

MANAGEMENT OF POSTERIOR SEGMENT INTRAOCULAR FOREIGN BODY WITH VITRECTOMY; VISUAL AND ANATOMICAL OUTCOME

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ABSTRACT

AIM:

To evaluate the anatomical and visual outcome following removal of intraocular foreign body (IOFB) through pars planavitrectomy.

MATERIAL & METHODS:

A retrospective analysis of 11 cases of retained posterior segment foreign body that underwent pars planavitrectomy for removal of foreign body during the period of January 2013 to August 2017 was conducted. Demographics of patients, mechanism and details of injury, Snellen best corrected visual acuity, examination results at presentation and after surgery, any diagnostic imaging and surgical procedure were recorded and analysed.

RESULTS:

Out of eleven eyes of eleven patients (mean age= 25.4±8.6, range 22–50 years; all male) preoperative retinal detachment and endophthalmitis was seen in 27.3% and 36.4% of cases respectively. Eighty-two percent of cases presented within 17 days of sustaining injury. Foreign body size ranged from 2mm to 8 mm and all were magnetic metal. After vitrectomy and removal of foreign body, the number of eyes with vision of hand motion or worse decreased from 72.7% to 27.3%. Similarly 45.5% of eyes gained best corrected postoperative visual acuity of better than 6/60. Anatomical success could be achieved in 81.8% of eyes.

CONCLUSION:

Anatomical outcome following vitrectomy in eyes with retained posterior segment IOFB in terms of retinal attachment is sufficient; however, visual outcome can be affected by other collateral ocular injuries and their sequelae.

KEY WORDS: posterior segment intra-ocular foreign body, vitrectomy and visual outcome.

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INTRODUCTION

Open globe injuries are often associated with retained intraocular foreign body (IOFB). It is seen in 18-41% of open globe injuries, with majority of cases occurring in young men less than 40 years old¹⁻³. IOFB results from a high velocity projectile arising from hammering metal on metal (60-80%) or power tool or explosives¹. Ocular injuries with retained IOFB possess a serious threat to vision due to the mechanical damage to intraocular structures, introduction of infection and chemical reaction of the foreign body⁴. Thus, they are often associated with corneal and sclera wound, hyphema, cataract, vitreous hemorrhage, retinal detachment and endophthalmitis⁵⁻⁷.

Removal of posterior segment foreign body in pre-vitrectomy era was solely dependent on the use of hand held external electromagnet for magnetic foreign body (FB) and forceps in cases with non-magnetic FB. This technique was highly unpredictable and was associated with iatrogenic trauma to eye and development of proliferative vitreoretinopathy (PVR) changes⁸. Now pars planavitrectomy and removal of FB with magnet or forceps is the preferred and widely practiced approach by many surgeons^{4,9,10}.

In this study, we share our experience with vitrectomy and removal of FB in cases with posterior segment IOFB and their visual outcome.

MATERIAL & METHODS:

A retrospective review of all the cases of intraocular foreign body of posterior segment from January, 2013 to August, 2017 was done at Bharatpur eye hospital in Bharatpur, Nepal. Eyes having open globe injury (OGI) with retained posterior segment intraocular foreign body (IOFB) who had undergone surgical intervention were included in this study. Surgically induced retained IOFBs such as intraocular lenses were excluded from the current study.

Medical records were reviewed for demographics of patients, mechanism and details of injury, Snellen best corrected visual acuity, examination results at presentation and after surgery, any diagnostic imaging and surgical procedure.

A written informed consent was obtained from all the subjects prior to surgery. A standard 20 gauge three ports pars planavitrectomy with simultaneous pars planalensectomy when considered necessary was performed. IOFB was removed by forceps or an intraocular magnet. Perfluoropropane (C3F8) or silicone oil was used for intraocular tamponade when required. Endolaser photocoagulation of the breaks and 360° photocoagulation of the retinal periphery was done. Postoperative retinal detachment, partial or total was

considered an anatomical failure. Statistical analyses were performed using Statistical Product and Service Solutions (SPSS) software version 20, (SPSS Inc, Chicago, IL, USA). The paired *t*-test and the chi square test were performed for data analysis. A *P* value less than 0.05 was considered statistically significant.

RESULTS:

Eleven eyes of 11 patients were included in the study. Demographical data of the patients is shown in Table 1. Age of patients ranged from 22 to 50 years. Duration of interval of injury to presentation ranged from 2 days to 1 year. 82% of cases presented to the hospital within 17 days of injury. All the patients were operated within 1-3 days of presentation. Mechanism of injury in all these patients was hammering (nail, stone, concrete block, or iron rod).

Demographics (n=11)		
Mean age	Years Mean ±SD	35.4±8.6
Gender	Male	11
	Female	0
Eye	Right	8(72.7%)
	Left	3(27.3%)
Mean interval	Days Mean ±SD	66±132.5

Table 1: Demographics data

All the foreign bodies extracted were magnetic metal. Size of the foreign body ranged from 2 mm to 8 mm and mean size was 3.1 mm. IOFB characteristics are shown in Table 2.

