THE RETINA PARTNERS

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Case of the Month – June 2020

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A 70-year-old female was referred with concern for retained lens fragments and a malpositioned anterior chamber intraocular lens (ACIOL) two weeks after cataract extraction with intraocular lens implantation (CEIOL) in the left eye (OS). The patient noted subjectively that her vision had improved with surgery, but that it was "hazy" and complained of numerous floaters. Visual acuity (VA) OS had improved from 20/200 to 20/60 after CEIOL for a brunescent cataract, complicated by anterior and posterior capsular rupture, vitreous prolapse, a malpositioned ACIOL, and retained lens fragments.

On exam, VA was 20/25 in the right eye (OD) and 20/60 OS. Intraocular pressures were 13 OD and 21 OS. Slit lamp exam OD revealed a well-centered 1-piece intraocular lens (IOL) in the capsular bag. In the OS, there were 4 nylon sutures to the temporal, clear corneal incision (~6-7 mm incision), which was Seidel negative, and there was ACIOL haptic-corneal touch and corneal edema. The anterior chamber was moderately deep and quiet. There were two patent peripheral iridectomies inferonasally and superonasally. A malpositioned ACIOL was present, with mild nasal decentration, the haptics in the "S" rather than the "reverse S" position, and there was mild nasal peaking of the pupil. The optic was vaulted backwards towards the iris with optic-iris touch.

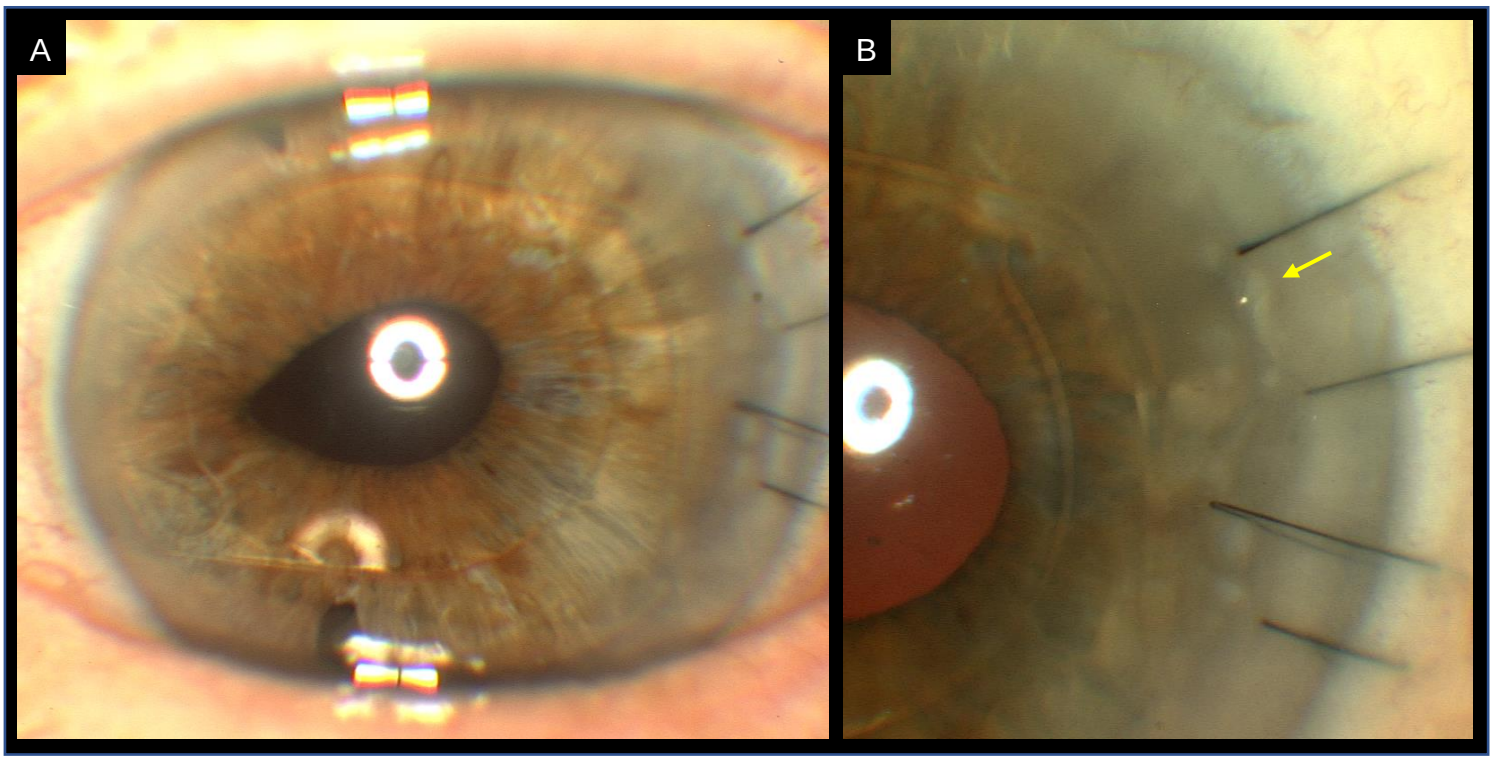

Figure 1: (A) Slit lamp photos of the left eye, two weeks after CEIOL, reveal an anterior chamber intraocular lens (ACIOL), with mild nasal decentration, mild peaking of the pupil nasally, and patent peripheral iridotomies (inferonasally and superonasally). The ACIOL is malpositioned, with the haptics in the "S" position. (B) Nylon corneal sutures are intact at the main incision temporally, and there is corneal edema secondary to ACIOL haptic – corneal endothelial touch (yellow arrow).

