

A STUDY OF CASE SERIES OF INTRAOCULAR FOREIGN BODIES IN A TERTIARY CARE CENTER IN SOUTH INDIA

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ABSTRACT

BACKGROUND

Intraocular foreign bodies can cause vision threatening complication in cases of penetrating ocular injuries. Ocular injuries can occur anywhere at work place, at home, due to road traffic accidents, etc. Accidental eye injuries are common in males in work place. Awareness about using protective eye wear is required at work places where injuries are common.

The aim of the study is to study the demographic profile, visual and anatomical outcome in patients presenting with posterior segment Intraocular Foreign Bodies (IOFB) undergoing vitrectomy.

MATERIALS AND METHODS

Retrospective analysis was done on patients who underwent pars plana vitrectomy for posterior segment IOFB from March 2014 to April 2017. Complete ocular examination, B scan ultrasonography and x-ray orbit were done in all cases and retained posterior segment intraocular foreign body confirmed. Intraoperative difficulties, anatomical and visual outcome and postoperative complications were studied.

RESULTS

Cases with posterior segment intraocular foreign body and endophthalmitis had poor visual and anatomical outcome. Patients who underwent complete vitrectomy with 240 encirclage band with or without tamponade had better visual outcome.

CONCLUSION

Imaging in the injured eye is important to identify the presence of intraocular foreign body. Planning of the surgical procedure depending on the ocular condition plays a vital role in visual outcome.

KEYWORDS

Intraocular Foreign Body, Three Ports Pars Plana Vitrectomy, Endophthalmitis, B Scan Ultrasonography, Computed Tomography.

HOW TO CITE THIS ARTICLE: Shilpa YD, Kalpana BN, Kalpana S, et al. A study of case series of intraocular foreign bodies in a tertiary care center in South India. J. Evid. Based Med. Healthc. 2017; 4(77), 4555-4558. DOI: 10.18410/jebmh/2017/909

BACKGROUND

Ocular injury is the most common cause for monocular blindness worldwide.¹ Intraocular foreign bodies are common complication of penetrating ocular injuries. Intraocular foreign bodies can lead to anatomical and functional damage, infection and chemical reactions in the eye.² Any case presenting with penetrating injury through evaluation should be done and presence of intraocular

foreign body should be ruled out. In cases of injury due to flying object imaging using x-ray, B scan ultrasonography or Computed Tomography (CT scan) should be performed to rule out presence of foreign body. Foreign bodies in the eye can remain sterile without any ocular damage or can cause vision threatening anatomical and functional damage.

MATERIALS AND METHODS

This is a retrospective analysis, which was done from hospital records of Minto Eye Hospital, Bangalore Medical College and Research Institute, Bangalore, from March 2014 to June 2017. Case records of patients with posterior segment intraocular foreign bodies who underwent vitrectomy were studied. Data was collected from the medical records regarding age, sex, visual acuity, time elapsed between initial injury and surgery, surgery procedure, microbiological analysis of vitreous biopsy in cases of endophthalmitis, intraoperative complications,

Financial or Other, Competing Interest: None.

Submission 05-09-2017, Peer Review 12-09-2017,

Acceptance 23-09-2017, Published 25-09-2017.

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DOI: 10.18410/jebmh/2017/909



postoperative complications, visual recovery, etc. B-scan was done after primary tear repair except in self-sealed tears. X-ray orbit was done in all cases to diagnose IOFB. Computed tomography was done only in cases where we wanted to rule out IOFB in ocular coats, IOFB in orbit, multiple IOFB or in doubtful cases. Preoperative best corrected visual acuity and details of surgical procedure, size and location of IOFB, status of retina and surgical complications were analysed. Surgeries were performed by different surgeons. Plan of surgery was decided by the operating surgeon and was based on clinical presentation and also based on intraoperative findings. On follow up at one week, four weeks and twenty four weeks, best corrected visual acuity and anatomical outcome were analysed. During each follow up visual acuity, slit lamp examination, fundus examination and B scan were repeated.

