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CASE REPORT

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Isolated posterior capsule rupture after blunt eye injury

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Abstract

Isolated posterior capsule rupture of the crystalline lens after blunt eye injury is a rare complication and demands a special surgical management strategy in order to achieve a good visual outcome.

KEYWORDS

forehead trauma, posterior capsule rupture, traumatic cataract

1 | INTRODUCTION

The present manuscript reports a male patient who visited an ophthalmologist 3 weeks after blunt eye injury. He had closed globe injury and traumatic cataract with isolated posterior capsule rupture. There are limited studies reporting about such type of complication. The management with phacoemulsification and combined pars plana vitrectomy with reverse optic capture of single-piece intraocular lens was performed due to an extension of the posterior capsule tear. Six months after the surgery, the patient achieved a best-corrected visual acuity of 20/16, and no signs of active inflammation or intraocular pressure elevation were noted.

Traumatic cataract with isolated posterior capsule rupture is a rare complication of blunt ocular trauma and therefore demands a well-considered and diverse approach in surgical management in order to achieve a good visual outcome.[1,2] Furthermore, there is a lack of peer-reviewed literature reporting about such type of complication.[1-5]

2 | CASE PRESENTATION

The present case report discusses a 39-year-old male patient who visited a doctor in the ophthalmology department on 14 August 2019 due to an ocular emergency. The patient complained of gradual visual loss in the left eye, blurred vision, and difficulty reading small-sized text on the phone or tablet. The complaints mentioned were noticed after a blunt left-eye injury at the end of July 2019—more than 3 weeks before visiting the ophthalmologist—which happened while repairing a tractor. A rubber belt ruptured and hit the patient's left eyeball with high speed and force.

2.1 | Examination

Ophthalmic examination indicated reduced visual acuity in the left eye. The uncorrected visual acuity (UCVA) was 20/16 in the right eye and 20/40 in the left. The intraocular pressure (IOP) did not differ significantly between the eyes, which was as follows: 16 mmHg in the right eye and 18 mm Hg in the left eye.

An examination of the right eye with a slit lamp was unremarkable. The left eye presented normal periorbital and ocular surfaces. Biomicroscopy revealed no signs of open globe injury. In contrast, it demonstrated smooth and clear cornea, and normal anterior chamber depth with no signs of hyphema or presence of cells in the anterior chamber; the pupil was round and had a normal pupillary reflex to the bright light. The anterior capsule of the lens was intact, yet isolated, and longitudinal posterior capsule rupture (PCR) with posterior pole lens opacification was recognized (Figure 1). The results from gonioscopy revealed a wide angle with no angle

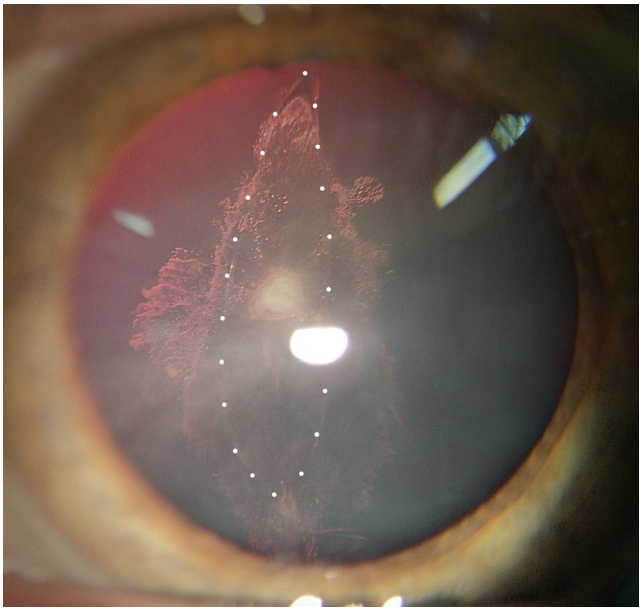

FIGURE 1 Slit-lamp image of isolated posterior capsule rupture

recession. B-scan ultrasound detected a flat retina and clear vitreous. A computed tomography scan for skull fractures was negative.