Dilated fundus examination (DFE) OD was within normal limits. DFE OS revealed a partial posterior vitreous detachment OS, several small nuclear retained lens fragments as well as retained cortical fragments. The exam was otherwise normal, and the retina was attached for 360 degrees without holes or tears.

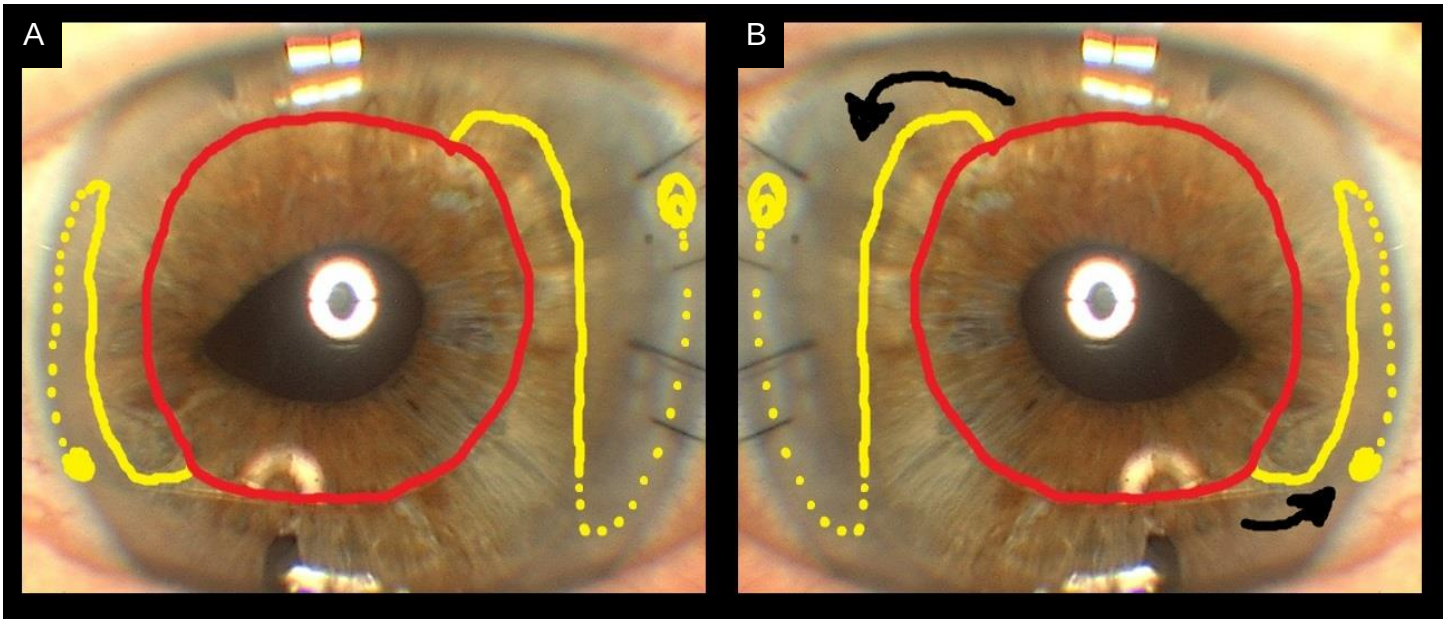

Figure 2: (A) Drawing overlay on the slit lamp photo from Figure 1A. Attention is drawn to the optic-haptic junction (red for optic, solid yellow for haptic at the optic-haptic junction), where the orientation of the haptics with respect to the optic are in the "S" position. (B) The inverted 2A image now in 2B shows what the correct "reverse S" position of the ACIOL would be (black arrows).

Clinical Course:

The patient elected to proceed with surgery, after understanding the risks, benefits, and alternatives, including the additional systemic risks of the COVID-19 pandemic. The patient was taken to the operating room, and 25-gauge pars plana vitrectomy, pars plana lensectomy, ACIOL explantation, and implantation of a sutureless scleral-fixated IOL with flanged haptics was performed (as there was inadequate anterior capsular support for implantation of a sulcus IOL). After induction of a posterior vitreous detachment, core vitrectomy was performed. Pars plana lensectomy followed, and small nuclear as well as cortical lens fragments were removed. Peripheral shaving of the vitreous base was performed with special attention to the areas underlying the trocars, in order to avoid vitreous incarceration or IOL tilt from remnant vitreous traction on the tunneled haptics postoperatively (Surgical Video: https://youtu.be/VWo8x9dmLMw).

