CASE REPORT

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Difficulties in Imaging Organic Orbital Foreign Bodies

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ABSTRACT Eye trauma constitutes a significant portion of emergency department visits, and intraocular foreign bodies (IOFBs) can lead to severe vision loss if not treated promptly. Diagnostic methods such as computed tomography, magnetic resonance imaging, or ultrasonography can help determine the presence and location of IOFBs. This case report discusses the condition of a 54-year-old woman who suffered trauma from an organic foreign body. The foreign body was not detected by any imaging method but was later identified and successfully removed as the clinical findings progressed. This case highlights the challenges in diagnosing IOFBs and the importance of thorough clinical evaluation, even when imaging methods fall short.

Keywords: Eye foreign bodies; ophthalmology; magnetic resonance imaging

Eye trauma accounts for 3% of all emergency department visits.[1] Intraocular foreign bodies (IOFBs) refer to foreign objects that penetrate the wall of the ocular globe and account for 20-40% of all open-globe injuries. These injuries can lead to varying degrees of damage to the ocular tissues, depending on the size, shape, density of the foreign object, and the velocity of the trauma. IOFB injuries are serious and can result in significant vision loss. These injuries can manifest as penetration, rupture, or perforation. While foreign bodies are most commonly metallic (69%), 67% of open-globe injuries occur in Zone 1 (cornea-limbus).[2] Organic materials account for a significant portion of non-metallic IOFBs, and contamination with organic matter is quite common in rural areas of our country.

In the presence of IOFBs, signs such as eyelid redness and swelling, conjunctival hyperemia, chemosis, ptosis, hyphema, restricted eye movements, shallow anterior chamber, and lens perforation may be observed. Infection is the most serious complication and can lead to endophthalmitis. Early detection and removal of the foreign body, along with infection prophylaxis and treatment management, play a crucial role in IOFB injuries. Delays in detecting and repairing the wound can lead to severe vision loss, permanent ocular surface damage, and even endophthalmitis. Ocular imaging methods, including computed tomography (CT), magnetic resonance imaging (MRI), or ultrasonography (USG), should be considered to diagnose IOFBs. In this case report, we aim to present the clinical presentation and treatment management of a 54-year-old woman with an organic IOFB injury.

CASE REPORT

A 54-year-old woman presented to our clinic with complaints of burning and redness in her left eye after being struck by a broomstick. Her ophthalmological examination revealed bilateral visual acuity of 1.0 on

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the Snellen chart. Intraocular pressure was measured as 13 mmHg in the right eye and 15 mmHg in the left eye using the Goldmann applanation tonometer. Anterior segment examination of the right eye was unremarkable, while the left eye showed conjunctival hyperemia and mild eyelid edema. No epithelial defect, foreign body, or perforation was observed in the cornea. Fundus examination was normal in both eyes, and there was no relative afferent pupillary defect. The patient was prescribed topical moxifloxacin (0.5%) five times daily, along with artificial tears three times daily, and was scheduled for a follow-up.

At her follow-up examination two days later, the right eye remained normal, but visual acuity in the left eye had decreased to 0.3 on the Snellen chart. The anterior segment examination showed widespread chemosis, conjunctival hyperemia, and increased eyelid edema, with restricted eye movements in all directions and diplopia. The fundus examination remained unremarkable, and no relative afferent pupillary defect was present. The patient was admitted to the hospital, and contrast-enhanced orbital CT was ordered. Treatment included moxifloxacin 0.5% five times daily, artificial tears (polyvinyl alcohol + povidone-iodine) five times daily, and a topical ointment containing oxytetracycline HCl and polymyxin B three times daily. Additionally, the patient was treated for suspected orbital cellulitis with systemic piperacillin/tazobactam (4.5 g three times daily) and teicoplanin (400 mg loading dose twice on the first day, followed by 400 mg daily for 14 days). Orbital CT showed trauma-induced hemorrhage and edema, but no foreign body was detected. Due to the poor clinical response to treatment, orbital MRI was performed, which also did not reveal any foreign body (Figure 1).

On the fifth day of hospitalization, as the clinical response remained inadequate, topical antifungal treatment with amphotericin B drops five times daily was added, given the history of trauma involving organic material. On the 10th day of treatment, the chemosis improved, and upon examination, a small (1-2 mm) yellow foreign body, covered with secretion, was suspected in the lower lid fornix. The foreign body, approximately 1 cm in length, was successfully removed with forceps and was identified as a twig (Figure 2). After the foreign body was removed, the patient's chemosis resolved, and the 14-day course of systemic antibiotic treatment was completed. At the follow-up visit after discharge, bilateral visual acuity was fully restored, and the chemosis and eyelid edema had completely resolved, with no diplopia reported.

