ORIGINAL ARTICLES

VISUAL OUTCOME AND COMPLICATIONS IN INTRA OCULAR FOREIGN BODIES

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ABSTRACT

Objective: To evaluate visual outcome and complications in intraocular foreign bodies.

Study Design: Descriptive case series.

Materials and Methods: This prospective study was carried out in the department of Ophthalmology, Services Hospital Lahore, over a period of one year from July 2008 to July 2009. Eighteen patients having magnetic or non-magnetic intraocular foreign bodies (IOFBs) were included. The location of foreign body was determined with the help of slit lamp, direct and indirect ophthalmoscope, orbital radiogram, B-scan and CT scan. Patients with open entry wound underwent primary repair. Vitrectomy for intraocular foreign body was performed within two weeks of primary repair.

Results: Eighteen eyes of 18 patients were analyzed. There were 17 (94.44%) males and 1 (5.66%) female. Pre-operative visual acuity was perception of light in 9 (50%), hand movement in 5 (27.77%), finger counting in 2 (11.11%) and 6/60 in 2 (11.11%) patients. Post operative visual acuity was 6/18 or better in 6 (33.33%) and 6/60 in 4 (22.22%), hand movements in 6(33.33%), perception of light in 2 (11.11%) patients. Lens touch occurred in 1 (5.55%) patient and endophthalmitis developed in 1 (5.55%) patient. Giant retinal tear and total retinal detachment (RD) in 1 (5.55%) and phthisis bulbi in 1 (5.55%) patient.

Conclusion: Intra ocular foreign bodies contribute a significant component of ocular morbidity associated with open globe injury. However with prompt treatment a useful vision can be restored.

Keywords: Intra ocular foreign body, Visual acuity, Pars plana vitrectomy.

INTRODUCTION

Intraocular foreign bodies are both a common and a serious problem in traumatic ocular injuries. They occur in up to 40% of open globe and put the eye at risk for infection, retinal detachment and metallosis[1,2]. They represent a true emergency and can produce blindness even with the best treatment. Most IOFBs affect young productive members of society while hammering, drilling, or grinding at the work place[3-5]. Most commonly encountered foreign bodies are iron, steel, copper, zinc, aluminum, nickel and lead. Other foreign bodies comprise of stone, coal, glasses, plastic vegetable matter, wood, cotton and fibers.

The hammer chisel injury is the most common cause of the IOFB in adults[6]. Intraocular foreign body mostly causes damage to the eye by mechanical ways, introduction of infection and specific chemical reaction in the intraocular tissues[7].

With appropriate treatment, most eyes maintain or recover good vision. Approximately 80% of eyes recovered visual acuity to 1/60 (5/200) or better and 60% of eyes achieved at least 20/40[3].

Removal of the IOFB is integral for good visual rehabilitation. Good anatomic and visual recovery is the product of many factors, including a detailed history and examination, appropriate ancillary testing, minimally traumatic IOFB removal, repair of associated ocular damage and vigilant follow up.

MATERIAL AND METHODS

This prospective descriptive case series was carried out in the department of Ophthalmology, Services Institute of Medical Sciences Lahore, over a period of one year from July 2008 to July 2009. Eighteen patients having magnetic or non-

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magnetic intraocular foreign body were included in this study.

After admission, a detailed history and ocular examination was carried out. Patient's age and gender with particular reference to the cause of trauma were recorded. All patients underwent routine examination including visual acuity testing, pupillary examination, slit lamp biomicroscopy to detect wound of IOFB entry. The location of foreign body in the posterior segment was carried out by slit lamp and indirect ophthalmoscopy whenever ocular media was clear. Orbital radiogram, B-scan and CT- scan were performed when required for exact localization of foreign body.

Patients with open entry wound had primary repair done under local or general anesthesia. Vitrectomy for IOFB was performed within two weeks of primary repair. Postoperatively topical antibiotics, steroid and mydriatic drops were administered. Oral steroids were given in those cases in which vitreous reaction was found.

Patients were examined on first post operative day, first week, every two weeks for two months and then every month for six months. On each follow up visit, detailed examination was performed which included fully corrected distance and near visual acuity and intraocular pressure. Anterior and posterior segments were evaluated for any postoperative complications.

Data was analyzed using computer software SPSS version 19. Quantitative data like age was presented in the form of mean ± SD. Qualitative data like gender, visual outcome and complications was presented in the form of frequency and percentages.

