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Case Report

Pattern of Visual Prognosis in Patients with Retained Intraocular Foreign Bodies: A Case Series

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ABSTRACT

Background: Ocular trauma with retained intraocular foreign bodies (IOFBs) can cause severe inflammation, infection, and vision loss. Early diagnosis and prompt management are essential to preserve vision and ocular integrity and prevent complications such as endophthalmitis and sympathetic ophthalmia.

Purpose: To determine the pattern of eye injuries from workplace trauma or occupational trauma, management of complications and the visual outcome at a tertiary care eye hospital in southern odisha.

Method: The five cases of ocular trauma from workplace were reviewed prospectively. Information regarding patient's age, gender, type of work, visual acuity at presentation, details of injuries, diagnosis, management and visual acuity at follow up visits were documented and analysed.

Conclusion: Timely intervention leads to a better visual prognosis, prevention of endophthalmitis and sympathetic ophthalmia.

Keywords: IOFB, Ocular Trauma, Workplace Injury.

INTRODUCTION

Intraocular foreign bodies (IOFBs) play a major role in causing visual disability throughout the world, especially among young males in high-risk occupations.[1,2] These injuries account for approximately 18%–41% of open globe injuries and are often associated with a poor visual prognosis when diagnosis or intervention is delayed.[3] Intraocular foreign body (IOFB) retention usually occurs after high-velocity injuries and consist of either organic or inorganic materials.[4] Apart from causing orbital or intraocular complications from direct trauma, retained organic materials carry an increased risk of post-traumatic orbital infections.[5] Certain metallic foreign body within the eye may produce retinotoxic ions, e.g. siderosis and chalcosis,[6] and most metallic IOFB should be removed at the earliest to alleviate the risk of these reactions and minimize intraocular inflammation.[7]

Visual impairment can result from direct tissue damage caused by an IOFB during the initial injury, as well as from subsequent complications like retinal detachment and post-traumatic endophthalmitis, particularly with organic IOFBs. Several factors are used to predict final visual outcomes, including initial visual acuity, the size and location of the IOFB, the size and location of the entry wound, the presence of a relative afferent pupillary defect, as well as retinal detachment and endophthalmitis.[8]

The management of IOFBs typically involves surgical removal to minimize the risk of complications and preserve visual acuity.[9] Vitrectomy is recommended for the removal of posterior segment IOFBs as it allows for direct visualization and controlled extraction of the foreign body. The goal of treatment is to preserve the integrity of the eye and achieve favorable visual outcomes.

Case Report 1

A 35 year old male patient presented with pain, swelling in the left eye for 10 days following trauma with a wood particle while chopping wood. Visual acuity in the left eye was 6/ 6. Extra ocular muscle was free and full in all directions in the left eye. Anterior segment

examination revealed edema and ecchymoses of left upper lid, decrease in interpalpebral fissure height, conjunctival congestion, a palpable foreign body in the superior fornix, and a larger fragment lodged in the superolateral fornix with partial thickness scleral perforation. CT orbit demonstrated a hypodense calcified lesion in the preseptal region with soft tissue thickening, emphysematous changes, and a small avulsion fracture of the left zygoma.

Management

The patient underwent surgical removal of the foreign body of size 2.5* 0.5*0.7 cu cm under local anesthesia. Postoperatively, systemic antibiotics, analgesics, and corticosteroids were administered. The patient recovered uneventfully with complete resolution of symptoms and post op visual acuity in the left eye was 6/6.



Figure 1: Pre operative picture. Note the swelling over the left eyelid

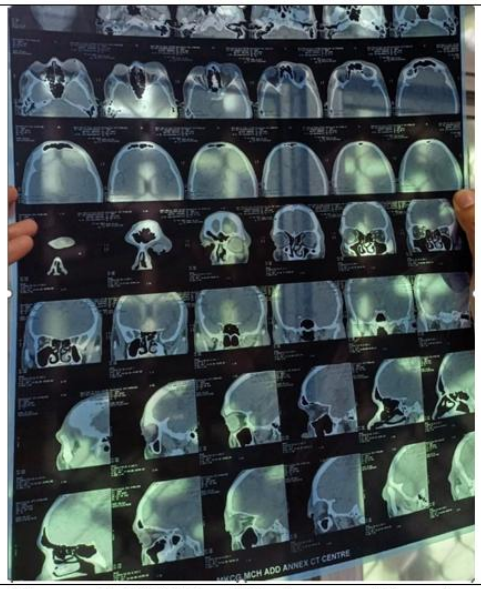


Figure 2: NCCT orbit shows a Hypodense calcified leison/ in the superior part of left orbit



Figure 3: Intraocular foreign body removed from left fornix

Table 1. Post op parameters

	OD	OS
Visual acuity	6/6	6/6
IOP	15mm of hg	12mm of hg

Case Report 2

A 50 year male presented to the casualty with injury to the right eye while cutting stone. The patient had no perception to light in the right eye. Extra ocular muscle movement was severely restricted in all gazes and directions.

Anterior segment examination revealed full thickness laceration of both upper and lower lid along with full thickness corneal laceration at the lateral limbus with a foreign body of size 4 cm * 2 cm *0.1cm deeply impacted at the wound site.

NCCT orbit revealed globe rupture along with

vitreous haemorrhage.

Management

The patient underwent surgical removal of foreign body under local anaesthesia. Intravitreal antibiotics were administered. Postoperatively, systemic antibiotics, analgesics and corticosteroids were administered. The poor visual prognosis was clearly explained preoperatively and the need for timely intervention to prevent sympathetic ophthalmia. Vitreo retina consultant was sent.



