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Intralenticular Metallic Foreign Body: A Case Report

Maan Ali Almokdad[1], Ashraf ALakkad[2*]

[1]Department of Ophthalmology, Al Sharq Hospital, Fujairah, United Arab Emirates
[2]Department of Internal Medicine, Madinat Zayed Hospital, AL Dhafra Region, UAE

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***Corresponding author:** Ashraf ALakkad
Department of Internal Medicine, Madinat Zayed Hospital, AL Dhafra Region, UAE

Abstract **Case Report**

Background: Intraocular foreign body (IOFB) injuries exhibit variations based on multiple factors, including size, composition, location, type, contamination, the extent of tissue damage, and potential complications that may arise. ***Case Presentation*:** This case study describes a 48-year-old male patient who presented to the outpatient clinic with a progressive decline in vision in the right eye lasting three weeks. The patient reported a history of redness in the affected eye, occurring for several days after performing maintenance work. Intraocular pressure measurements were normal for both eyes. The slit lamp examination revealed a corneal opacity near the limbus at the 2 o'clock position in the right eye, along with a small peripheral iris hole aligned with the corneal opacity. Additional diagnostic investigations, including a B-scan ultrasound and a CT scan of the orbit without contrast, were conducted. The B-scan ultrasound showed a clear vitreous and a flat retina, while the CT scan detected a metallic foreign body measuring 3x3 mm. The foreign body was found to be partially embedded in the lens and partially in the vitreous, as confirmed by the imaging. As a result, the patient was admitted to the hospital, and a comprehensive treatment plan was implemented. Topical antibiotics, steroids, cycloplegic, and nonsteroidal anti-inflammatory eye drops were prescribed. The patient underwent cataract surgery with sulcus intraocular lens implantation, combined with a pars plana vitrectomy to remove the foreign body. Additional procedures, such as 360 laser treatment, air-fluid exchange, and injection of SF6 gas, were performed. ***Conclusion*:** This case highlights the successful management of an intraocular foreign body injury, emphasizing the significance of prompt diagnosis and appropriate surgical intervention in achieving positive visual outcomes.

Keywords: Metallic, Intra lenticular foreign body, Cataract.

INTRODUCTION

Penetrating ocular trauma is a significant etiology of vision loss, often associated with the presence of an intraocular foreign body (IOFB) [1]. In fact, IOFBs are found in approximately 18% to 41% of open globe injuries, making them a common occurrence in such cases [2]. However, it is important to note that involvement of the lens in these injuries is not as frequent, with intralenticular foreign bodies (ILFBs) accounting for only approximately 5% to 10% of all IOFB cases [3]. Typically, intraocular foreign bodies resulting from penetrating ocular injuries are detected during the initial examination [4]. However, there are instances where an IOFB may be missed, leading to delayed detection. Symptoms associated with a missed IOFB may manifest after a considerable period of time, hindering early identification and intervention [5].

Cataract formation is a common consequence of lens involvement by an IOFB, necessitating cataract surgery for visual rehabilitation in most cases [6]. Retention of an iron-containing foreign body in the lens poses a particularly grave risk, as it can lead to the development of "siderosis bulbi", a sight-threatening condition [7]. Similarly, copper IOFBs can result in chalcosis [8]. In contrast, inert materials such as glass, stone, and plastic tend to be better tolerated by ocular tissues [9]. On the other hand, organic materials often provoke severe tissue reactions and carry a higher risk of contamination [10].

It is worth noting, the size and velocity of the foreign body play a significant role in the extent of ocular damage caused by penetrating injuries [11]. Large foreign bodies entering the sclera at low speeds tend to inflict more substantial damage than small, high-speed foreign bodies entering the cornea [12]. The entry site and final location of the foreign body within

the eye are also critical factors in determining the potential complications and outcomes [13]. In rare cases, an intraocular foreign body may not elicit any immediate inflammatory reaction, and its presence may only be detected during a slit lamp examination conducted as part of cataract surgery or during the cataract operation itself [14]. Understanding the characteristics and implications of intraocular foreign bodies resulting from penetrating ocular injuries is essential for prompt diagnosis and appropriate management. This case report presents challenging case of intracapsular foreign body deep in the lens capsule.

CASE PRESENTATION

A 48-year-old male patient presented to the OPD clinic with a chief complaint of progressive low vision in the right eye for the past three weeks. The patient reported a history of redness in the right eye that lasted a few days after performing maintenance work, specifically hammering a nail, approximately six weeks ago.

