A 23-year-old man with traumatic subluxation, cataract, and aniridia developed a hyperopic shift following phacoemulsification and insertion of capsular tension rings with iris leaflets (aniridia CTRs) and a 1-piece acrylic intraocular lens (IOL) in the capsular bag. Early postoperative Scheimpflug imaging showed posterior bowing of the IOL in the capsular bag behind the aniridia CTR. The hyperopic shift slowly progressed up to 1 year postoperatively; at that time, Scheimpflug imaging disclosed progressive posterior IOL bowing causing a decreased effective convergent power of the IOL. After the hyperopic shift stabilized at 1 year, laser in situ keratomileusis was performed, and emmetropia was achieved after 36 months of follow-up. Our case is the first report in the literature of anterior segment imaging showing deformation of a 1-piece acrylic IOL implanted with an iris prosthesis in the capsular bag. The progressive hyperopic shift that accompanied postoperative capsule fibrosis highlights the need to use more stable IOLs when implanting aniridia CTRs.

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CASE REPORT

A 23-year-old man presented with traumatic cataract subluxation and aniridia of the right eye (Figure 1, A). The preoperative corrected distance visual acuity (CDVA) was 20/200 with significant glare and photophobia. Prior to surgery, IOL calculation was performed using the SRK/T formula. Phacoemulsification was then performed. The first of 2 interlacing aniridia CTRs (type 50C, Morcher GmbH) was inserted through the 3.0 mm phacoemulsification incision to stabilize the bag before cortical cleanup. A 21.0 diopter (D) foldable 1-piece acrylic IOL was then implanted in the capsular bag behind the aniridia CTR. The second aniridia CTR was implanted in front of the IOL and rotated to create a complete iris diaphragm in the capsular bag.

In the immediate postoperative period, the CDVA was 20/15 and the glare was resolved (Figure 1, B). At 1 month, the patient was hyperopic with a spherical equivalent (SE) of +1.75 D. Scheimpflug images were captured and analyzed. It was noted that the effective lens position (ELP) of the IOL from the back of the cornea was 5.00 mm (Figure 2, A) with posterior bowing of the IOL at an angle of 10.2 degrees from the frontal plane (Figure 3, A). The hyperopic shift progressed to an SE of +2.50 at 1 year. Follow-up imaging at 2 years showed an ELP of 5.078 mm (Figures 1, C, and 2, B) with increased posterior bowing of the IOL, measuring 20.3 degrees from the frontal plane (Figure 3, B). This was the effect of the healing process on the patient’s refractive state over a 3-year follow-up.

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accompanied by anterior bowing of the aniridia CTR, resulting in a 0.395 mm increase in the distance between the iris leaflets and the IOL. As the refractive error had been stable for a year, laser in situ keratomileusis was performed and achieved emmetropia and an uncorrected distance visual acuity of 20/20, which remained at the 36-month follow-up.

**DISCUSSION**

Combined lens–diaphragm prosthetics have shown good results in the management of aniridia and cataract. However, they require large incisions to place, predisposing to complications such as vitreous prolapse and expulsive hemorrhage. Moreover, they have been associated with postoperative uveitis and glaucoma. Alternatively, aniridia CTRs allow separate implantation of the CTR and foldable IOL through the initial phacoemulsification wound. Insertion of these separate parts is technically challenging. Nevertheless, the difficulty is outweighed by the potential advantages of the aniridia CTR; namely, less risk for intraoperative complications and postoperative astigmatism with smaller incisions, stabilization of dehisced zonular fibers, and lower rates of postoperative inflammation.

The complications of aniridia CTRs and the possible structural effects on the IOL implanted together in the capsular bag are underreported. Our case highlights and documents by anterior imaging how the aniridia CTR can deform the shape of a 1-piece acrylic IOL in a crowded capsular bag and how the fibrosis of the capsular bag can worsen that deformity. Scheimpflug imaging disclosed a small posterior bowing of the IOL in the early postoperative period, likely causing a small hyperopic shift by decreasing the effective convergent power of the IOL. The reason for the progressive hyperopia during the first year was again disclosed by Scheimpflug imaging that was captured and analyzed using ImageJ software. This demonstrated increasing posterior bowing of the IOL as the capsule fibrosed. The posterior bowing of the IOL was accompanied by anterior bowing of the aniridia CTR diaphragm in a spring-like fashion, increasing the distance between the iris leaflets and the IOL. Ozturk et al. described a hyperopic shift with collamer copolymer plate–haptic IOLs and related that to the posterior bowing of the highly flexible IOL. Posterior bowing of the IOL was similarly incriminated for causing the undesirable hyperopia in our case; however, it was secondary to the aniridia CTRs implanted in the bag alongside the IOL. Standard IOL calculation does not consider the added size of the aniridia CTRs or the potential interactions of the iris leaflets with the IOL, issues which have not been reported in the literature. Our case demonstrated that in aniridia cases, aniridia CTRs can successfully diminish patients’ glare and photophobia. Nevertheless, bulky aniridia CTRs can
deform 1-piece acrylic IOLs and cause refractive surprises. Future research should evaluate the use of more rigid IOL types to resist deformity in a crowded capsular bag and avoid undue hyperopic shifts as a result of IOL bowing with the use of aniridia CTRs.

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