

Case Report: Intraocular Foreign Body Injury Required Concurrent Vitrectomy for Primary Repair

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Intraocular foreign body (IOFB) injury is a subtype of penetrating globe injury. Timing of surgery for IOFB removal is controversial. Following primary repair, IOFB removal can be performed either in the same surgical session or later in a second intervention.¹⁻⁸

Here we present a case of a wire-shaped IOFB. The location of this IOFB rendered the case unique and necessitated early vitrectomy and IOFB removal along with primary repair.

CASE REPORT

An otherwise healthy 35-year-old man was referred with a wire-shaped IOFB in his left eye, with 1 end protruding out of the globe and the other end extending into the vitreous cavity (Figures 1 and 2). The IOFB was acquired in an accident that had occurred 6 hours earlier.

Visual acuity was 0.40 logMAR. The foreign body had penetrated through the sclera in the inferonasal quadrant, and there was no other noticeable damage to the cornea, lens, or posterior segment. The patient underwent surgery on the same day under general anesthesia.

A limited localized peritomy and scleral cauterization around the entry site were performed before 23-gauge transconjunctival sclerotomy ports were created. Posterior vitreous detachment (PVD) was induced following core vitrectomy (Figure 3). The vitreous around the IOFB and around



Figure 1. One end of the IOFB extended into the vitreous cavity.

the interior aspect of the entry site was completely removed (Figure 4).

The foreign body was then pulled out freely through the entrance laceration. The scleral wound and the conjunctiva were closed with absorbable 8-0 polyglactin sutures. Finally, complete peripheral vitrectomy was performed with scleral indentation.



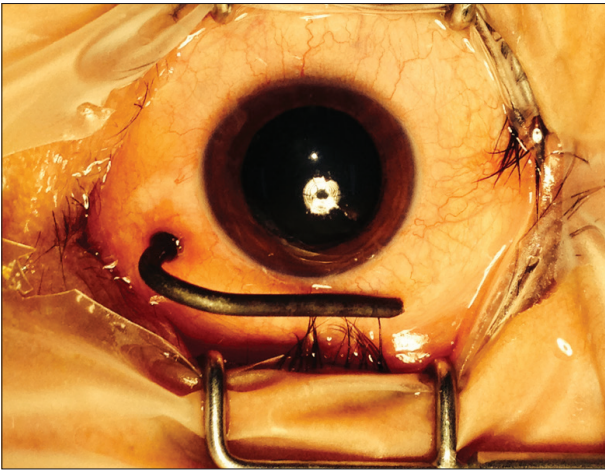


Figure 2. The other end of the IOFB protruded from the globe.

It has been 6 months since the surgery and there have been no cosmetic or other disturbances with exception of moderate nuclear and posterior subcapsular cataract. Final BCVA is 0.20 logMAR, and cataract surgery has been already planned.

SURGICAL STRATEGY

Entry-site laceration is sine qua-non for IOFB injuries. In other words, IOFB injuries are actually penetrating globe injuries. Therefore, the first step in handling an IOFB injury should include a thorough exploration of the globe wall, from the outermost conjunctiva to the innermost sclera in the vicinity of the ascertained or presumed laceration site for a precise evaluation of the damage. Appropriate management of any prolapsed tissues and sealing of the laceration are vital in terms of restoring globe integrity and providing safer closed-system conditions for ocular surgery.

Once any obstacles clouding posterior segment visualization, such as injured lens debris, have been removed, it is best to focus on the vitreoretinal compartment. Following core vitrectomy, incarceration of vitreous at the laceration site should be relieved in order to avoid traction. Complete removal of vitreous from the interior (retinal) aspect of the laceration and the edges of any concomitant retinal breaks, along with induction of PVD, are key steps for good clinical practice. Induction of PVD may be performed either before or after assessing the IOFB in terms of its location, size, and shape. If induction of PVD imposes a greater risk for retinal injury due to increased mobilization of the IOFB, then it is better to remove the IOFB first and induce PVD later.

Depending on its size and shape, the IOFB may be extracted via a limbal or pars plana incision. At this

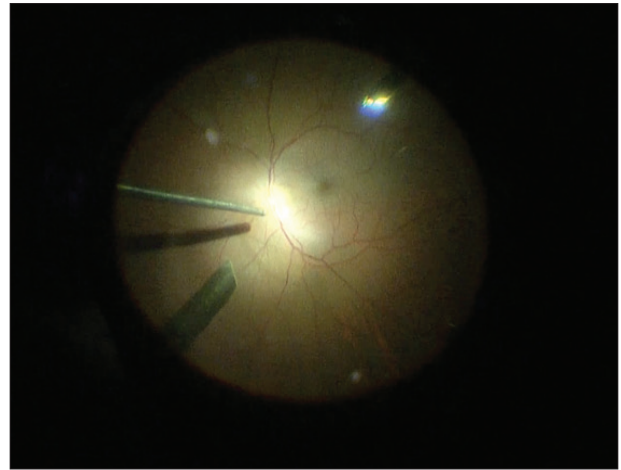


Figure 3. PVD was induced following core vitrectomy.

