

## **Traumatic Intraocular Foreign Body with and without ocular reaction: a case series**

### **Abstract**

**Background** : The most common cause of Intraocular foreign bodies (IOFBs) is hammering; the incidence over time shows a decrease at the workplace and an increase in the home. Around 85% of these IOFBs are metallic. Endophthalmitis occurring in the setting of an IOFB is perhaps the most important marker of poor prognosis, with the incidence of endophthalmitis being between 1,3% to 61%.

**Purpose** : To present four case series of patient diagnosed traumatic IOFB with and without ocular reaction.

### **Case Report** :

First case : A 19-year-old man diagnosed scleral penetrating injury, IOFB, retinal detached, luxated lens on left eye. Vitrectomy pars plana, pars plana lensectomy and IOFB extraction was done in this patient. Second case : A 30-year-old man, diagnosed suspected endophthalmitis, suspected IOFB, foreign body in cornea and traumatic cataract on left eye. Scleral suturing, vitrectomy pars plana, pars plana lensectomy, IOFB extraction, foreign body extraction in cornea, synechiolysis, intravitreal antibiotic injection and vitreous biopsy was done. Third case : A 29-year-old man, diagnosed IOFB in the left eye. Vitrectomy pars plana, IOFB extraction, endo laser and tamponade by C3F8 was done. Fourth case : A 22-year-old man, diagnosed Rhegmatogen Retinal Detachment and IOFB in the right eye. Band buckle, vitrectomy pars plana, IOFB extraction, endo laser, C3F8.

**Result** : All patient was underwent vitrectomy surgery. First, second and third patient was redetached retinal 1 week after surgery. Fourth patient was attached retinal 1 week after surgery.

**Conclusion** : IOFBs in the posterior segment require careful analysis of the risks and advantages. Endophthalmitis prevention is the primary goal for which as early surgery as reasonably possible is recommended for both medical and legal reasons.

### **I. Introduction**

Intraocular foreign bodies (IOFBs) are a serious form of ocular injury, accounting for 17% to 41% of penetrating ocular injuries. According to the United States Eye Injury Registry (USEIR), the surveillance arm of the American Society of Ocular Trauma (ASOT), the frequency in the United States is 16%. The most common cause is hammering; the incidence over time shows a decrease at the workplace and an increase in the home. Around 85% of these IOFBs are metallic. Endophthalmitis occurring in the setting of an IOFB is perhaps the most important marker of poor prognosis, with the incidence of endophthalmitis being between 1,3% to 61%.<sup>1,2</sup>

There are wide variations in the risk of endophthalmitis seen in open globe injuries with retained IOFB, partly because of the variations of the health systems and the level of ophthalmic care present at first presentation, but also partly because it is problematic to define posttraumatic endophthalmitis. Some studies limit the definition to culture positive cases, whereas others also include culture negative cases. However, excluding culture negative cases may exclude some cases of true infectious endophthalmitis. Similarly, positive cultures may not always correlate with infection. Mieler et al noted that 26% of IOFB were culture positive with no evidence of endophthalmitis, whereas Rubsamén et al did not find routine cultures of open globe injuries to be helpful.<sup>1</sup>

This case report will present four case series of patient diagnosed IOFB with and without endophthalmitis.

