CASE REPORT

Surgical management of a white cataract induced by a metallic intralenticular foreign body

Alessandro Vasco, MD, Giulia Caruso, MD, Eugenia Vasco, MS

Introduction: A patient with an intralenticular metal foreign body in the right eye who, following initial antibiotic treatment for a corneal wound, developed a traumatic cataract a month after the initial event.

Patient and clinical findings: Upon presentation, the clinical examination of the patient showed just a small corneal leucoma, no signs of inflammation in the anterior segment, and a white cataract.

Diagnosis, intervention, and outcomes: Ultrasound B-scan and orbital computed tomography were performed, which suggested the presence of a metallic foreign body in the crystalline lens. The surgical management of the case, where, given the integrity of the posterior capsule and verified intraoperatively, a triple procedure was performed, with foreign body extraction, phacoemulsification, and IOL implantation, resulting in a good visual outcome.

Conclusions: Metallic intralenticular foreign bodies represent a rare finding that sometimes goes unnoticed in the clinical examination, but which can lead to serious sight-threatening complications and should therefore not be underestimated. When a foreign body sensation is referred, an accurate examination of the anterior segment is necessary. The surgery required in case of complications can be challenging and demands attentive preoperative evaluation and readiness to adapt to conditions found intraoperatively.

According to what is reported by the most recent data available in the literature, occupational eye injuries account for a third of eye patients seeking treatment at an accident and emergency department.\(^1\) The incidence of intraocular foreign bodies, among open-globe injuries, ranges from 18% to 41%. It has been reported that most intraocular foreign bodies are metallic in nature.

Intralenticular foreign bodies are only rarely observed in ophthalmological clinical practice and represent only 2% to 10% of all intrabulbar foreign bodies.\(^2\)

The presence of a foreign body in the crystalline lens can have several consequences: cases have been reported of intralenticular foreign bodies remaining asymptomatic for several years and being discovered only when they caused complications or in a completely random manner.\(^3,4\) To date, the longest case of a retained intralenticular foreign body with no associated problems on a clear lens has been described by Dhawahir-Scala and Kamal, in which the foreign body remained asymptomatic for 60 years.\(^4\) In other instances the consequences can be more serious: the foreign body can lead to the development of a traumatic cataract after a variable time, with consequent and rapid decrease in visual acuity. Furthermore, the retention of a metallic foreign body in the crystalline lens, although with a lower frequency than when it is retained in the posterior segment, can cause over time a siderosis bulbi, a sight-threatening condition characterized by heterochromia, cataracts, chronic uveitis, secondary glaucoma and retinal pigmentary degeneration, with serious repercussions for visual function.

In the event that complications occur, surgical removal of the intralenticular foreign body is necessary. We report a case of surgical management of a traumatic white cataract induced by an intralenticular metallic foreign body.

Patient Consent Statement

The authors certify that they have obtained all appropriate patient consent forms in writing. In the form, the patient has given his consent for his images and other clinical information.

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From the Department of Ophthalmology, A.O. Cannizzaro, Catania, Italy (A. Vasco); Department of Ophthalmology, University Hospital “Policlinico Vittorio Emanuele,” Catania, Italy (Caruso); University of Catania, Catania, Italy (E. Vasco).

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Corresponding author: Alessandro Vasco, MD, Department of Ophthalmology, A.O. Cannizzaro, Via Messina, 829, 95126 Catania, Sicily, Italy. Email: alessandrovasco2@gmail.com.

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to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

CASE REPORT

A 29-year-old man, a laborer by profession, was referred to our ophthalmology department with a diagnosis of white cataract and a suspicion of intralenticular foreign body in the right eye. The patient had visited an ophthalmic emergency department 1 month before because of a foreign body sensation in the right eye after hammering metal at work. Due to a diagnosis of corneal wound, he was prescribed antibiotic therapy for 7 days and sent home. After completing the therapy, the patient had not experienced any symptoms until about a month later, when he noticed a progressive deterioration in vision in the right eye.

Upon presentation at our clinic, under slit-lamp examination a small upper paracentral corneal leucoma was evident, presumably a foreign body entry; there were no signs of inflammation in the cornea or in the anterior chamber, and a white cataract was present (Figure 1). The fundus was unexplored. Ultrasound B-scan of the right eye was performed, which highlighted the presence of scattering behind the crystalline lens (Figure 2). Orbital computed tomography scan showed the presence of an high density object in the crystalline lens, which was very suggestive of a metallic foreign body (Figure 3). What was not possible to determine with the investigations, which would inevitably have affected the outcome or the evolution of the surgery, was the degree of penetration of the foreign body, and consequently the state of integrity or otherwise of the posterior capsule. In the case of a posterior capsular tear, or where the foreign body is incarcerated at the posterior capsule, during the hydrodissection the tear could become enlarged due to the associated hydrostatic pressure. Consequently the lens or foreign body could drop into the posterior segment. For this reason, had there been a laceration of the posterior capsule, an extracapsular cataract extraction might have become necessary. Therefore, we needed to be prepared for this possibility. Furthermore, if the foreign body fell into the posterior segment, a vitrectomy might have been needed. Another factor to take into consideration was the high intralenticular pressure due to the intumescence, which would have made the capsulorhexis difficult to execute, with a high risk of a capsule tear-out.