RESULTS

Eighteen eyes of 18 patients were analyzed. There were 17 (94.44%) males and 1 (5.66%) female. The age of patients ranged from 16 to 65 years (35.52 ± 9.50).

The cause of injury was hammer and chisel in 14 (77.77%) patients, 2 (11.11%) patients were injured by grinding and working on lathe machine. One (5.55%) patient injured by gun shot and 1 (5.55%) patient was injured by road side accident. None of the patients was using ocular safety measures at the time of injury.

Pre-operative visual acuity was perception of light in 9 (50%), hand movement in 5 (27.77%), finger counting in 2 (11.11%) and 6/60 in 2 (11.11%) patients (fig-1).

The site of entry of foreign body in the eye was corneal in 16 (88.88%) limbal in 1 (5.55%) and scleral in 1 (5.55). Traumatic cataract was present in 11 61.11%) patients. one (5.66%) patient had IOFB in lens, one (5.66%) had IOFB in posterior surface of iris and ciliary body.

Initial wound repair lens matter aspiration and anterior vitrectomy were done in 7 (38.88%) patients. 16 (88.88%) patients required pars plana vitrectomy. In 2 (11.11%) patients IOFB could not be removed because it has passed through posterior wall of globe. None of the patients with retained IOFBs underwent enucleation or evisceration. Two (11.11%) patients required intravitreal antibiotics and steroids pre-operatively.

The size of IOFBs ranged between 0.5 mm to 4.5 mm as shown in table-1. All the IOFBs were metallic. Location of IOFBs were 1 (5.55%) in iris and ciliary body, 1 (5.55%) in crystalline lens, 10 (55.55%) in vitreous, 4 (22.22%) embedded in retina 2 (11.11%) passed through the posterior wall of globe.

The post operative final VA was 6/18 or better in 6 (33.33%) patients. 4 (22.22%) maintained VA 6/60. Six (33.33%) patients maintained a VA of hand movements, 2 (11.11%) patients maintained VA of perception of light. Fig-2 shows a comparison of pre and post-operative visual acuity. Non-parametric test McNemar was applied to see the difference between pre and post-operative visual acuity.

Results of McNemar showed that there was significant difference between pre and post-operative visual acuity in 9 patients (50%) which improved to 2 (11.11%) patients $p < 0.05$. 6/18 VA acuity was found in 6 (33.33) patients as compared to 0% in pre-operative which showed significant improvement ($p<0.05$). During surgery lens touch occurred in 1 (5.55%) patient. Endophthalmitis developed in 1 (5.55%) patient post-operatively. Giant retinal tear and total RD developed in 1 (5.55%) patient. Phthisis bulbi developed in 1 (5.55%) (table-2).

DISCUSSION

As in pervious reports[12,13], majority of our patients were male (94.44%) and relatively young with most in working age group. One key feature of the injuries in our study that has also been shown in previous studies was lack of eye protection[14].

In our study, tool related activities like hammering and chiseling comprise (77.77%) of all injury related mechanisms, a feature common in most studies on the topic[11,12].

In our study, similar to previous studies, the cornea was involved as an entry site in the vast majority of eyes (88.88%)[11-13].

The final location of IOFB was 10 (55.55%) in vitreous, 4 (22.22%) were embedded in retina, 1 (5.66%) in iris and ciliary body and 1 (5.66%) in lens. A review of the National Eye Trauma System documented the vitreous as the final location in 47% of IOFB injuries, retina in 33%, pars plana / ciliary body in 5%, lens in 5% and the anterior chamber (AC) in 10%[11].

IOFBs are usually associated with vitreous haemorrhage and retinal detachment. In our study retinal detachment was seen in 2 (11.11%) patients post operatively. Demircan et al. also showed retinal detachment in 10 (14.3%) and phthisis bulbi in 3 (4.3%) out of 39 eyes[15]. In our study phthisis bulbi was present in 1 (5.55%) patient.

In our study the foreign body was localized with ultrasonography in most of the cases. Deramo et al showed ultrasound biomicroscopy as an effective technique in detecting and localizing occult foreign bodies after ocular trauma which is also suitable for studying vitreoretinal status[16].

Table-1: Size of intraocular foreign body.