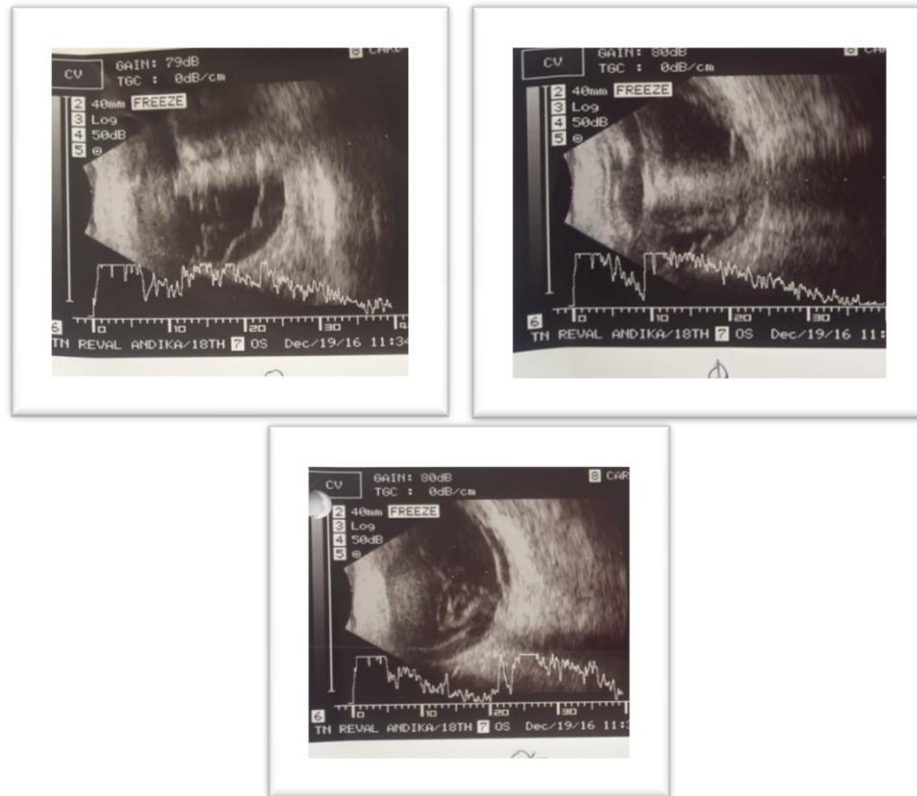
## II. Case Series

### II.1 Case 1

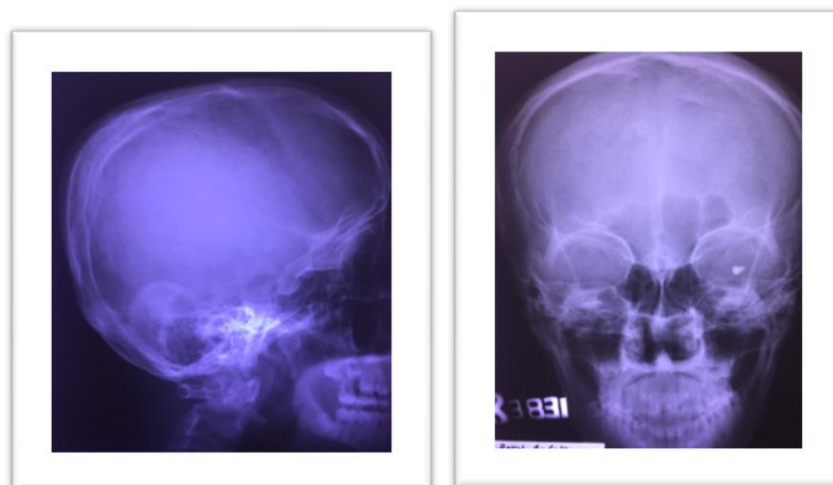
A 19-year-old male presented with redness in the left eye after he had been pounding a metal object approximately 2 weeks ago. He was not wearing safety glasses and felt something strike his right eye and he pull out that metal by himself. He continued working for a few hours. Ten days after trauma, he come to the ophthalmologist with chief complain of blurred vision. He was diagnosed with scleral penetrating injury + IOFB + luxated lens on left eye. He was then referred to the external eye disease unit Cicendo Eye Hospital.

He was consult to the Vitreoretinal Unit from external eye disease unit Cicendo Eye Hospital on December 19<sup>th</sup>, 2016, with chief complaint blurred vision in the left eye. His vital sign was within normal limit. At presentation, his best-corrected visual acuity (BCVA) was hand motion in the left eye. Intraocular pressure with palpation was normal. Ophthalmology examination of the left eye slightly blepharospasm, conjunctival and siliar injection, scleral penetrating injury, flare/cell (+3/+3) in anterior chamber, luxated lens in the left eye. Funduscopy in the left eye showed hazy media. B-scan ultrasonography examination showed retinal detached and suspected luxated lens (Figure 2.1.1).

Rontgen schedel showed that there was IOFB (Figure 2.1.2). Anterior and Posterior segment of the right eye was within normal limit.



**Figure 2.1.1** B-scan ultrasonography examination shows an image of retinal detached and suspected luxated lens



**Figure 2.1.2** Rontgen schedel shows an object in the left eye suspected IOFB.

Patient was diagnosed as scleral penetrating injury + IOFB + luxated lens + retinal detached ec trauma + vitreous hemorrhage in the left eye. He underwent vitrectomy pars plana, pars plana lensectomy, IOFB extraction. Ciprofloxacin 2x500mg, Metil Prednisolon 1mg/kgs, Paracetamol 3x500mg, Ofloxacin eye drop 6xLE, Prednisolon acetate eye drop 6xLE, Cyclopentholate 1% eye drop 3xLE, was given after surgery.

