

UBM in Lens Particle Glaucoma After Penetrating Injury

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Lens particle glaucoma after penetrating ocular trauma is secondary to lens capsular rupture by a sharp element. The resulting glaucoma depends on the amount of lens fragments released into the anterior chamber, the inflammatory response, and the ability of the trabecular meshwork to clear the material. The purpose of this article is to report a lens particle glaucoma case of a patient who attended at the emergency room three months after suffering a penetrating eye trauma with a wire. Although the medical treatment for glaucoma and inflammation should be established initially in this entity, the definitive treatment is by means of the extraction of the lens and its fragments. When patients delays in attending, peripheral anterior synechiae and serious glaucomatous damage may be found. If significative goniosynechiae develop, a filtering surgery may be required. Ultrasound biomicroscopy could be a useful complementary aid to diagnosis, surgical plan and follow-up.

Keywords: Lens-induced Glaucoma; Penetrating Injury; Eye Trauma**Abbreviation**

AC: Anterior Chamber; AH: Aqueous Humor; BCVA: Best Corrected Visual Acuity; CAI: Carbonic Anhydrase Inhibitors; ER: Emergency Room; IOP: Intraocular Pressure; PAS: Peripheral Anterior Synechiae; TM: Trabecular Meshwork; UBM: Ultrasound Biomicroscopy

Introduction

Penetrating ocular trauma cases are typically characterized by their complexity and heterogeneity, since they can be accompanied by other multiple ocular injuries [1]. Lens particle glaucoma is a lens-induced glaucoma secondary to penetrating ocular trauma. Other mechanisms that can generate an increase in IOP after penetrating trauma may be: pupillary seclusion with "iris bombé"; intraocular hemorrhage, as occurs in hyphema or ghost cell glaucoma; lens-induced mechanisms, as in lens particle glaucoma or phacoanaphylactic glaucoma; and epithelial downgrowth [2].

After the rupture of the anterior lens capsule with a sharp element, the release of lens material may induce an increase in IOP by pre-trabecular obstruction and trabecular inflammation. The resulting glaucoma depends on the amount of material involved, the inflammatory response, and the ability of the trabecular meshwork to clear the material [3]. In general, the release of these lens particles and the consequent ocular hypertension begin to manifest within a few days after the trauma.

When the patient delays in consulting, the visual prognosis is usually more reserved.

The initial management of this type of glaucoma is by topical and systemic drugs with aqueous suppressing effect and with the addition of topical steroids to control inflammation. The definitive treatment is to remove the lens and its particles. A delay in surgical treatment could cause further glaucomatous damage, synechiae formation, cystoid macular edema, or corneal decompensation [4].

Case Report

The purpose of this article is to report a case of a 23-year-old patient who attended at the ER of Santa Lucía Ophthalmic Hospital, referring decreased vision and pain in his OS after an ocular trauma with a wire, three months earlier. His BCVA was 20/20 in OD and light projection in OS. Slit lamp examination revealed: mild corneal edema, a full corneal thickness scar, a mature cataract with thick white particles suspended in the AH (Figure 1), significant flare, AC reaction and PAS. The IOP was 12 mmHg in OD and 46 mmHg in OS. While in the OD no alterations were observed in the ocular fundus, this exam could not be performed in the OS due to media opacity. Vitreous silence was confirmed in OS by ultrasound. The UBM revealed an anterior capsular rupture, lens fragments in the anterior chamber (Figure 2), PAS, and zonular dialysis (Figure 3). Glaucoma was initially treated with oral CAI and topical aqueous suppressants; and inflammation, with corticosteroid drops. Surgical treatment consisted of lensectomy and removal of lens fragments (Figure 4). After lensectomy, an optic disc with a 1.0 cup-to-disc ratio was noted with no other retinal injuries. Because the IOP continued with very high values, probably due to extensive PAS (Figure 5) and trabecular damage, trabeculectomy with Mitomycin-C was also performed (Figure 6 and 7). We emphasize the importance of making a correct diagnosis of this pathology and to perform an early surgical management to resolve it successfully. UBM could be a useful complementary aid to the diagnosis and surgical plan.

Figure 1: Slit lamp iconography of lens particle glaucoma. Note mild corneal edema, full-thickness corneal scar, lens fragment in AC, and traumatic cataract.

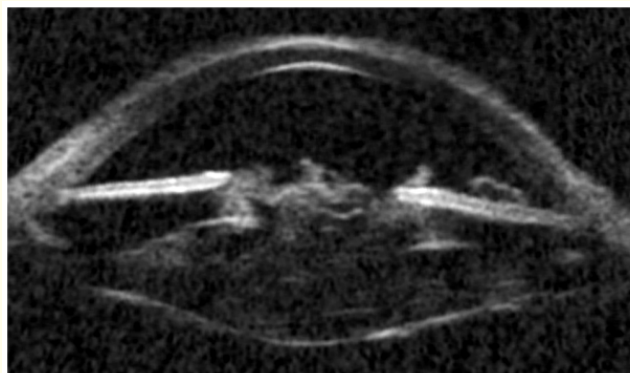


Figure 2: UBM where it is seen an open anterior capsule releasing lens material into the anterior chamber.