A modified, 3-port sutureless intrascleral fixation technique was utilized, based on techniques previously described by Dr. Yamane and Dr. Wolfe, among others. The trocars were preplaced 2.1 mm from the limbus, with two cannulas 180 degrees away from each other tunneled in the "reverse S" position. Explantation of the ACIOL was then performed. Given that the 6-7 mm clear corneal incision constructed during CEIOL was still recent, the decision was made to use the same incision to explant the ACIOL rather than to create a scleral tunnel and a second incision into the eye for explantation. The main incision was opened bluntly with viscoelastic. The ACIOL was gently disengaged from the cornea and the iris and was removed with forceps.

Two 10-0 nylon sutures were used to close the inferior and superior thirds of the main corneal incision. Secondary IOL implantation was then performed. A CT Lucia 602 IOL was selected for the superior durability profile of its haptics and desirable optical properties. The infusion was then exchanged from the inferotemporal to the superotemporal cannula. Next, the leading haptic was tunneled through the inferotemporal sclerotomy, the haptic was externalized, and the tip of the haptic was treated with low-temperature cautery to create a flange. The lagging haptic was then tunneled through the superonasal sclerotomy, and the haptic was flanged. Both haptics were tucked into the sclerotomies, underneath the conjunctiva. The main corneal incision was then closed with a final 10-0 nylon suture. At the completion of the case, the lens fragments were resolved, the retina was attached without holes or tears, the IOL was well-centered without tilt, and the haptics were well buried into the sclerotomies and covered by conjunctiva.

The patient did well post-operatively. Vision improved to 20/40 on post-op week 1. At post-op month 1, the corneal sutures were removed, and on post-op month 2, vision improved to 20/25, with normal intraocular pressures at all visits. The IOL was well-centered without tilt, and in good position without iris rubbing in the miotic or mydriatic state. The haptics were well buried within the sclerotomies and well-covered by conjunctiva.

Discussion:

The incidence of retained lens fragments after cataract surgery is 0.3-1.1%. Secondary complications can include acute or chronic inflammation, ocular hypertension or secondary glaucoma, corneal edema, cystoid macular edema, and retinal tears or detachments, among others. The severity of postoperative inflammation is often associated with the amount of retained lens material, especially in the case of nuclear fragments.

Inadvertent upside-down or malpositioned ACIOLs can lead to concomitant chronic iritis, cystoid macular edema (CME), pupil capture, iris adhesions, and corneal decompensation and require repositioning or IOL exchange.

The timing of vitrectomy for lens fragment removal is a subject of great interest and discussion. While there is no consensus on the timing, neither by the American Academy of Ophthalmology, nor the American Society of Retina Specialists, retained lens fragments represent a serious, albeit rare complication of cataract surgery. Some data suggests that the best outcomes can be achieved by performing vitrectomy 1-3 weeks after cataract surgery. Factors that support early, urgent intervention include high intraocular pressure despite medical management, the presence or suspicion of a retinal tear or detachment, or concomitant endophthalmitis. In cases with vitreous hemorrhage precluding a view posteriorly, this suspicion may be based on the discussion with the referring surgeon and on B-scan ultrasonography in the clinic. Factors that would support waiting include diffuse corneal edema that would preclude a view posteriorly for a safe surgical intervention, or a mild degree of retained cortical lens fragments without nuclear pieces. Cortical lens fragments can be monitored for weeks to see if they will resolve without surgery. One meta-analysis reported worsening outcomes for each 1-week delay in vitrectomy for lens fragments, after CEIOL post-operative week 2.

The lens status of the patient is also important to consider. In patients who are aphakic with retained lens fragments, it can be beneficial to the patient to perform implantation of a secondary IOL, if indicated, at the time of lens fragment removal. This requires planning for the type of secondary IOL, whether sulcus, scleral-fixated, ACIOL, etc. Numerous studies have shown no long-term differences in visual acuity or complication profiles between the various types of secondary IOLs. Thus, the decision for the type of secondary IOL should depend most greatly on the surgeon's familiarity and expertise with any of the given techniques, unless there are other circumstances that would dictate superiority of one technique over another. With adequate anterior capsular support, sulcus placement may be preferable. Without adequate capsule, a patient with diffuse conjunctival scarring (e.g. trauma, burn, previous surgeries) may fair better with an ACIOL than a scleral-fixated IOL. In contrast, a patient with significant corneal endothelial loss or Fuchs' might theoretically do better with a scleral-fixated IOL. The surgeon's preoperative judgement is critical for achieving the best outcomes.

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Take Home Points: Retained Lens Fragments & Intraocular Lens Exchange

- Retained lens fragments are a rare, albeit serious complication of cataract surgery. The optimal timing of repair depends on the individual patient's case.
- Numerous secondary intraocular lens exchange and implantation techniques have been described with similar, excellent outcomes. The optimal method depends on the patient's anatomy and surgeon's individual expertise.

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