Patient was discharged from hospital one day after surgery. He controlled on December 30<sup>th</sup>, 2016, 1 week after surgery. His visual acuity was 1/300 in the left eye. Intraocular pressure with palpation was normal. Examination anterior segment for left eye was found slightly blepharospasm, conjunctival and siliar injection, afakia in left eye. Funduscopy in left eye showed hazy media. B-scan ultrasonography examination showed retinal detached and vitreous hemorrhage (Figure 2.1.3). Metyl prednisolone 1x48 mg, Ofloxacin eye drop 6xLE, Prednisolone acetate eye drop 5xLE, and Cyclophentolate eye drop 3 times a day on the right eye, was given.

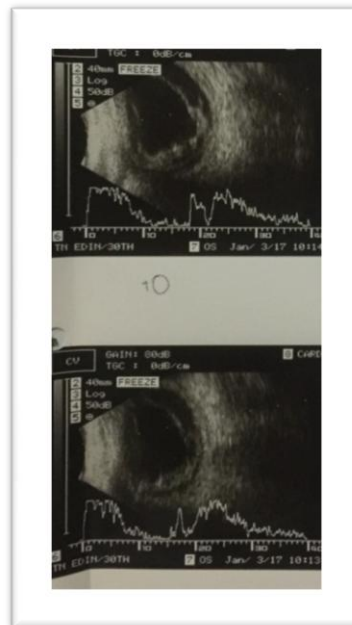


**Figure 2.1.3** B-scan ultrasonography examination shows an image of retinal detached and vitreous hemorrhage

## II.2 Case II

A 30-year-old male presented with blurred vision in the left eye after he had been pounding a stone approximately 9 days before. He wore glasses and did not feel something strike his left eye. He came to the ophthalmologist with chief complaint of blurred vision. He was treated with gatifloxacin eye drop, natamycin eye drop and ofloxacin eye drop. He came to Cicendo Eye Hospital because he did not feel any improvement.

He came to the Vitreoretinal Unit on December 23<sup>th</sup>, 2016, with chief complaint blurred vision and pain in the left eye. His vital signs were within normal limits. At presentation, his best-corrected visual acuity (BCVA) was light perception in the left eye. Intraocular pressure with palpation was normal. Ophthalmology examination of the left eye showed siliar injection, foreign body in cornea, flare/cell (+2/+2) in anterior chamber, posterior synechia and hazy lens in the left eye. Funduscopy in the left eye showed hazy media. B-scan ultrasonography examination showed vitreous opacity and vitreous hemorrhage, fibrosis vitreous (Figure 2.2.1). Radiograph of the skull showed that there was IOFB in the left eye.



**Figure 2.2.1** Vitreous opacity ec vitreous hemorrhage, fibrosis vitreous

Patient was diagnosed as suspected endophthalmitis, suspected IOFB, foreign body in cornea and traumatic cataract on left eye. He underwent exploration, scleral suturing, vitrectomy pars plana, pars plana lensectomy, IOFB extraction, foreign body extraction in cornea, synechiolysis, intravitreal antibiotic injection of ceftazidime with vancomycin, vitreous biopsy. Ceftriaxone iv 2x1grams, methyl prednisolone 1x48 mg, Moxifloxacin eye drop 1gtt/hour, Prednisolone acetate eye drop 1gtt/hour, and Cyclophentolate eye drop 3 times a day on the left eye was given after surgery. Vitreous humor biopsy with gram staining revealed coccus gram positive bacteri with negative KOH staining.

