ARTICLE

Iris-claw intraocular lens implantation: Efficiency and safety according to technique

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Purpose: To evaluate the safety, refractive and visual results of an iris-claw intraocular lens for aphakia (Artisan) according to the technique used.

Setting: Ophthalmology Department, Valme University Hospital and Oftalvist Clinic, Seville, Spain.

Design: Retrospective case series.

Methods: This study evaluated the outcomes of iris-claw IOL implantations performed by the same surgeon between 2011 and 2017. The results were analyzed by the incision type (corneal versus scleral tunnel) and lens position (prepupillary versus retropupillary).

Results: Seventy-six eyes (75 patients) were included. The postoperative uncorrected (UDVA) and corrected (CDVA) distance visual acuities were significantly better than the preoperative acuities ($P < .001$). The UDVA was 20/40 or better in 41.7% of patients, and had the CDVA was 20/40 or better in 68.1% of patients. The mean UDVA was significantly better in the scleral tunnel incision group (0.29 logarithm of the minimum angle of resolution [logMAR] ± 0.41 [SD]) than in the corneal incision group (0.66 ± 0.45 logMAR) ($P < .001$). The mean surgically induced astigmatism in the scleral tunnel incision group (0.73 ± 0.62 diopter [D]) was significantly lower than in the corneal incision group (2.49 ± 1.36 D) ($P < .001$). Although endothelial cell loss was lower in the retropupillary position, the difference was not significant ($P = .07$.)

Conclusion: Implantation of the iris-claw IOL in the retropupillary position and through a scleral tunnel incision was an effective and safe alternative to aphakia without capsule support, providing better refractive results compared with other techniques.

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Aphakia without capsule support is a clinical situation that patients tolerate poorly, occurring mainly in unilateral cases secondary to surgery or trauma.[1–3] These cases have been managed using 1 of 2 methods. The first is implantation of angle-supported intraocular lenses (IOLs), a solution with greater technical ease but with a greater risk for endothelial damage or glaucoma.[4–6] The second technique is suturing the IOL to the iris or fixating it in the sclera,[7,8] which carries a lower risk for endothelial damage and glaucoma but is more difficult to perform.[9,10]

Since Worst et al.[11] presented the first iris-claw IOL model (Artisan aphakic, Ophtec BV) in 1972, many surgeons have used these IOLs in eyes without capsule support. The haptics of the poly(methyl methacrylate) aphakic IOL are anchored to the iris, placing them far from the corneal endothelium and the iridocorneal angle. This lowers the risk for endothelial damage and glaucoma compared with angle-supported IOLs[12–14] and is an easier, quicker technique than fixating the IOL to the sclera.[15,16]

Initially, iris-claw IOLs were implanted in the anterior chamber (prepupillary claw). However, in recent years, a posterior chamber IOL (retropupillary claw) has become popular because it is implanted in a physiologically and theoretically safer position[17–19] (Figure 1). A main drawback of this type of IOL is that it requires a 5.5 mm incision, which makes it difficult to control surgically induced

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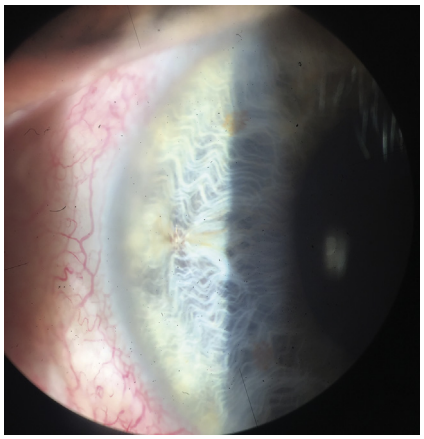

Figure 1. Retropupillary claw of the aphakic IOL. Note the fold in the iris caused by the IOL clamp (IOL = intraocular lens).

astigmatism (SIA), in particular in aphakic and vitrectomized eyes.[20,21]

In this study, we evaluated the visual, refractive, and safety results of implanting an Artisan aphakic iris-claw IOL based on the technique used as follows: prepupillary versus retropupillary implantation, corneal incision versus scleral tunnel incision, and anterior vitrectomy versus pars plana vitrectomy (PPV).

PATIENTS AND METHODS

This study comprised patients who had iris-claw IOL implantation by the same surgeon (A.H.M.) at 1 of 2 hospitals from January 2011 to June 2017. The local ethics committee approved the study.

A model 205 Artisan aphakic IOL was implanted in all eyes. The IOL power was calculated with partial coherence interferometry (IOLMaster 500, Carl Zeiss Meditec AG). The A-constant, which was provided by the IOL manufacturer, was 115.7 for the prepupillary model and 116.8 for the retropupillary model.

