentered IOL and 1eye (2.5%) with choroidal detachment.



ARTISAN IRIS CLAW

DISCUSSION

Iris-fixated lenses were first described in 1954 ("collar stud": Epstein 1954, "iris-clip": Binkhorst 1959). In the early 1960s, Collar implanted the first iris-fixated lens after an intra-capsular cataract extraction, but in 1971, Worst came in with the Iris Claw lens, and its modification evolved in the Artisan lens. Iris claw lens is an effective, predictable and safe option for aphakic eyes without capsule support, compared to other options, it has a quicker visual recovery, better visual outcomes and fewer complications than the other secondary IOL implantation options. Furthermore, its placement can be performed with a lower invasiveness and in a shorter surgical time what reduces the risk of photic retinal damage. is required to decrease the risk of pupillary block.



FOR COSMETIC PURPOSE

RETROPUPILLARY IRIS CLAW

The lack of an appropriate posterior capsular support makes it impossible to implant the intraocular lens into the lens capsule or the ciliary sulcus. Alternative techniques for placing the intraocular lens in cases of posterior capsule damage include anterior chamber lens attached to the drainage angle, fixation with or without lining the sclera lens, anterior chamber or posterior iris lenses and the use of a black diaphragm intraocular lens in aniridia [1, 4, 5]. An iris-claw anterior chamber lens (Artisan aphakic, Ophtec BV) was presented in 1972, and since then it has been widely used in aperture correction [6]. It is a non-collapsible implant made of poly (methyl methacrylate) (PMMA), with an optical part of 5.4 mm diameter and a haptic part of 8.5 mm. The lens haptics are designed to be attached to the iris at a safe distance from the traverse angle and the corneal endothelium. In comparison to anterior chamber lenses, such a design reduces the risk of endothelial cells' damage and the development of secondary glaucoma [7]. It also shortens and simplifies the procedure in comparison to attaching the lens to the sclera. The iris claw implantation was done as primary procedure in cases with traumatic subluxated lens and spontaneous subluxated hypermature cataract. It was done as secondary procedure in patients having surgical aphakia. The mean time period between cataract surgery and iris claw implantation was 2 months. The causes of surgical aphakia were -large posterior capsular rupture leading to inadequate capsular support, intra operative zonular dehiscence>180 degree, traumatic cataract. Iris claw lens can be implanted using either corneal incision or through a scleral tunnel (which is reported to cause less corneal endothelial cell

loss, less astigmatism and a lower risk of wound leakage compared to corneal incision) [10]. Implantation can be either Antepupillary or Retropupillary. Sutureless iris fixation may be accomplished in the setting of specially designed IOLs in which haptics are replaced by an "iris claw." During enclavation, a small knuckle of iris tissue is captured by the fixation hole or "claw" located on either side of the lens. Key parts of the procedure include the use of (1) miotic to maximally constrict the pupil leading to better exposure of iris tissue, (2) viscoelastic to create space and minimize corneal endothelial trauma, (3) a second instrument to stabilize the body of the lens while the enclavation needle is used to fixate the IOL, and (4) peripheral iridotomy. While iris claw lens use is well-described in phakic patients, they have also been utilized in cases of aphakia or IOL exchange. Despite a higher incidence of IOL dislocation, it is reported that the retropupillary fixation offers the advantage with physiological posterior chamber implantation, resulting in a deeper anterior chamber and a lower intraoperative and postoperative risk of corneal de-compensation than anterior fixation. A peripheral iridectomy is required to reduce the chances of pupillary block.

Informed consent was taken from the patient before surgery after explaining the procedure in detail. Peribulbar, subtenon, or retrobulbar anaesthesia was preferred while implanting the iris claw lens.The pupil should be normal, not dilated nor constricted. Mohr et al suggested a pupil size of 4–5 mm, optimal for secondary iris claw iol implantation.

A corneal incision or a scleral tunnel incision at the 12 o'clock position for implanting iris claw is made. A sclero-corneal tunnel is preferable as it reduces the surgically induced astigmatism (SIA) and chances of wound leakage and endophthalmitis. Two paracenteses at 3 o' and 9 o'clock were made. Anterior or posterior vitrectomy was done whenever and wherever required. Remnants of the capsule were removed before implanting ICIOL as postoperative capsular fibrosis may cause IOL instability. After injecting appropriate amount of viscoelastic, the Iris claw, with its concavity oriented anteriorly, was inserted into the anterior chamber using iris claw forceps, turned to the horizontal position and centred on the pupil. After injecting a small amount of viscoelastic on the peripheral iris, holding the middle of the optic with the forceps, one haptic was tilted down and pushed under the iris with gentle manipulation. Before enclavating the haptics, the ICIOL should be maintained in the correct position with the optic centred in the pupil. A sinskey hook was inserted through the paracentesis to aid in the manoeuvering. Tilting the haptics will produce an indentation on the iris. The iris is then enclavated into the haptic claw with a gentle push with the sinskey hook. The two dimples in the iris due to haptic enclavation are identified to ensure the appropriate fixation of the ICIOL. Peripheral iridectomy was done to prevent pupillary block.

Most of the studies have reported standard medication following Iris claw IOL implantation, which includes topical steroids and antibiotics. Topical non-steroidal anti-inflammatory drugs (NSAIDs) were used postoperatively to reduce the risk of Cystoid macular oedema.

Limitations in present study was that, the follow up period was 3 months and the sample size was small. Studies with longer duration of follow-up are needed to evaluate long term visual outcome and complication profiles. Large sample size may help to extrapolate these results to the general population.

CONCLUSION

We can conclude that iris claw implantation is a safe, effective and easy method with minimal complications to treat aphakia. The anatomical position of lens is well maintained. Though the procedure demands sophisticated surgical skills, the results are rewarding in terms of visual outcome of patients. Also it is an economical method of correction of aphakia in poor patients visiting tertiary hospital.

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