2.2 | The surgical management

The present traumatic cataract case was treated in our department. The procedure implied the management of the loss of posterior capsule support with reverse optic capture. The cataract surgery was performed combined with 23G pars plana vitrectomy. A conventional 2.4-mm clear corneal incision was made along with paracentesis. A 360° intact continuous curvilinear capsulorhexis (CCC), smaller than usual, with a diameter of about 4 mm, was created by the use of capsulotomy forceps. Instead of conventional cataract surgery, the hydrodelineation of the lens nucleus was performed without hydrodissection. The lens nucleus was extracted with low flow settings of a phaco machine. In order to remove the cortex, slow aspiration with a manual coaxial handpiece was performed. When the majority of the cortex was removed, an extensive PCR was observed. It excluded the possibility of intraocular lens (IOL) implantation in the bag. To minimize the vitreous prolapse, an injection of dispersive viscoelastic was administered to create a tamponade near the torn part of the capsule. A single-piece foldable IOL was implanted, and stable reverse rhexis fixation was obtained by applying a forward optic capture technique. However, single-piece IOL in the sulus may cause multitude of problem in postoperative period including uveits, hyphema, glaucoma, pigment dispersion, dysphotopsia, cystoid macular edema, and iris chafing with transillumination defects.[6] After stabilizing the anterior chamber and hydrating the corneal incisions, 23G pars plana vitrectomy was performed to evacuate herniated vitreous from the posterior capsule tear and dropping cortical fragments from the vitreous body. A standard postoperative medication, according to the practice of the clinic, consisting of topical dexamethasone and chloramphenicol, was prescribed and gradually tapered over a period of 4 weeks.

2.3 | The outcome

Six months after the surgery, uncorrected visual acuity was 20/25, while the best-corrected visual acuity (BCVA) with a slight myopic shift of 0.5 D was 20/16. The IOP recorded was 17 mm Hg in both eyes. The results of gonioscopy revealed a wide angle with no angle recession (Schaffer scale grade 4). No signs of active inflammation during a slit-lamp examination were observed. The implanted IOL was stable and demonstrated no signs of dislocation (Figure 2). A mild stretch of the capsular opening was noticed. Optical coherence tomography scans of the anterior segment were performed to visualize the position of the IOL (Figures 3 and 4).

3 | DISCUSSION

Blunt ocular trauma may damage the cornea, sclera, retina, and subluxate or luxate the lens. However, there are few literature sources on isolated PCR following a blunt eye injury.[2]

The management of PCR depends on several parameters like the extent and location of the tear, the amount of residual nucleus and cortex, and the presence of vitreous in the anterior chamber. As there are limited articles reporting capsular tear fibrosis and successful IOL implantation in the bag,[2] the

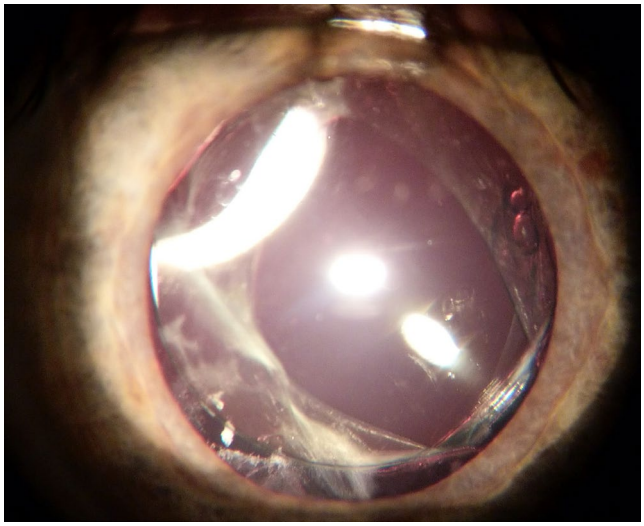

FIGURE 2 Slit-lamp image of reverse optic capture

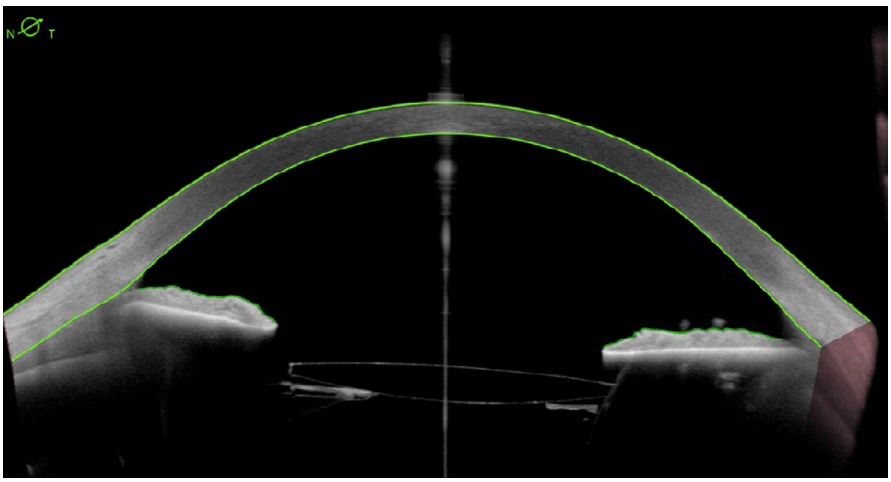

FIGURE 3 Optical coherence tomography anterior segment scan imaging IOL optic before anterior capsule. IOL, intraocular lens