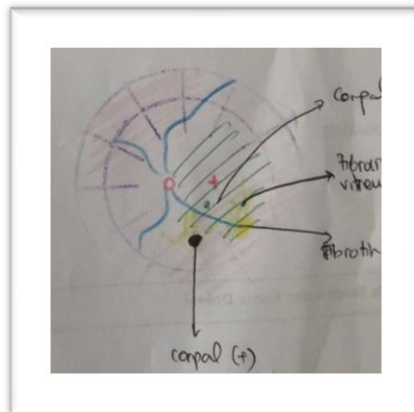
Patient was controlled on January 30<sup>th</sup> 2016, 1 week after operation. His visual acuity was light perception in the left eye. Intraocular pressure with palpation was normal in both eyes. Examination anterior segment for right eye was found blepharospasm, siliar injection, corneal edema, flare/cell (+2/+2), hifema in anterior chamber, and afakia. Funduscopy in left eye showed hazy media. B-scan ultrasonography examination showed retinal detached in left eye. Moxifloxacin eye drop 1gtt/hour, Prednisolone acetate eye drop 5xLE, and Cyclophentolate eye drop 3 times a day on the left eye, was given to him. Patient was planned to pars plana vitrectomy, endolaser, endo drainage, silicon oil under monitoring anesthesia care.

### II. 3 Case III

A 29-year-old male presented with redness in the left eye after he had been pounding a metal object approximately 6 months ago. He was not wearing safety glasses and felt something strike his left eye. He come to the ophthalmologist with chief complain of blurred vision and then he treated with eye drop but he forgot the name. Because of the blurred eye doesn't resolved, he come to the Cicendo Eye Hospital.

He came to the Vitreoretinal Unit on December 27<sup>th</sup>, 2016, with chief complaint of blurred vision in the left eye. His vital sign was within normal limit. At presentation, his best-corrected visual acuity (BCVA) was closed face finger counting in the left eye. Intraocular pressure with palpation was normal. Anterior

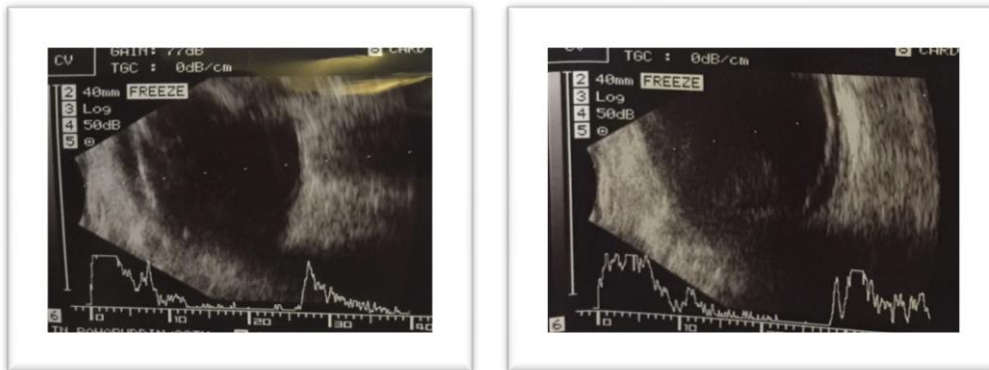
segment within normal limit. Funduscopy in the left eye showed IOFB in the inferior (figure 2.3.1). Anterior and Posterior segment of the right eye was within normal limit.



**Figure 2.3.1** Funduscopy in the left eye showed IOFB in the inferior.

Patient was diagnosed as IOFB in the left eye. He underwent vitrectomy pars plana + IOFB extraction + endo laser + C3F8 under monitoring anesthesia care. Ciprofloxacin 2x500mg, Metil Prednisolon 1mg/kgs, Paracetamol 3x500mg, Ofloxacin eye drop 6 times a day on the left eye, Prednisolon acetate eye drop 6 times a day on the left eye, Cyclopentholate 1% eye drop 3 times a day on the left eye, was given after surgery.

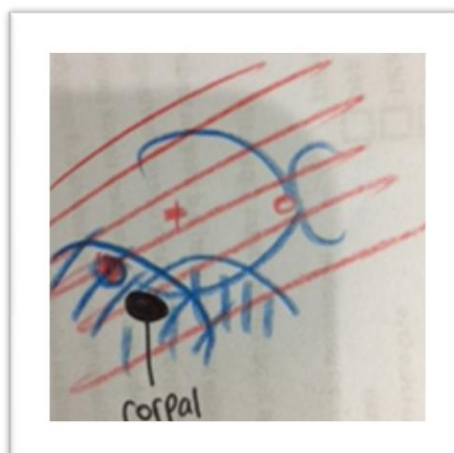
Patient was discharged from hospital one day after surgery. He controlled on January 24<sup>th</sup>, 2017, 1 week after surgery. His visual acuity was hand movement in the left eye. Intraocular pressure with palpation was within normal limit. Examination anterior segment for left eye was within normal limit. Funduscopy in left eye showed hazy media. B-scan ultrasonography examination showed retinal redetached and gas filled eye (Figure 2.3.2). Ofloxacin eye drop 6 times a day on the left eye, Prednisolone acetate eye drop 5 times a day on the left eye, and Cyclophentolate 1% eye drop 3 times a day on the left eye was given. Patient will be evaluated in two weeks.