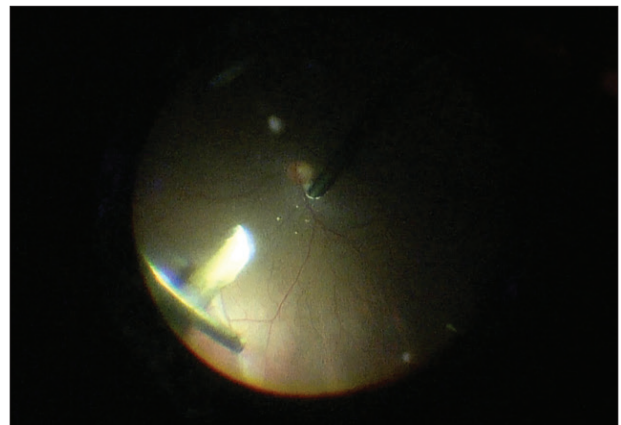


Figure 4. The vitreous around the IOFB and around the interior aspect of the entry site was completely removed.

phase of the surgery, special attention should be paid to performing vitreous removal as completely as possible from the incision trajectory path. Shaving of the vitreous base and complete vitrectomy are the next steps, as in any other vitreoretinal procedure.

The surgical algorithm in repairing any penetrating globe injury is considered to have 2 stages. Stage 1 (primary repair) includes all external surgical procedures that aim to restore globe or “framework” integrity and thereby sustain viability by avoiding detrimental hypotony, decreasing the likelihood of massive hemorrhage, preventing prolapse of internal structures, and preventing penetration of infectious agents. Stage 2 (secondary repair), on the other hand, includes external and internal elective procedures intended to reconstruct the anatomy with maximum possible functionality, performed under a safer closed-system surgery environment.

Immediately after injury, patients are frequently

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admitted to the most easily accessible primary or secondary care center in which only the first stage (primary repair) of surgery can be performed. However, referral of the patient directly from a secondary care center to a tertiary care center prior to any intervention is not unusual in seriously injured traumatic cases. In practice, we observe that a limited number of cases can undergo both stages of surgery in 1 session.

There exists a consensus for the timing of primary repair (stage 1): Immediate intervention should be carried out within 24 hours. However, there is controversy regarding optimal timing for secondary repair (stage 2) that includes vitreoretinal procedures. Some authors favor early vitreoretinal intervention, while others prefer delayed surgery.¹⁻⁸

In the case of IOFB injury, determination of optimal timing for secondary repair, including removal of the IOFB or IOFBs, is more complicated. The size, shape, and location of the IOFB; chemical or physical properties of the IOFB; presence of any signs of infection; and extent of collateral ocular damage should all be taken into account for the timing of the intervention.¹ Some authors have suggested that early intervention including vitreoretinal surgery might decrease the incidence of endophthalmitis and development of proliferative vitreoretinopathy (PVR).²⁻⁴ By contrast, Colyer et al found that there was no significant difference in the incidence of endophthalmitis between early intervention and delayed intervention with prophylactic antibiotic use.⁵ Moreover, Knox et al reported no significant differences in the outcomes of delayed intervention, even in IOFB cases that were deemed to be endophthalmitis and underwent intravitreal antibiotic injection.⁶

Some writers have reported poor anatomic and visual outcomes in delayed intervention,²⁻⁴ whereas others have reported no significant differences with delays.^{5,7,8} Delayed intervention seems to be advantageous in terms of providing good visualization of the surgical field and easy induction of PVD in an eye in which the acute inflammatory response has subsided, the hemorrhage risk has decreased relatively, and the tissues are less edematous and fragile.

CONCLUSION

This case, in which 1 end of a wire-shaped IOFB protruded out the eye and the other end extended into the vitreous cavity, clearly falls into the category of IOFB injuries that required early surgery including both stages (primary and secondary repair) in the same session. In such cases, attempting to pull an IOFB that is tightly adhered to the vitreous directly out of the eye is likely to result in massive prolapse and loss of vitreous, secondary tractional breaks, retinal detachment, hypotony, and additional vitreous or even suprachoroidal hemorrhage by disturbing fragile retinal and choroidal vessels. Therefore, the first aim should be to ensure that the IOFB is removed securely.

After adequate quality of visualization for vitreoretinal surgery has been provided using minimal anterior segment manipulation, core vitrectomy is performed. Then, along with PVD induction, the intravitreal portion of the IOFB is freed from the vitreous before the IOFB is pulled out. The next step is repair of entry-site lacerations in a watertight fashion. Due to the risk of inadvertent retina or lens damage, the portion of the procedure intended to reconstruct the anatomy with maximum possible functionality—peripheral vitrectomy with scleral indentation—should be performed after IOFB removal. The surgeon should never underestimate the importance of complete vitrectomy in traumatic cases in young adults in order to minimize the development of PVR. ■

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