ARTICLE

Iris-claw intraocular lens for aphakia: Can location influence the final outcomes?

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Purpose: To describe the demographic data, evaluate the long-term refractive and anatomical outcomes, and report the incidence of complications of anterior iris (prepupillary) and posterior iris (retropupillary) fixation of the Artisan aphakia iris-claw intraocular lens (IOL).

Setting: Complejo Hospitalario Universitario de Santiago de Compostela, Spain.

Design: Retrospective case series.

Methods: Patients who had iris-claw IOL implantation were divided into 2 groups: Group 1 (prepupillary) and Group 2 (retropupillary). The corrected distance visual acuity (CDVA), anatomical changes, endothelial cell count (ECC), presence of cystoid macular edema (CME), and operative and postoperative complications were determined.

Results: The study comprised 95 eyes of 95 patients. Fifty-seven patients had prepupillary implantation and 38 patients had retropupillary implantation. Indications for surgery were IOL luxation or subluxation (n = 24), lens luxation or subluxation (n = 17), trauma (n = 15), aphakia (n = 30), and other (n = 9). The CDVA improved significantly in both groups and there were no differences between them. A significant ECC reduction was observed in both groups, with no differences between them. The incidence of CME was 16.1% (21.8% in the prepupillary group and 7.9% in the retropupillary group at 3 months and 8 months, respectively), although the difference was not statistically significant. Other postoperative complications were rare and no differences were found between groups.

Conclusions: Irrespective of location, the iris-claw IOL provided good visual outcomes with few complications. However, prepupillary IOL implantation seemed to contribute to greater endothelial cell loss and earlier onset of CME.

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Intracapsular intraocular lens (IOL) implantation remains the ideal procedure after cataract extraction. However, alternative methods of IOL implantation should be considered in some cases, such as capsular rupture and significant zonular dehiscence during cataract surgery, as well as weakened zonular fibers because of trauma, pseudoexfoliation syndrome, pathological myopia, uveitis, or hypermature cataracts, or because of Marfan syndrome or Weill-Marchesani syndrome. Surgeons might choose to implant an anterior chamber IOL (AC IOL) (also known as angle-supported IOL) or a scleral-fixated IOL. However, neither of these procedures are exempt from complications. Use of AC IOLs might lead to reduced endothelial cell count (ECC) and corneal decompensation, secondary glaucoma, and chronic inflammation. Scleral-fixated posterior chamber IOLs (PC IOLs) might also cause inflammation, retinal tears, choroidal hematoma, and cystoid macular edema (CME).

Iris-claw IOLs were designed by Jan Worst in 1978[1] to correct aphakia after intracapsular cataract surgery. The Artisan aphakia 205 IOL[A] (Ophtec BV) is a 1-piece biconvex, made of poly(methyl methacrylate), 8.5 mm long (7.5 mm for pediatric patients), and it has an optic zone of 5.0 mm. This IOL was originally designed to be placed over the anterior surface of the iris. The haptics are fixed to an avascular portion of the iris without sutures. The IOL can be easily centered and it does not come into contact with the anterior chamber angle.[1] Several studies

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have reported on the safety and effectiveness of this IOL in both positions: anterior chamber (prepupillary) and posterior chamber (retropupillary).[2–4]

This study aimed to analyze the viability and safety of Artisan iris-claw IOL implantation in the absence of capsular support, as well as to determine whether anterior iris (prepupillary) or posterior iris (retropupillary) location influence the final visual and anatomical results.

PATIENTS AND METHODS

This retrospective cohort study included patients who had iris-claw IOL implantation consecutively between 2006 and 2016 at the University Hospital in Santiago de Compostela, Spain.

All patients were previously informed about the procedure and its risks and signed a specific informed consent form before implantation. This study was conducted in accordance with the tenets of the Declaration of Helsinki and approved by the Galician research ethics committee (registration code 2017/127).

The inclusion criteria were as follows: subluxation of preexisting IOL (degrees 1, 2, and 3), lens subluxation (pseudoexfoliation syndrome, Marfan syndrome, lens coloboma, and other pathologies), trauma and aphakia without capsular support. All patients presented with an iris morphology that allowed a stable IOL placement.

The exclusion criteria were as follows: iris abnormalities hampering enclavation (mydriasis >5.0 mm or absence of iris), history of ocular inflammation in the previous 6 months, uncontrolled intraocular pressure (IOP), severe corneal opacity, and poor visual prognosis.

All procedures were performed by the same anterior segment surgeon (R.T.). Iris-claw IOL implantation was carried out as a primary or secondary procedure. The patients were divided into 2 groups: Group 1, anterior chamber (prepupillary) implantations (Figure 1) and Group 2, posterior chamber (retropupillary) implantations (Figure 2). The surgeon identified the best location in each case (prepupillary or retropupillary), according to anterior chamber depth, ECC, presence of glaucoma (especially pigmentary glaucoma), and anatomical complexity. The IOL was always retropupillary when the anterior chamber was less than 3.0 mm, the ECC was less than 1200 cells/mm^2, or in the presence of pigmentary glaucoma or advanced glaucoma.