We decided to proceed with the phacoemulsification surgery, foreign body extraction and intraocular lens (IOL) implantation (Video 1 available at http://links.lww.com/JC9/A351): after corneal incisions, the anterior capsule was stained with trypan blue, which highlighted a small superior paracentral defect. We executed a central capsulotomy with a cystotome; the anterior capsule immediately opened to a fish-mouth shape due to the high intracrystalline pressure. Therefore we inserted a cannula inside the incision and removed liquid cortical material to relieve capsular tension. With the help of scissors we correctly executed the capsulorhexis and started to aspire cortical masses with a irrigation/aspiration cannula. At this stage the foreign body became visible in the nucleus. We mobilized it with a spatula, seeing it was not incarcerated at the posterior capsule. Subsequently the foreign body was extracted with capsulorhexis forceps through the corneal incision, the length was about 2 mm. We then completed the aspiration of the cataract masses with irrigation/aspiration cannula, verifying that the posterior capsule was perfectly intact.

As a last step, a 1-piece hydrophobic monofocal acrylic lens was implanted.

On the first postoperative day, corrected distance visual acuity of the right eye was 1.0. Slit lamp examination showed a...
transient cornea, anterior chamber with no signs of inflammation and a correctly placed IOL; the fundus was normal.

**DISCUSSION**

Intralenticular foreign bodies are rarely observed in the ophthalmological clinical practice and they can lead to very different scenarios, from an immediate traumatic cataract to the development of siderosis bulbi due to iron retention. They can also remain inert for a variable amount of time, from months to years, and be identified by chance on a clear lens through slit lamp examination during a routine visit or in the course of a programmed cataract surgery.\(^5\)

In some cases the patient may not be fully aware of the trauma suffered or of its extent, due to the low severity of the symptoms. In our case, the patient went to an ophthalmic emergency room complaining of a foreign body sensation and not reporting any history of trauma of particular significance. Once he completed antibiotic therapy prescribed for the corneal abrasion identified during the visit, the patient no longer experienced any type of symptoms in the following weeks, until he started to notice a decrease in visual acuity due to the development of traumatic cataracts. If this event had not occurred, the clinical picture could have remained completely asymptomatic for an indefinite period of time.

Management of intralenticular foreign bodies can be difficult, and the decision to proceed with surgical removal should be based on many factors, such as foreign body size, chemical composition and the possibility of infection.\(^6\) In the case of visual impairment due to cataract formation induced by an intralenticular foreign body, the standard management is: removal of the foreign body, phacoemulsification, and IOL implantation (triple procedure).

Some authors suggest that the decision to remove intralenticular foreign bodies with cataract should be based on the degree of cataract, any complication, especially uveitis or glaucoma, and the patient’s visual needs. A small intralenticular FB with capsular tear and a localized lenticular opacity may be left undisturbed and closely followed up for the development of any complication.\(^7\)

Other authors, instead, taking into account the possible complications caused by long-term retention of a foreign body on the crystalline lens and considering the recent surgical advances that enable safe removal of the foreign body with good visual results, suggest that early removal of the foreign body, even in the absence of cataract or other complications becomes the method of choice.\(^8,9\)

In our case, due to the occurrence of an advanced cataract, surgery was necessary; thanks to the identification and intraoperative mobilization of the foreign body, once verifying the anatomical integrity of the posterior capsule, we successfully performed a triple procedure, with removal of the foreign body, phacoemulsification and IOL implantation. The visual recovery of the patient in the postoperative period was optimal.

Our case is interesting as the patient was not fully aware of the penetrating trauma suffered; he did not present any definite trauma history; and the presence of the intralenticular foreign body had gone unnoticed and could have remained as such if the patient did not develop a cataract. In fact, once the corneal abrasion had healed, the patient was completely asymptomatic. Furthermore, the undefined localization of the foreign body at the presurgical evaluation, which gave space for many doubts to arise about the intraoperative evolution of the intervention, made the surgical procedure challenging.

Intralenticular foreign bodies represent a rare finding that sometimes go unnoticed in the clinical examination and can remain undetected even for a long time, but which can lead to serious sight-threatening complications. For this reason, the possibility of their presence should never be excluded in the event of a referred trauma and an accurate examination of the anterior segment is necessary when a foreign body sensation is referred. The surgery required in case of complications such as a cataract can be challenging and demands attentive preoperative evaluation and readiness to adapt to conditions found intraoperatively.

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**WHAT WAS KNOWN**

- Intralenticular foreign bodies often give rise to pauci or asymptomatic clinical pictures, as following the penetration of the foreign body, the wounds on the cornea and on the anterior capsule can seal, but they can still give rise to complications such as a traumatic cataract or bulbar siderosis over a long period of time.
- Due to the scarcity of symptoms, intralenticular foreign bodies can be neglected by patients and even physicians and detection can follow considerable delay.

**WHAT THIS PAPER ADDS**

- It is important to not underestimate even a simple sensation of a foreign body and to carefully examine the lens, as traumas underestimated by the patient can lead to serious consequences.
- Surgical strategy based on the preoperative examination and the execution, should be carefully considered and whenever conditions permit, of a triple procedure, being prepared to deviate from the planned surgery in case of complications.

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**Disclosures:** None reported.