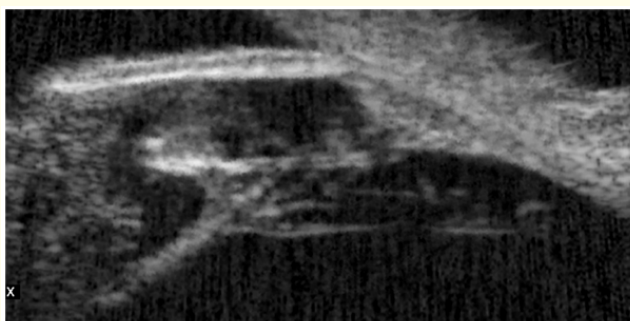


Figure 3: UBM showing PAS, zonular dialysis and anterior capsule rupture.

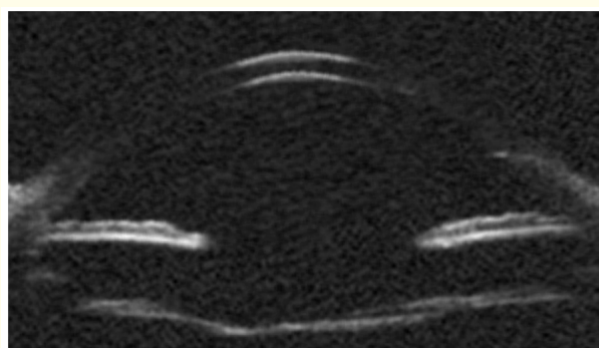


Figure 4: UBM after lensectomy. Noted the aphakia.



Figure 5: UBM after lensectomy where aphakia and PAS are observed.

Figure 6: Slit lamp iconography after lensectomy and trabeculectomy showing aphakia, surgical iridectomy and part of the trabeculectomy bleb.

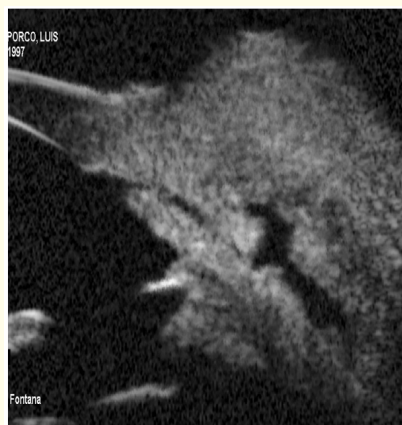


Figure 7. UBM after trabeculectomy. Note from right to left: filtering bleb, scleral flap, patent scleral ostium and iridectomy.

Discussion

peripheral anterior synechiae [3,5], in this case, the mechanism that caused glaucoma was the capsular rupture by a sharp element and the consequent release of lens fragments. The ocular inflammation and the obstruction of the TM caused by this lens material then predisposed to the development of angular synechiae. Due to the delay of the patient in attending, we do not know if he initially had a hyphema, which could have contributed to the formation of these PAS.

The resulting glaucoma depends on the amount of material involved, the inflammatory response, and the ability of the trabecular meshwork to clear the lens fragments. In general, the release of this material and the consequent ocular hypertension begin to manifest within a few days after the trauma. When the patient delays in attending, the diagnosis may become difficult. It usually helps to establish the correct sequence of events. The characteristic symptomatology is a significantly painful red eye with decreased vision. The examination reveals corneal edema, high IOP, open angle, thick white particles in the aqueous humor, significant flare and AC reaction, which may also be accompanied by a sterile hypopyon. If this condition takes time to develop, peripheral anterior synechiae and posterior synechiae could also be observed.

A differential diagnosis to take into account is phacoanaphylactic glaucoma, a condition that can occur after sensitization of the immune system against lens proteins [6]. It is a granulomatous inflammatory reaction involving polymorphonuclear leukocytes, lymphocytes, and giant cells [7], which may also affect the TM, generating an IOP peak. The absence of granulomatous keratic precipitates was enough in this case to clinically rule out this condition.

We believe the lensectomy was not enough to regulate IOP because of the patient's excessive delay in attending to the ER, which may have contributed to the development of PAS and glaucoma damage. We do not know the amount of time in which his IOP was out of control and we also don't know the IOP values prior to the first consultation, but we infer that his severely damaged left optic disc probably endured too high IOPs for a significative period of time.

Despite the fact that we managed to reduce IOP with filtering surgery, the final BCVA obtained was very poor (20/200). The authors believe that the advanced glaucomatous damage evidenced in the left optic disc only before lensectomy was caused before the patient consulted, who may have had very high IOP values for months.

Conclusion

Even though lens particle glaucoma usually resolve with medical treatment plus lensectomy, if secondary complications as PAS or iris bombé develop, glaucoma filtering surgery may be needed. An early diagnosis and treatment is essential for the proper management of this pathology. Ultrasound biomicroscopy might be a useful complementary aid for diagnosis, surgical plan and follow-up.

Conflict of Interest

The authors do not have any financial interest concerning this case report.

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