Surgical Technique

Anesthesia was peribulbar or topical depending on the patient's requirements and the surgeon's preference. The A-constant used was 115.0 (prepupillary) and 116.8 (retropupillary). A superior clear corneal incision was made for both locations (prepupillary and retropupillary). It is important to immobilize the IOL correctly with special forceps (Shepard forceps). Prepupillary IOLs were stabilized with these forceps at the optics and the midperipheral iris was fixated to the haptics with a needle inserted through the paracenteses (10 o'clock and 2 o'clock). Retropupillary IOLs were pushed behind the iris, 1 haptic after the other. It is important to grasp a large part of the body of the IOL with the Shepard forceps to prevent its displacement, especially when enclavating the midperipheral iris into the haptics. A reverse Sinskey hook or a 27-gauge needle bent 45 degrees was passed through the paracenteses (3 o'clock and 9 o'clock) to enclavate a sufficient portion of iridal tissue. The ideal interlocking of the iris-claw IOL was considered correct when dimples were visible on the iris. This helps prevent spontaneous detachment of the IOL into the vitreous cavity. The corneal wound was sutured with 10-0 nylon suture and selectively removed after 8 weeks, depending on the patient's refractive and topographical astigmatism. Steroid and antibiotic eyedrops were prescribed for 1 month.

Data Collection

Demographic, clinical, and surgical characteristics were obtained retrospectively from medical records. The demographic data analyzed included age, sex, eye operated, etiology of aphakia, and preoperative eye pathology.

The following clinical parameters were collected preoperatively and at 1, 3, and 6 months and annual visits postoperatively:

- The corrected distance visual acuity (CDVA) registered with a logarithm of the minimum angle of resolution chart in Early Treatment Diabetic Retinopathy Study (ETDRS) letters.
- Corneal astigmatism was measured using the Scheimpflug system (Pentacam, Oculus Optikgeräte GmbH). Postoperative corneal astigmatism was recorded when it remained stable after suture removal.
- Slitlamp evaluation: anatomical changes on the iris related to IOL implantation (pupil deformity and atrophy at the haptic enclavation site).
- Intraocular pressure measured with the Perkins applanation tonometer. Intraocular hypertension was defined as IOP of 22.0 mm Hg or higher and hypotony as 6.0 mm Hg or lower.

The ECC was obtained using specular microscopy (Ophthaltec, Costruzione Strumenti Oftalmici). The macular evaluation with optical coherence tomography (OCT) (Cirrus 500, Carl Zeiss Meditec AG) determined the presence of edema.

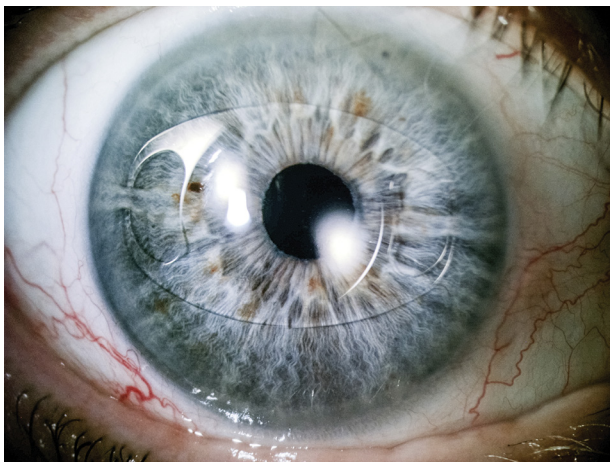

Figure 1. Iris-claw intraocular lens to correct the aphakia in absence of capsular support. Anterior iris surface fixation (prepupillary location).

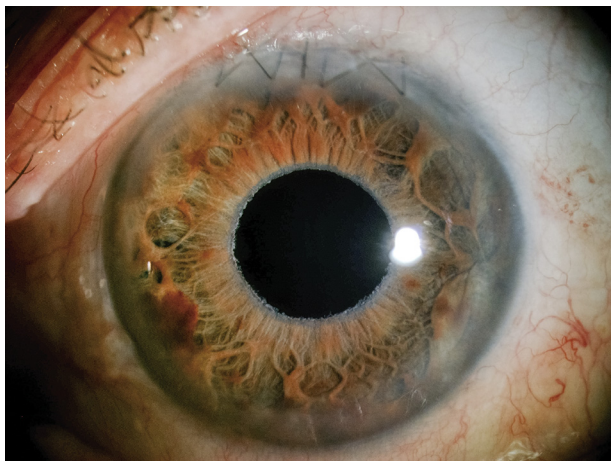

Figure 2. Iris-claw intraocular lens with posterior iris surface fixation (retropupillary location).