**Figure 2.3.2** B-scan ultrasonography examination shows an image of retinal redetached and gas filled eye.

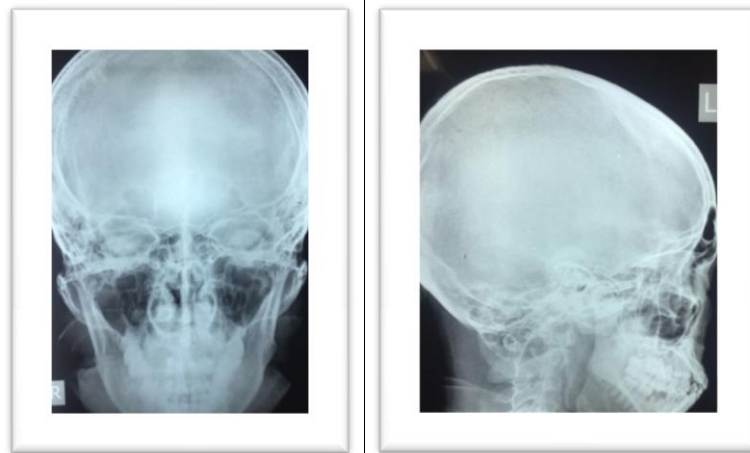
#### II. 4 Case IV

A 22-year-old male consulted to the Vitreoretinal Unit from External Eye Disease unit on January 4<sup>th</sup>, 2017, with chief complaint of blurred vision in the right eye. Approximately 2 months before, he got a car accident and the glass was broken. His vital sign was within normal limit. At presentation, his best-corrected visual acuity (BCVA) was 0.1 in the right eye. Intraocular pressure with palpation was normal. Anterior segment in the right eye was found suturing in the cornea and ouval pupil, others was within normal limit. Funduscopy in the right eye showed retinal detached, break (+) and IOFB in the inferior (figure 2.4.1). Rontgen schedel was within normal limit (figure 2.4.2). Anterior and posterior segment of the left eye was within normal limit.



**Figure 2.4.1** retinal detached, break (+) and IOFB in the inferior





**Figure 2.4.2** Rontgen schedel anterior and lateral was within normal limit.

Patient was diagnosed as Rhegmatogen Retinal Detachment and IOFB in the right eye. He underwent band buckle + vitrectomy pars plana + IOFB extraction + endo laser + C3F8 under monitoring anesthesia care. Ciprofloxacin 2x500mg, Metil Prednisolon 1mg/kgs, Paracetamol 3x500mg, Ofloxacin eye drop 6xLE, Prednisolon acetate eye drop 6xLE, Cyclopentholate 1% eye drop 3xLE, was given after surgery.

Patient was discharged from hospital one day after surgery. He controlled on January 17<sup>th</sup>, 2017, 1 week after surgery. His visual acuity was hand movement in the right eye. Intraocular pressure with palpation was within normal limit. Examination anterior segment for right eye was within normal limit. Funduscopy in right eye showed attached retina. Ofloxacin eye drop 6xLE, Prednisolone acetate eye drop 5xLE, and Cyclophentolate 1% eye drop 3 times a day on the left eye was given. Patient will be evaluated in two weeks.

### III. Discussion

The incidence of retinal toxicity associated with a metallic intraocular foreign body has rapidly declined with the advent of modern microsurgical techniques. A variety of reports have noted that retained foreign bodies occur in 5–40% of all penetrating eye injuries. These injuries tend to occur in young males.<sup>3</sup>

All of the patients was young males, first patient was 19 years old, second patient was 30 years old, third patient was 29 years old and the fourth patient was 22 years old. Previously pounding by metal object in first and third patient and stone object in second patient, the fourth patient was hit by glass in the car accident.