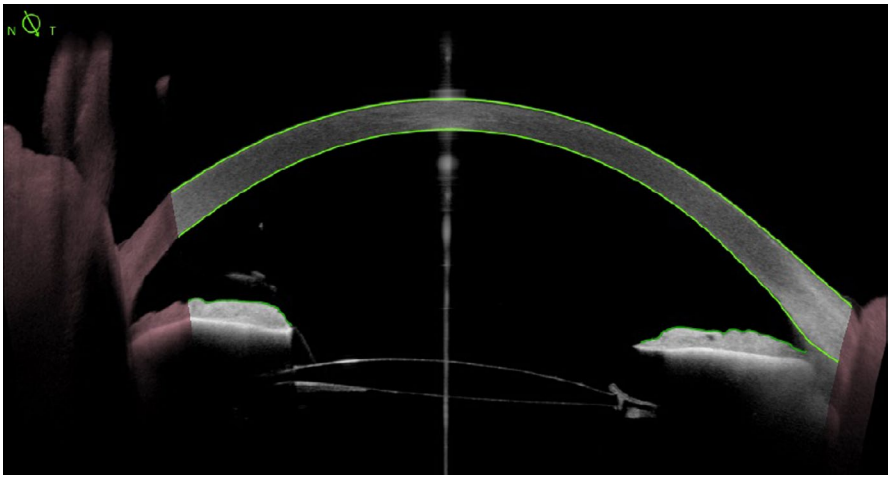

FIGURE 4 Optical coherence tomography anterior segment scan imaging IOL haptic on the right heading beneath anterior capsule. IOL, intraocular lens

primary plan regarding this case was the IOL implantation in the capsular bag. Considering the extension of the PCR and prolapsed vitreous in the tear, pars plana vitrectomy with lensectomy were selected as the most appropriate method for the treatment of the issue.

Another important point is the selection of the IOL. In the case of PCR with the loss of posterior capsule support, many surgeons would consider a 3-piece IOL designed for the sulcus fixation. Unfortunately, such an option was not available in our clinic. Although iris-fixated IOL is one of the options, it must be remembered that most of the lenses of this design are single-piece polymethyl methacrylate (PMMA) IOL with 8.5 mm overall length and 5 mm clear optical zone.[7] As a result, these lenses are not foldable and require a wide corneal incision and sutures inducing astigmatism.[8] There is no denying that this was not considered to be the best treatment for the 39-year-old male. The surgeons should remember that if the reverse optic capture does not work, it is possible to remove the lens and replace it with a 3-piece IOL with sulcus fixation or iris-fixated IOL. However, if none of this is available, and the only option is a single-piece IOL, a reverse optic capture or so-called forward optic capture can be considered. Reverse optic capture has been mentioned in a previous study during the treatment of similar cases.[4] Reverse optic capture is a technique of IOL implantation during which the haptics of a 3-piece or single-piece lens are positioned posterior to the anterior capsulotomy, while the optic is anterior to the edge of the anterior capsular opening. This technique requires that the anterior capsular rim of the CCC is intact for the full 360 degrees and smaller in diameter than the IOL optics.[8] During the surgery, the IOL optic is brought through the CCC anteriorly to achieve reverse rhexis fixation. This technique is useful when the IOL is placed in the capsular bag, but a posterior capsule tear occurs as soon as the IOL is placed in the bag or is noticed or extends after IOL placement. Therefore, the IOL fixation is not considered stable.[9]

The main advantage of reverse optic capture is the possibility of using a single-piece IOL. Currently, these are the most common type of lenses applied in our operating room and are readily available. The injector system and incision size remain constant, while the reverse optic capture cannot be performed if the capsulotomy is too big to capture the optic effectively. Such an issue may occur in the case of a manually

performed CCC. In reverse optic capture, although the haptics are at a distance from the iris, the optic edge is anterior to the capsule and, therefore, close to the iris plane. This could predispose some patients to iris chafe, pigment dispersion, and uveitis-glaucoma-hyphema (UGH) syndrome. It is important to monitor patients for these issues so that any problem can be addressed as soon as possible.[9]

Another potential disadvantage highlighted by Dr Jason J. Jones is the remaining fibrotic posterior capsular opacification caused by the optic not serving to separate the anterior and the residual posterior capsule. Posterior capsular YAG laser capsulotomy can and should be applied in cases of opacification occurrence.[9]

In conclusion, isolated lens posterior capsule rupture after blunt eye injury is a rare complication and demands a special surgical management strategy in order to achieve a good visual outcome.

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CONFLICT OF INTEREST

The authors declare no potential conflicts of interest.

AUTHOR CONTRIBUTIONS

ĒE: contributed to literature review and data collection; JV: contributed to manuscript revision; EE: contributed to literature review and data collection; OG: contributed to data collection; GL: contributed to final manuscript revision and approval.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

PRIOR PUBLICATION

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DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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