The patient underwent a thorough eye examination, which revealed the following findings: The "Uncorrected Visual Acuity" (UCVA) was measured at 0.04 in the right eye and 1.0 in the left eye. The "Best Corrected Visual Acuity" (BCVA) was recorded as 0.08 in the right eye and 1.0 in the left eye. Intraocular Pressure (IOP) was measured at 11 mmHg in the right eye and 12 mmHg in the left eye.

During the Slit Lamp Examination (SLE), the right eye appeared quiet. A juxta limbal corneal opacity was observed at the 2 o'clock position. Additionally, a small peripheral iris hole was detected along the same line as the corneal opacity. The anterior capsule remained intact even after maximum pupil dilation. An advanced cataract was present, and a dark foreign object, possibly a foreign body, was suspected to be deep within the lens. The anterior chamber appeared quiet, and the view of the fundus was poor. A B-scan Ultrasound revealed a clear vitreous and a flat retina. A CT scan of the orbit without contrast revealed a high-density foreign body measuring 3x3 mm. The foreign body appeared to be partially embedded in the lens and partially in the vitreous (intracapsular) and appeared to be metallic. The examination of the left eye showed findings within normal limits.

Given the diagnostic findings, the patient was admitted to the hospital for further management. The following treatment plan was implemented: The patient was started on topical antibiotics, steroids, cycloplegic, and nonsteroidal anti-inflammatory eye drops. Additionally, the patient was prepared for general anesthesia. Cataract surgery with "sulcus intraocular lens" (IOL) implantation was performed. A pars plana vitrectomy was conducted, successfully removing the foreign body. The patient also underwent 360 laser treatment, air-fluid exchange, and injection of gas (SF6). Close follow-up was scheduled to monitor the patient's progress. After six weeks, the patient's Best Corrected Visual Acuity (BCVA) in the right eye improved to 0.9 with a prescription of -0.5 spherical power and -0.25 cylindrical power at an axis of 130 degrees.

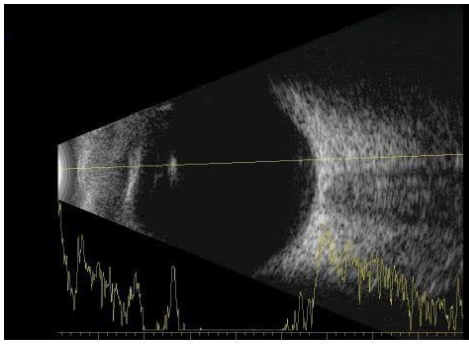

Figure 1: B-Ultrasound intraocular FB

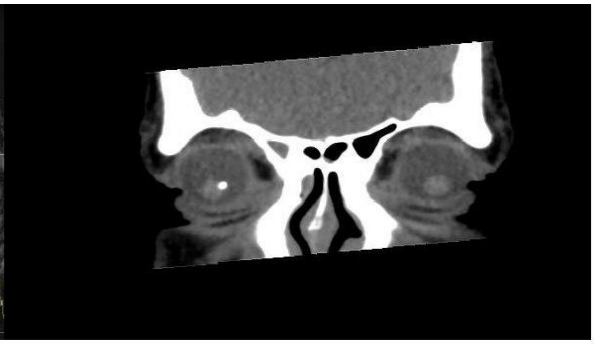

Figure 2: IOFB- coronal CT-scan orbits reveals Rt intraoculr metal FB

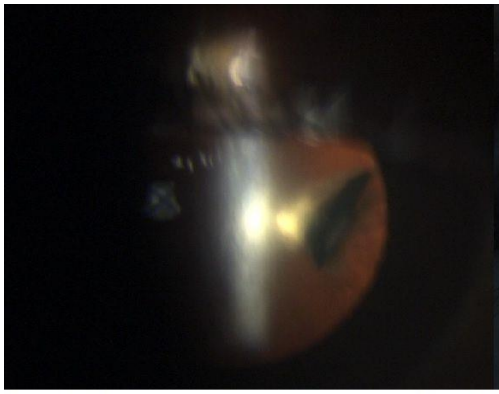

Figure 3: IOFB7pre operation slit lamp examination reveals FB impeded in the posterior capsule