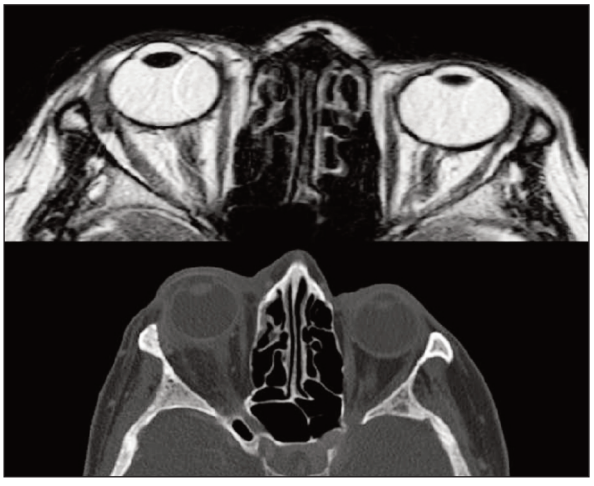

FIGURE 1: Magnetic resonance imaging and computed tomography sequences of the patient reported as clean.

FIGURE 2: A branch piece hidden in the patient's conjunctiva and removed from the lower fornix.

Complete written informed consent was obtained from the patient.

DISCUSSION

IOFBs are a serious ophthalmological emergency and a common cause of blindness.[3] If left untreated, IOFBs can cause not only mechanical damage to the ocular tissues but also permanent chemical damage and infection, affecting visual function.

Detailed history-taking and thorough examination are essential in diagnosing IOFBs. The mechanism of injury and the material causing the trauma should be carefully documented. The patient's symptoms and the clinical history can guide the clinician regarding the location of the injury, the likelihood of IOFB. Some patients may not experience pain or changes in visual acuity after an ocular injury. Children and witnesses may have difficulty recognizing the injury, and symptoms may appear later. Therefore, IOFB should be suspected in all open-globe injury cases. In this case, the initial ophthalmological examination in the emergency department revealed full visual acuity, with no abnormal findings other than mild conjunctival hyperemia.

IOFBs may not be detected during clinical examination, making imaging critical. Diagnostic methods such as plain radiography, CT, MRI, and USG can be used. These methods can help determine the presence and location of IOFBs and provide information about the material. Among patients with open-globe injuries, CT is the most reliable method for detecting IOFBs when compared with clinical examination and B-scan USG.[4] MRI should only be performed after excluding metallic IOFBs, as ferromagnetic foreign bodies can move and cause further damage. B-scan USG can be used when IOFBs are not detected by direct or CT imaging, but it must be performed with extreme caution in cases of open-globe injury to prevent extrusion of ocular contents.

Endophthalmitis is a very serious complication of IOFB injuries, occurring in 6-16% of cases and potentially leading to enucleation.[2,5,6] A study by Zhang et al. involving 1,421 patients with IOFB injuries found that the location of the foreign body and the timing of primary repair were statistically significant risk factors for endophthalmitis.[2] Treatment depends on the location and extent of the injury but generally involves urgent removal of the IOFB and repair of damaged structures. IOFB patients should also receive topical and systemic antibiotics, while most cases of post-traumatic endophthalmitis are caused by Gram-positive bacteria, empirical treatment with broad-spectrum intravenous antibiotics is the standard of care.[7]

In our case, despite performing all imaging modalities, the foreign body was not radiologically detected. The IOFB, a subconjunctival foreign body located in the lower fornix, was successfully removed with forceps, and the globe was found to be intact. The patient exhibited chemosis, restricted eye movements, hyperemia, and reduced visual acuity, but no signs of endophthalmitis were present.

In conclusion, IOFBs may sometimes go undetected with imaging methods. In such cases, clinicians should not dismiss the possibility of a foreign body, especially in cases involving organic materials. Even if the foreign body is not visible on imaging, persistent symptoms should prompt a review of the treatment plan. In these cases, relying on clinical findings and ensuring early intervention and prevention of infection are crucial.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Murat Erdağ;* ***Design:*** *Selma Arslan Mehmetalioğulları;* ***Control/Supervision:*** *Murat Erdağ;* ***Data Collection and/or Processing:*** *Selen Canan Seziş;* ***Analysis and/or Interpretation:*** *Selma Arslan Mehmetalioğulları;* ***Literature Review:*** *Selen Canan Seziş;* ***Writing the Article:*** *Selma Arslan Mehmetalioğulları;* ***Critical Review:*** *Murat Erdağ;* ***References and Fundings:*** *Selen Canan Seziş;* ***Materials:*** *Murat Erdağ.*

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