IOFB entrance	
Cornea	54.5%
Sclera	45.5%
IOFB location	
Retina	72.7%
Vitreous	27.3%
IOFB type	
Metallic	100%

Table 2: IOFB characteristics.

Co-morbidities are shown in Table 3

Anterior segment	
Corneal wound	6 (54.5%)
Scleral wound	5 (45.5%)
HypHEMA	2 (18.2%)
Hypopyon	3 (27.3%)
Cataract	5 (45.5%)
Lens rupture	2 (18.2%)
Posterior segment	
Retinal detachment	3 (27.3%)
Endophthalmitis	4 (36.4%)
Vitreous hemorrhage	2 (18.2%)

Table 3. Co-morbidities.

Preoperative retinal detachment (RD) was seen in 3 (27.3%) eyes. In one case attachment surgery was not possible due to severe PVR changes. Endophthalmitis was seen in 4 of 11 eyes (36.4%) at presentation. No microbial growth was seen in any of the vitreous samples from eyes with endophthalmitis. Three of 4 eyes with endophthalmitis had postoperative VA better than 6/60 whereas one case developed postoperative RD had VA of light perception.

Anatomical success was achieved in 9 of 11 cases (81.8%). Out of 2 cases where retina could not be attached, one had FB incarcerated in retina and detachment was associated with high grade proliferative vitreoretinopathy (PVR) changes. Second case was that of endophthalmitis which developed post-operative retinal detachment 4 weeks after removing IOFB.

Visual outcome is shown in Table 4.

	VA at presentation		VA 3 months postoperative	
	Frequency	Percent	Frequency	Percent
<= HM	8	72.7	3	27.3
cf to ≤1/60	1	9.1	3	27.3
>1/60 to ≤6/60	2	18.2	0	0
>6/60	0	0	5	45.5
Total	11	100	11	100.0

Table 4: Visual outcome

The number of patients with preoperative best corrected visual acuity (BCVA) of hand motion or worse was seen in 8 patients

that decreased to 3 in number, three months after surgery. However, one patient lost follow up 4 days after surgery. BCVA improved to more than 6/60 in 5 patients after surgery.

Various causes of postoperative visual impairment were aphakia, epiretinal membrane, retinal detachment with severe PVR changes, corneal scarring, high astigmatism secondary to corneal repair and retinal scarring.

DISCUSSION

Pars planavitrectomy is the preferred technique for removal of IOFB as it allows management of associated posterior segment injuries. Factors that determine the visual outcome include nature and location of the foreign body, interval between the injury and surgery, initial visual acuity, entrance wound location, preoperative retinal detachment, presence of intraocular hemorrhage, presence of endophthalmitis and the type of surgery.

Injuries at work place when hammering was the cause for IOFB in all the patients in this study. As seen in this study, many studies have also found that retained IOFB was commonly due to work related injuries^{11,12}. However bomb blast injury has been reported to be the commonest source of IOFB in some studies¹³.

In our study preoperative retinal detachment was seen in 27.3% of cases. The rate of retinal detachment associated with IOFB as seen in previous studies ranged from 16 to 47%^{14,15,16}. Postoperative retinal detachment occurred in 18.2% of eyes. One of these eyes had preoperative total retinal detachment with severe PVR changes and the other had presented with endophthalmitis. Various studies have reported the rate of postoperative retinal detachment ranging from 6.3% to 36.8%^{17,18}. The number of cases with preoperative endophthalmitis was remarkably high as compared to other studies. The reported incidence was 0 to 13.5%¹⁹.

In this study 4 of 11 cases (36.4%) presented with features suggestive of endophthalmitis. The diagnosis of endophthalmitis was established in these cases based on the clinical signs and B scan ultrasonography. Vitreous sample from none of these eyes demonstrated microbiological growth. Median duration of injury to presentation in eyes with endophthalmitis was 6 days which was less when compared with eyes without endophthalmitis (i.e. 8 days). Hence longer interval between injury and surgery did not appear to be a risk factor for endophthalmitis. In contrast to this Chaudhry et al⁷ noticed delayed repair of globe and removal of IOFB as the most predictive factor of developing endophthalmitis.

Postoperative BCVA remained unchanged in 27.3% of cases which was similar to the outcome in a study done in 48 patients

(31.9%)²⁰. Remarkable improvement in BCVA was seen in 36.4% of cases from HM or worse to better than 6/60. We found a final BCVA of 6/60 or better in 45.5% of eyes and final anatomical success was seen in 9 of 11 patients (81.9%).

The limitations of this study include small sample size, retrospective nature of the study and a short follow up of 3 months after surgery. At this time some patients still had treatable complications like aphakia and epiretinal membrane.

CONCLUSION

In conclusion pars planovitrectomy for foreign body extraction results in a very good anatomical outcome in terms of retinal attachment. Similarly visual outcome although good in most cases, can be affected in others by collateral ocular injuries and their sequelae.

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