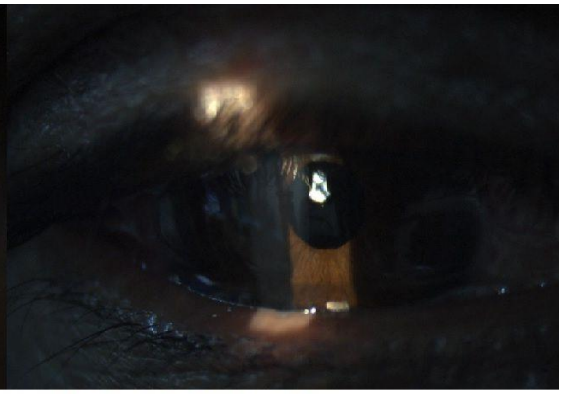

Figure 4: Post operation slit lamp examination

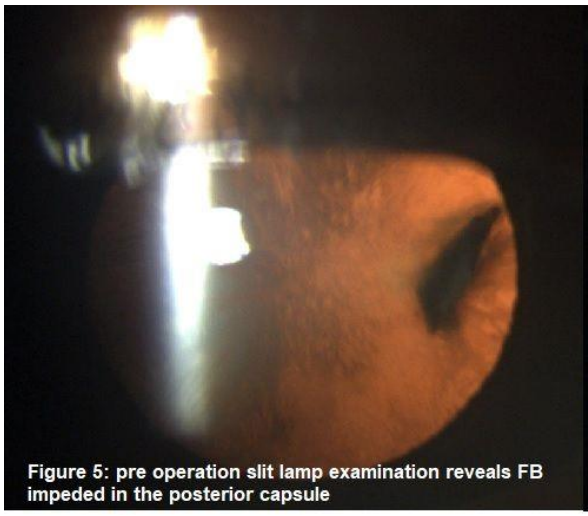

Figure 5: pre operation slit lamp examination reveals FB impeded in the posterior capsule

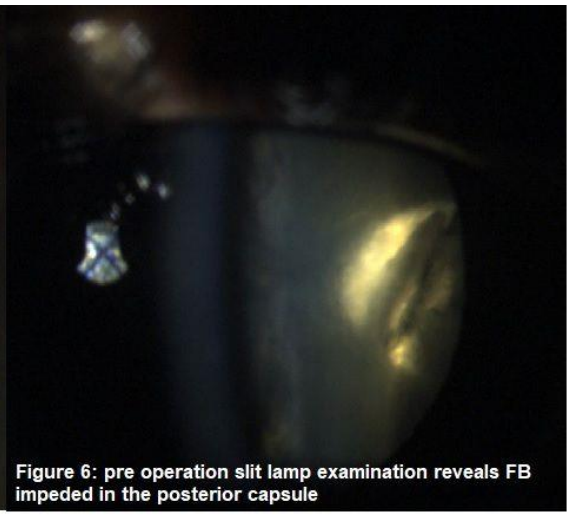

Figure 6: pre operation slit lamp examination reveals FB impeded in the posterior capsule

