



UBM in Lens Particle Glaucoma Due to Penetrating Injury: A Case Report

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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 with 3-months history of penetrating eye injury. 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. In this case, ultrasound biomicroscopy served as a complementary aid to diagnosis and surgical plan.

Keywords: Ultrasound Biomicroscopy; Lens-Induced Glaucoma; Penetrating Injury; Eye Trauma**Abbreviations**

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

Introduction

Lens particle glaucoma is a lens-induced glaucoma that may occur after trauma to the lens, cataract surgery or Nd: YAG posterior capsulotomy [1]. When secondary to penetrating injury, a sharp element disrupt the anterior lens capsule, releasing lens material into the anterior chamber that may provoke 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 this material [2]. In general, the liberation 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, as in this case, the visual prognosis is usually more reserved. 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. Although the initial management of this type of glaucoma is to control IOP and inflammation with medical treatment, the definitive treatment is to surgically remove the lens and its particles. Due to the large amount of inflammation and the high IOP values that are usually observed in this type of glaucoma, any delay to establish the treatment may cause irreversible glaucomatous damage, among other possible complications [3]. This report, is accompanied by an interesting series of figures of the case, including unique UBM images of lens particle glaucoma.

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 penetrating injury 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 Prednisolone Acetate 1% drops. The surgical approach due to the glaucoma emergency consisted of lensectomy and removal of lens fragments, leaving the surgical implantation of an IOL for a second time (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 MMC 0.2 mg/ml was also performed (Figure 6 and 7).

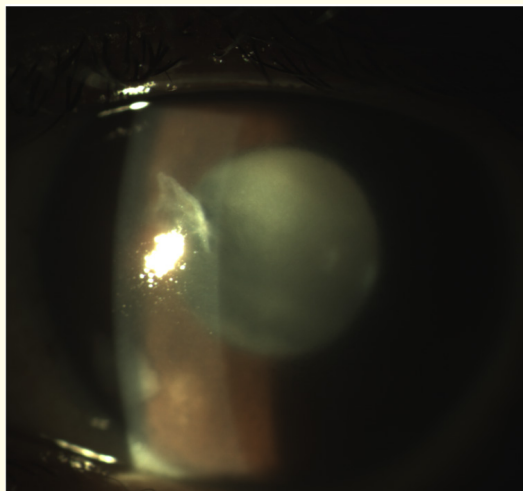


Figure 1: Slit lamp iconography of lens particle glaucoma. Note mild corneal edema, full-thickness corneal scar, lens fragment in AC, and mature cataract.

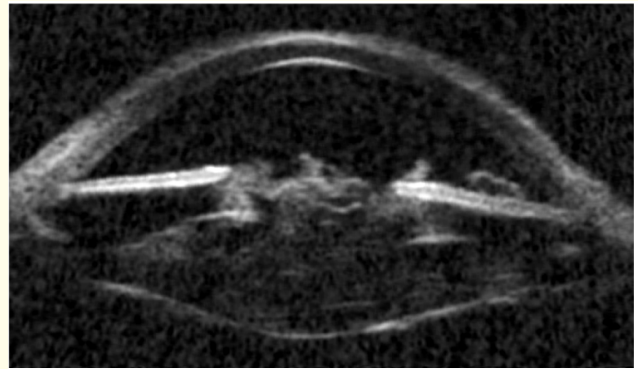


Figure 2: UBM where it is seen an open anterior capsule releasing lens material into the anterior chamber.

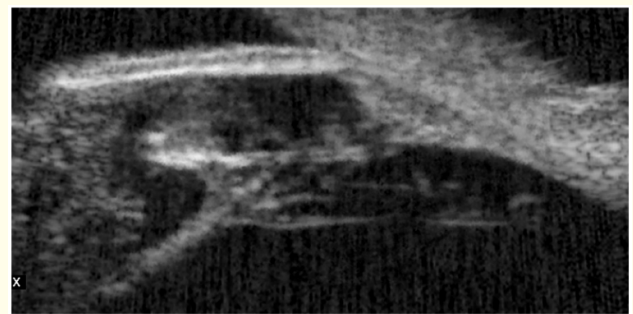


Figure 2: UBM showing PAS, zonular dialysis and anterior capsule rupture.