Inclusion Criteria

Cases with intraocular foreign bodies who underwent vitrectomy and intraocular foreign body removal.

Exclusion Criteria

Cases of posterior segment intraocular foreign bodies with panophthalmitis.

RESULTS

Twenty seven cases of posterior segment foreign bodies were studied.

Twenty six (96%) cases were males with mean age of 18 yrs. (16-60 yrs.). A child who was six year old was the only female in this study.

Mean interval between injury and patients presenting to hospital was 2 days (1-7 days).

Mean interval between injury and surgery was 10 days (2-15 days).

All the patients had injury with metal at workplace (50%) or at home (50%). None of the patients were using protective eyewear at the time of injury. Many were unaware about the use of protective eyewear at work place.

In 25 (93%) cases, the injuries were self-inflicted and two (7%) cases were bystanders.

Nine (33%) cases had injury on right eye.

Twenty one (77.7%) cases had corneal tear, 4 (14.8) had scleral tear and in 2 cases site of entry was not identified. This is referred in Table 1.

Site of Entry Wound	Total Patients	Percentage
Cornea	21	77.7%
Sclera	4	14.8%
Unidentified	2	7.4%

Table 1. Entry site of IOFB

Vision in the injured eye ranged from 6/18 to perception of light at presentation.

Fourteen (51.9%) cases had significant cataract. All these cases had corneal tear and breach in the lens capsule.

Eleven (40.7%) cases presented with endophthalmitis and IOFB. This is referred in Table 2.

	Total Patients	Percentage
Hyphaema	6	22.2%
Cataract	14	51.8%
Vitreous haemorrhage	4	14.8%
Endophthalmitis	11	40.7%

Table 2. Ocular injuries with IOFB

CT scan was ordered in five cases to confirm the diagnosis.

Core vitrectomy was done in three cases of endophthalmitis where complete vitrectomy was not possible.

In cases with endophthalmitis, vitreous tap was taken at the beginning of vitrectomy before starting the infusion. It was immediately sent to the microbiology laboratory for Gram stain, KOH mount and culture and sensitivity for microorganisms and fungal elements. Investigation did not yield positive organisms in any of these cases.

All cases of endophthalmitis received intravitreal antibiotics (vancomycin 1 mg/0.1 mL and ceftazidime 2.25 mg/0.1 mL) at the end of vitrectomy. Intravitreal steroids was not used at the end of vitrectomy in any of our cases.

Lensectomy was decided on table and done in 12 cases through pars plana route.

240 encirclage band was used in 15 cases, out of which, 240 band with silicone oil tamponade was used in 11 cases where retinal breaks due to IOFB was in inferior quadrant or in cases with retinal detachment. 240 band with gas tamponade was used in 4 cases. Perfluropropane (C3F8) or Sulfur Hexafluoride (SF6) was used for gas tamponade.

The difficulties we faced during surgery were non-dilating pupil, hazy media due to sutured corneal tear, cataract and fresh vitreous haemorrhage. We had difficulty in locating IOFB in two cases initially and later they were localised.

Twenty cases were followed upto three months. Others were lost for follow up after one month.

Three cases of endophthalmitis with IOFB who underwent core vitrectomy developed retinal detachment and subsequently phtthisis bulbi. Eight cases of endophthalmitis undergoing complete vitrectomy had vision ranging from 6/60 to perception of light. One case which underwent complete vitrectomy developed retinal detachment.

On followup, six cases who underwent 240 band with tamponade developed retinal detachment during first month. Eight cases with 240 encirclage band and gas tamponade or silicone oil filled eye underwent silicone oil removal in oil filled eye and intraocular lens placement on follow up. Their vision ranged from 6/18 to 4/60. One patient with 240 band with silicone oil filled eye had consistently low intraocular pressure and hence silicone oil removal was not attempted. The above is represented in Table 3 and 4.