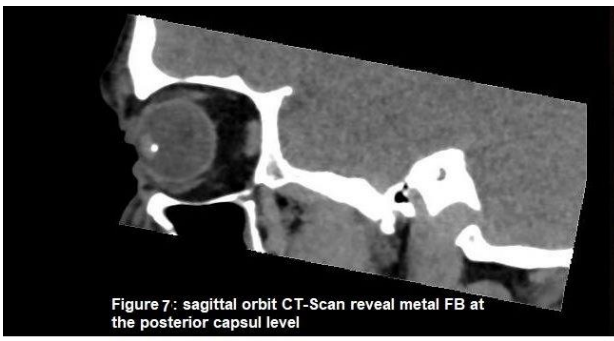

Figure 7: sagittal orbit CT-Scan reveal metal FB at the posterior capsul level

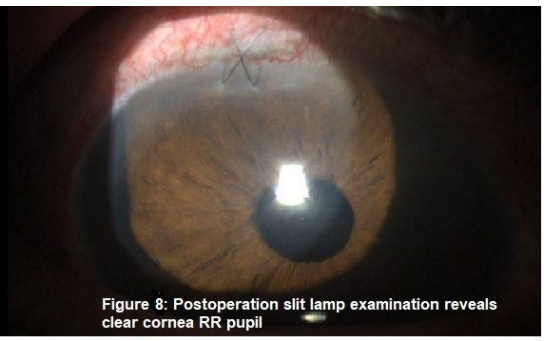

Figure 8: Postoperation slit lamp examination reveals clear cornea RR pupil

DISCUSSION

In this case, a 48-year-old male patient presented with progressive low vision in the right eye following a history of redness after performing maintenance work. Diagnostic assessments revealed a significant difference in visual acuity between the right and left eyes, a juxta limbal corneal opacity, a small peripheral iris hole, an advanced cataract, and a suspected intraocular foreign body (IOFB) embedded in the lens and vitreous. Confirmatory imaging, including B-scan ultrasound and CT-scan, confirmed the presence of the metallic IOFB. The patient underwent cataract surgery with intraocular lens implantation, foreign body removal, “pars plana vitrectomy”, 360 laser treatment, air-fluid exchange, and gas injection. An intralenticular foreign body is a rare condition. In our case, the location of the foreign body (intracapsular) was also uncommon, presenting additional complexities during the surgical procedure and potentially increasing its level of difficulty. To the best of our knowledge, so far, only one case has been found in which the location of the foreign body was also intracapsular [15].

Most patients with a “retained intralenticular foreign body” commonly develop “cataract formation”, resulting in a decrease in visual acuity that often necessitates surgical intervention [16]. However, it is important to note that “progressive cataract formation” is not inevitable in all cases. The presence of “subcapsular epithelium” facilitates the rapid healing of small breaches in the anterior lens capsule through swift epithelial proliferation, thereby restoring its continuity

[17]. This healing process limits the free passage of ions and fluids, which can contribute to the progression of cataract formation [18]. Several case reports have documented patients with localized lens opacities, stable good vision, and the presence of a small embedded foreign body in the lens over extended periods of time, ranging from two years to 60 years [19]. Additionally, besides cataract formation, rare occurrences such as uveitis, glaucoma, abscess formation, endophthalmitis, and intraocular metallosis have been sporadically reported in association with intralenticular foreign bodies [20]. In our specific case, it is noteworthy that despite the absence of a breach in the anterior capsule, advanced cataract formation was observed. The presence of an intralenticular foreign body likely contributed to the accelerated development of the cataract. As the cataract progressed, it resulted in a significant reduction in visual acuity, necessitating surgical intervention.

The development of siderosis bulbi represents the most severe complication associated with a retained intraocular or intralenticular iron-containing foreign body [21]. Clinical manifestations of this condition encompass optic disc swelling, retinal pigmentary degeneration, secondary glaucoma, chronic uveitis, cataract formation, pupil mydriasis, and iris heterochromia [22]. It is important to note that the occurrence of siderosis bulbi has become relatively rare in recent times due to the prompt removal of foreign bodies facilitated by advancements in surgical techniques [23]. These advancements have significantly reduced the likelihood of prolonged retention, thereby mitigating the risk of siderosis bulbi and its associated ocular sequelae.

In our case, advanced cataract formation and swelling were noted. Cataract formation occurs when the natural lens of the eye becomes progressively opaque, leading to blurred vision and decreased visual acuity. In this case, the presence of the intralenticular foreign body may have triggered a cascade of biochemical reactions and cellular changes within the lens, hastening the development of the cataract. These changes could involve alterations in lens protein structure, osmotic balance, or oxidative stress, among other factors.

Furthermore, the observed swelling of the eye may be indicative of an inflammatory response triggered by the presence of the foreign body. Inflammation plays a significant role in ocular trauma and can manifest as tissue edema, redness, and pain. The swelling observed in our case suggests an ongoing inflammatory process, which could further contribute to the cataract formation and overall visual deterioration.

When dealing with foreign objects inside the lens of the eye, the management involves conducting an initial evaluation of different factors, including the size, location, composition, risk of infection, and extent of damage to the lens and other intraocular structures [10]. In cases where the foreign body is small and minute, and does not impact the visual axis, and the lens remains clear with no additional intraocular damage, a conservative approach may be adopted [24]. This approach involves the initial treatment with topical steroids and close observation [25]. However, if any complications arise or the clinical condition worsens, it becomes necessary to proceed with lens extraction, typically in the form of cataract surgery, along with the removal of the intralenticular foreign body [26].

CONCLUSION

Intralenticular foreign body (ILFB) is an uncommon occurrence that should be considered when evaluating a self-sealed small corneal wound after a penetrating eye injury, accompanied by a small iris hole and/or early cataract development. A small corneal wound, a small iris hole, early cataract formation, and a history of trauma collectively indicate a strong likelihood of an intraocular foreign body (IOFB). Therefore, conducting a thorough assessment and appropriate diagnostic workup is crucial in devising an effective management strategy, ultimately leading to favorable outcomes.

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