In cases of aphakia secondary to a surgical complication, the iris-claw IOL was implanted during the surgical procedure in which the complication was treated. An anterior vitrectomy was performed through corneal access in eyes that did not require a PPV. The 5.5 mm main incision was created in the cornea or the scleral tunnel 2.0 mm from the limbus (Figure 2). The prepupillary IOL was implanted in the usual manner using claw needles or by the Vacufix system (Ophtec BV). The retropupillary IOL was implanted with the concave part facing up (Figures 3 and 4).

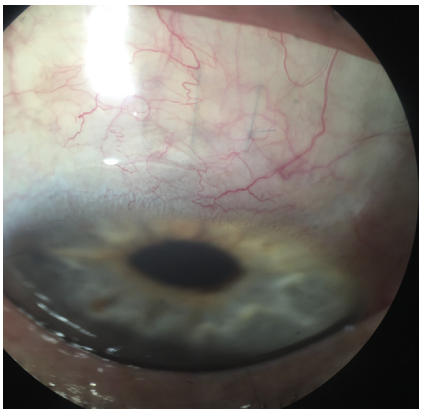

Figure 2. A 5.5 mm scleral tunnel incision is made 2.0 mm from the limbus and sutured with 3 loose nylon sutures.

Statistical Analysis

Visual acuities were analyzed on the logarithm of the minimum angle of resolution (logMAR)[22] scale. The SIA was calculated using the Alpins vector analysis method[23–25] and was based on the preoperative and postoperative keratometry values. The data were evaluated for all patients and according to the following variables: incision type, IOL position, and type of vitrectomy. The quantitative variables were evaluated using the geometric mean[22] except for the endothelial cell count (ECC), which was summarized by the median, and for qualitative variables, which were reported as percentages. Differences in the quantitative variables between 2 groups were analyzed using the independent-sample Student *t* test for normal values and the nonparametric Mann-Whitney *U* test for non-normal values. Significant mean differences were quantified with 95% confidence intervals. The Wilcoxon test was used to analyze change in quantitative variables between preoperative values and postoperative values. A *P* value less than 0.05 was considered statistically significant. To confirm that the incision was a confounding variable for the IOL position in terms of the uncorrected distance visual acuity (UDVA) results, a univariate linear model was used. The data were analyzed using SPSS for Windows software (version 23.0, IBM Corp.).

RESULTS

The study evaluated 76 eyes of 75 patients. The mean age of the 38 men and 37 women was 71 years (range 28 to 91 years).

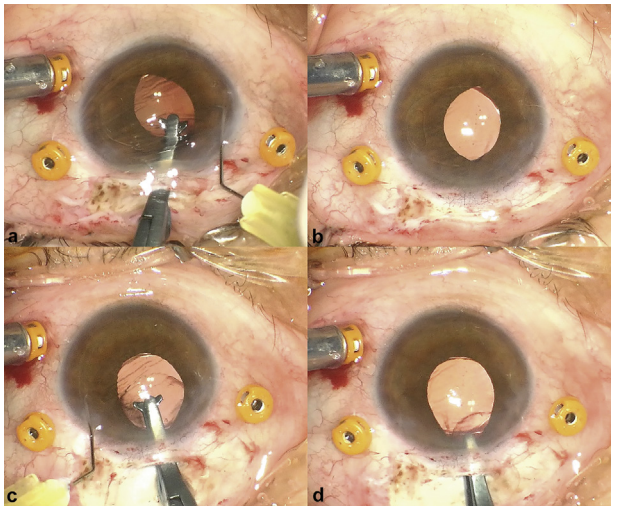

Figure 3. Retropupillary IOL placement. *a*: Subluxation of one half of the optic and a haptic and anchoring by pressing the needle on the iris above the haptic. *b*: First anchored haptic. *c*: Subluxation of the other half of the optic and the other haptic; the same maneuver was used to anchor it. *d*: The IOL anchored in the retropupillary position (IOL = intraocular lens).

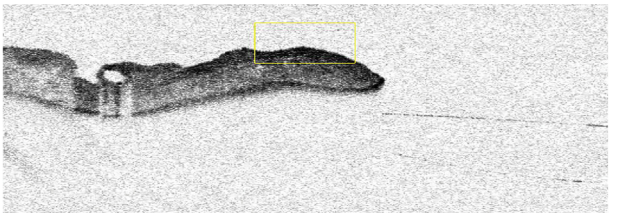

Figure 4. Optical coherence tomography of an intraocular lens in the retropupillary position. Note the anchored haptic and the protection the iris provides when the haptic is covered.