Size (mm)	No of patients	Percentage
0.5	2	11.11%
1.0	4	22.22%
1.5	4	22.22%
2.0	4	22.22%
3.0	3	16.66%
4.5	1	5.55%

Table-2: Complications during and after surgery.

Complications	No of eyes	Percentage
Lens touch	1	5.55%
GRT and total retinal detachment	1	5.55%
Endophthalmitis	1	5.55%
Phthisis bulbi	1	5.55%

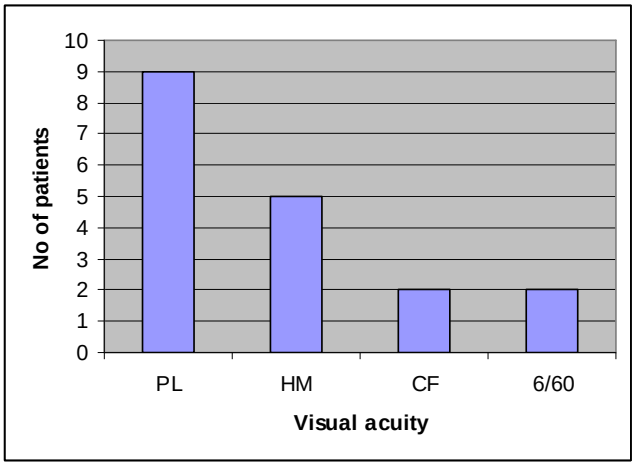

Figure-1: Preoperative visual acuity.

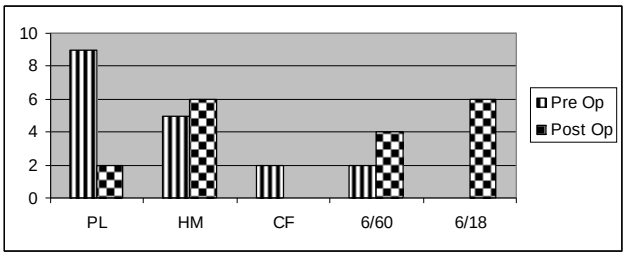

Figure-2: Comparison between pre and post operative visual acuity.

Initial visual acuity was the most important predictive factor of visual outcome in patients with retained IOFBs. Previous studies have also identified the presenting visual acuity as an important predictive factor[9,10,17,18]. Hammering metal on metal as the mechanism of injury had a better visual outcome than those whose injury was caused by other mechanisms. This is because injuries secondary to hammering metal on metal tend to involve relatively small foreign bodies with less associated ocular trauma than injuries from other mechanisms like firearms or explosion. In our series the size of IOFBs remained 0.5 mm to 2 mm in majority of patients (88.88%).

A direct comparison of studies reporting the visual results of patients with IOFBs is difficult because of the variability of circumstances involved with ocular trauma. The results of our study compare favorably with other reports of visual outcome after a retained IOFB. A study conducted by Brinton et al reported that 63% achieved functional success, defined as a visual acuity better than 20/100 or an improvement from a presenting acuity of light perception or worse to more than 5/200[9] Willams et al. reported the results of 105 eyes with retained IOFBs. Sixty percent of these patients achieved a final visual acuity of 20/40[19].

In our study the visual results are fairly comparable with other studies as 10 (55.55%) patients had final visual acuity of 20/200 or better.

Endophthalmitis has been estimated to occur in 0% to 10.7% of patients with retained IOFBs[20,21]. In our study endophthalmitis occurred in 1 (5.55%) patient postoperatively.

When examining those factors that are predictive of visual out come, it is interesting that vast majority of factors are characteristics of the injury itself rather than the treatment course. Most factors can be identified at the patients initial presentation and may be less impacted by the specific course of management. In fact, recent studies have suggested that delay in removal of an IOFB may not be as critical as previously thought[22,23].

Our study also did not find any significant association between time to surgical intervention and out come. Recent studies suggest that emergent IOFB removal (within hours) may not be as necessary as previously thought as long as open glob injury in closed promptly and systemic antibiotics are initiated quickly.

CONCLUSION

Ocular trauma continues to be a major cause of visual impairment. Patient education, occupational safety, and advancement in microsurgical techniques continue to help in improvement of visual outcomes. Ocular trauma intraocular foreign bodies contribute a significant component of ocular morbidity associated with open globe injury. However with prompt treatment a useful vision can be restored.

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