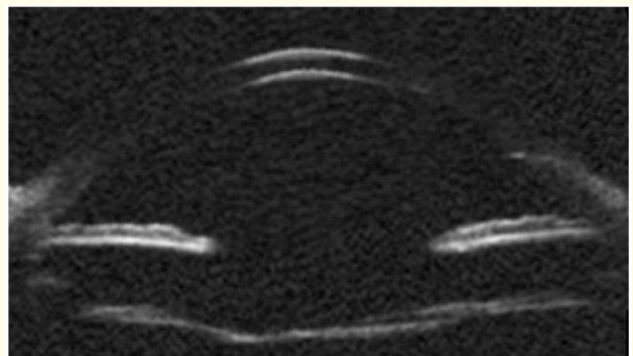


Figure 3: UBM after lensectomy. Noted the aphakia.

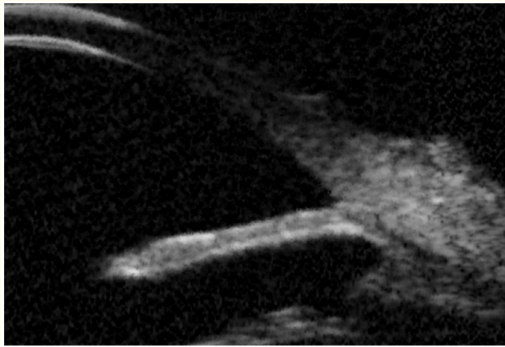


Figure 5: UBM after lensectomy where aphakia and PAS are observed.

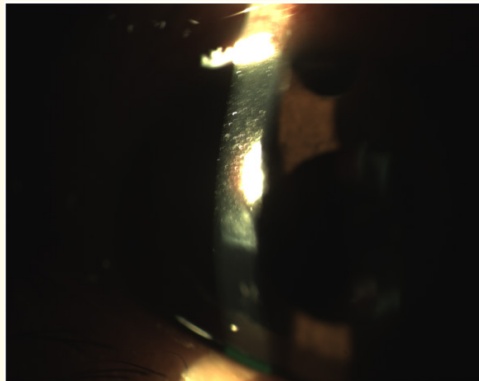


Figure 6: Slit lamp iconography after lensectomy and trabeculectomy. Note the aphakia, the iridectomy and the bleb.

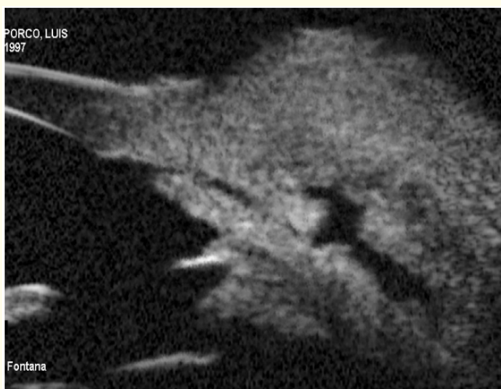


Figure 7: UBM after trabeculectomy. Note from right to left: filtering bleb, scleral flap, patent scleral ostium and iridectomy.

Discussion

Although the main reported cause of glaucoma after a penetrating injury is the development of peripheral anterior synechiae [2,4], 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 these 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 any additional damage like hyphema, which could have contributed to the formation of these PAS.

A differential diagnosis to take into account is phacoanaphylactic glaucoma, a condition that can occur after sensitization of the immune system against lens proteins [5]. It is a granulomatous inflammatory reaction involving polymorphonuclear leukocytes, lymphocytes, and giant cells [6], 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.

Other mechanisms that can generate an increase in IOP after penetrating injury may be: pupillary seclusion with “iris bombé”; intraocular hemorrhage, as occurs in hyphema or ghost cell glaucoma; and epithelial downgrowth [7].

We believe the lensectomy was not enough to regulate IOP because of the patient’s excessive delay in attending to the ER. We established his lack of awareness as a major factor in his 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 significant period of time.

Although the mean IOP was 12 mmHg after 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 after lensectomy, was caused before the patient consulted, who may have had very high IOP values for months.

Conclusion

Even though lens particle glaucoma 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. The authors emphasized the importance to diagnose adequately this pathology and the early surgical management to resolve it successfully. In this case, UBM served as a complementary aid to diagnosis and surgical plan.

Conflict of Interest

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

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