Site of IOFB	Total Patients	Percentage	Visual Recovery
Superotemporal quadrant	6	22.2%	6/18-CFCF
Superonasal quadrant	3	11%	6/24-PL
Inferotemporal quadrant	10	37%	6/36-CFCF
Inferonasal quadrant	6	22%	6/36-PL
Macular	2	7.4%	CFCF-PL

Table 3. Site of IOFB and Visual Recovery

	Procedure	Visual Recovery	Total Patients	Percentage
Endophthalmitis with IOFB	Core vitrectomy	No PL	3	11%
Endophthalmitis with IOFB	3PPPV ± SOI	6/60 - PL	8	29.6%
IOFB	3PPPV	PL	1	3.7%
IOFB	240BB + 3PPPV ± SOI/GAS	CFCF	6	22.2%
IOFB	240BB + 3PPPV ± SOI/GAS	6/18 -4/60	9	33.3%

Table 4. Visual Recovery Based on Surgical Procedure

DISCUSSION

In any case of open globe injury with history of hammering, blast injury or injury with flying objects, IOFB has to be ruled out by clinical examination, x-ray orbit, B-scan ultrasonography or CT scan.

IOFBs account for upto 40% in open globe injuries.³ Work-related injuries are most common (54-72%), followed by injuries at home (30%). The most common mechanisms of injury include hammering metal on metal, power tools and gunshots or explosives.^{4,5} Most common IOFB is metallic.⁶

The extent of trauma from IOFBs is associated with the size, shape, speed, density and velocity of the object as well as the composition of the penetrating or perforating material.³ Visual outcome is based on the mechanism of injury, type of foreign body and subsequent complications.⁷ Vision loss can be devastating as a result of endophthalmitis, retinal detachment or metallosis.⁸

Andrew et al has mentioned that 90% of posterior segment IOFB is seen in males 29 to 38 years of age.⁴ However, in this study, 20 (70.4%) cases were males between 16 to 40 years age group.

IOFB in penetrating ocular injury is usually seen when a small sharp object hits the eye with high velocity.

Corneal entry is also often associated with less damage than scleral entry for the same reason along with a lessened risk of retinal injury. In addition, there is an inverse relationship between wound length and the occurrence of retinal damage.⁴

Endophthalmitis is devastating complication of any open globe injuries. Incidence of endophthalmitis in eyes with retained IOFB is between 2%-17%.^{9,10,11} Most common organism is Staphylococcus species and Bacillus species.⁹

In this study, incidence endophthalmitis was 40%. This is higher than the previous studies conducted worldwide.

B scan ultrasonography is a simple, noninvasive and inexpensive mode imaging, which can be repeated. In all our cases, B scan and x-ray were indispensable tools in identifying the IOFBs. In all our cases, IOFB was confirmed with x-ray and B scan. The importance of B scan^{12,13} and x-ray^{14,15} has been stated in previous studies.

CT scan is commonly used imaging technique for accurate localisation of IOFB.^{14,15} In our study, CT scan was ordered only in doubtful cases.

Complete vitrectomy is very difficult in traumatised eyes with hazy media. Hence, placement of 240 band helps in base support and to counteract the traction by vitreous at the base. Few studies have stated that use of sclera buckle reduced the risk of retinal detachment.^{5,16}

The advantage of silicone oil tamponade in vitrectomy for endophthalmitis has been stated in previous studies.^{17,18} In our study, cases which underwent 240 band with silicone oil or gas tamponade had better anatomical and visual outcome.

Microsurgical vitreoretinal instrumentation and technique has helped in better management of posterior segment IOFB. Initial ocular injury is an important prognostic sign in these cases. In addition, size and composition of IOFB, time interval between injury and surgery were the prognostic factors. Also, preoperative visual acuity was an important determinant of postoperative visual acuity.

CONCLUSION

In this study, B scan ultrasonography and x-ray played an important role in identifying and localising IOFB. Patients with encirclage band and tamponade had better visual and anatomical outcome. However, larger comparative studies are needed to prove this.

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