The most common cause of poor visual results in cases of retained IOFBs is retinal disease that may be the result of retinal damage sustained at the time of IOFB entry, tractional complications of posterior segment, siderosis, and postoperative retinal detachment. Preoperative retinal detachment, the location and the size of IOFB, scleral or corneoscleral entry wound are predictive of a postoperative retinal detachment. Prompt removal of retained intraocular foreign bodies by electromagnetic recovery or vitrectomy is recommended. Overall, 20/40 or greater final visual acuity can be expected in up to 71% of eyes.<sup>1,3</sup>

In this cases, first patient was diagnosed retinal detached preoperative by B-scan ultrasonography and the size of IOFB was 7x4mm with scleral entry. The IOFB removal technique for this patient was by electromagnetic. The second patient was diagnosed retinal detached postoperative with the scleral entry. The IOFB removal technique was by forceps. The third and fourth patient was diagnosed retinal detached preoperative and the IOFB removal technique was by electromagnetic in the third patient and by forceps for the fourth patient.

Ocular siderosis, caused by trivalent iron ions, may develop as early as a few days or as late as several years. Clinical signs include: iron deposits on the corneal endothelium, brown discoloration of iris, dilated nonreactive pupil, yellow cataract, pigmentary retinal degeneration and eventual visual field loss.<sup>3</sup>

The etiology for the first and third patient was pounding by metal (iron) object approximately 2 weeks for the first patient and 6 months for the third patient but there was no ocular clinical sign.

Endophthalmitis is an ocular inflammation resulting from the introduction of an infectious agent into the posterior segment of the eye. Despite aggressive therapeutic and surgical intervention, endophthalmitis generally results in partial or complete loss of vision, often within a few days of inoculation. Infectious

agents generally gain access to the posterior segment of the eye following one of three routes: (1) as a consequence of intraocular surgery (postoperative), (2) following a penetrating injury of the globe (post traumatic), or (3) from hematogenous spread of bacteria to the eye from a distant anatomical site (endogenous).<sup>4</sup>

The second patient in this case was post traumatic and diagnosed with endophthalmitis ten days later, he was diagnosed as post traumatic endophthalmitis because the history of pounding by stone object.

Risk factors for the development of traumatic endophthalmitis include 24 hours of delay in primary wound closure, presence of an IOFB (6.9–13%, not depend on IOFB type), soil contamination higher rate of endophthalmitis (30%), rupture of lens capsule. Diagnosis is often delayed due to masquerading signs that usually accompany severe ocular trauma. Early symptoms was photophobia, pain out of proportion to the clinical findings, visual loss worse than media opacities, hypopyon, vitritis, retinal periphlebitis.<sup>5,6,7</sup>

The second patient was 24 hours of delay in primary wound closure, presence of IOFB and soil contamination in the stone object. The symptoms was photophobia, pain and tearing.

Priority of management endophthalmitis are the microbiologic diagnosis and intravitreal antibiotics. As soon as the diagnosis of endophthalmitis is suspected, the first maneuver to be done is to obtain a vitreous sample in order to find the causal microorganism. A sample of aqueous humour may be useful also, but the priority is to get some vitreous by tap. The probability to find a microorganism by direct examination or by culture is indeed higher in the vitreous (40 to 69% of the cases) than in the aqueous humour (22 to 30%).<sup>4,5,6</sup>

Vitreotomy, culture of resistance, vitreous biopsy was done in the second patient. The result of surgery revealed coccus gram positive bacteria with negative KOH staining.

In order to cover as well as possible all the germs that can be responsible for the endophthalmitis, combinations of two antibiotics are recommended. That is vancomycin 1 mg with ceftazidime 2.25 mg. Intravitreal antibiotics of

vancomycin and ceftazidime was given to second patient. Factors that were related to recurrent infection were marginal susceptibility of the organism to the originally injected antibiotics, infection with a slowly replicating organism, and infection with a gram-negative bacillus.<sup>4,8,9,10</sup>

#### **IV. Conclusion**

If they are fresh, even inert IOFB are best removed. If IOFB removal is decided upon and the eye shows associated tissue damage, it is better to perform complex reconstruction simultaneously than as a secondary reconstructive procedure. Endophthalmitis prevention is the primary goal for which as early surgery as reasonably possible is recommended for both medical and legal reasons. Endophthalmitis is an ocular inflammation resulting from the introduction of an infectious agent into the posterior segment of the eye. Early diagnosis and treatment of endophthalmitis are critical. Cultures are essential and may be lifesaving, vitreous sample should be obtained in all cases. IOFBs in the posterior segment require careful analysis of the risks and advantages.

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