Figure 4: Open globe injury with impaction of foreign body



Figure 5: Retained metal object after surgical removal.

Case Report 3

A 38 year old male presented to the casualty with trauma to the right eye while chopping wood. Anterior segment examination revealed edema and ecchymoses of the right upper lid and right lower lid; along with a curved laceration of 6cm *2cm*2cm along the medial canthus. It was associated with chemosis and sub conjunctival haemorrhage was seen. Vision was Hand movement positive.

On B- scan, vitreous haemorrhage along with total funnel shaped retinal detachment was noted.

NCCT orbit revealed a linear hypodense foreign body of size 5 cm * 1 cm *1cm in the right extraconal space with peribulbar fat stranding along with displaced fracture of greater wing of sphenoid involving lateral bony orbit. There was no evident globe rupture noted.

Management

The foreign body was surgically removed from the extra conal space followed by medical management with intravenous antibiotics and intravenous steroids. The patient was then referred for a vitreo- retina consultation for posterior segment management. The visual acuity in the right eye hand movement positive post operatively.



Figure 6: Pre operative image



Figure 7: Foreign body removed from the right extraconal space

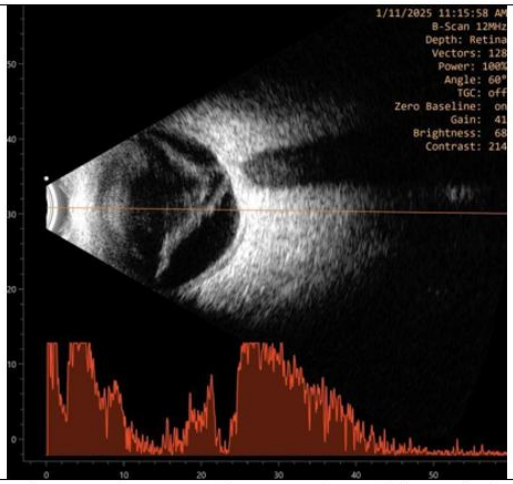


Figure 8: B Scan image vitreous haemorrhage and total funnel shaped retinal detachment in the right eye.

Case Report 4

A 18 year old male presented to the trauma unit with a wooden stick of size 11cm* 1.5 cm* 1cm jutting out from just below his left eye following trauma with stick while driving. Anterior segment examination of the left eye appeared to be normal. Visual acuity of the patient in the left eye was 6/12. Intra ocular pressure was 12 mm hg. Extra ocular movement was restricted in the left eye inferiorly. NCCT orbit reveal a linear hypodense foreign body in the left orbito-maxillary region.

Management

The patient underwent surgical removal of the foreign body followed by suturing of the exit wound. He was administered Intravenous antibiotics, intravenous steroids and intra muscular NSAIDS following surgery to expedite

recovery.

The patient made an uneventful recovery following surgery with post op BCVA of 6/12.



Figure 9: Pre op image. Note the location of the foreign body in the inferior aspect of orbit.

Case Report 5

A 27 year old man presented to the ER with complaints of redness and watering in the RE since 4 hours following trauma with a wooden particle while chopping wood. On slit lamp examination there was deep impaction of a chunk of wood of size 1cm* 1cm*0.5cm in the lateral aspect of right palpebral conjunctiva; posterior margin of which was not appreciable. There was a epithelial defect of 1*1 mm^2 over cornea at 7 o' clock which took fluorescein stain as observed under cobalt blue filter in the slit lamp. Visual acuity was 6/6 in both eyes; intra ocular pressure was 14 mm of hg in the right eye and 12 mm hg in the left eye.

Xray orbit and face was normal.

Management

Patient underwent surgical removal of the foreign body under local anaesthesia following which he was treated with broad spectrum IV antibiotics and analgesics. Patient was given lubricating eye drop, anti biotic eye drop and eye ointment D-Panthenol. Patient recovered uneventfully with 6/6 vision in the right eye.



Figure 10: Foreign body impacted at right lower palpebral conjunctiva

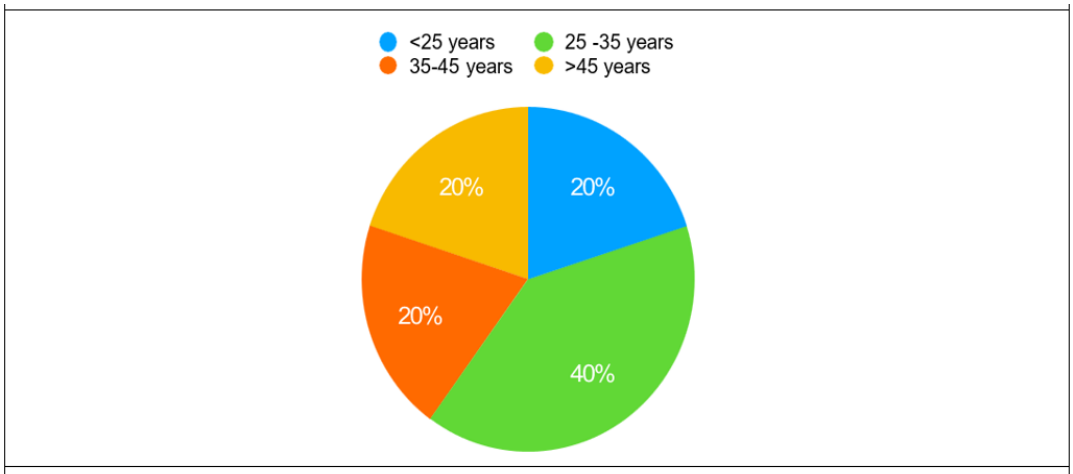


Figure 12: X- ray face and paranasal sinuses in AP and lateral view

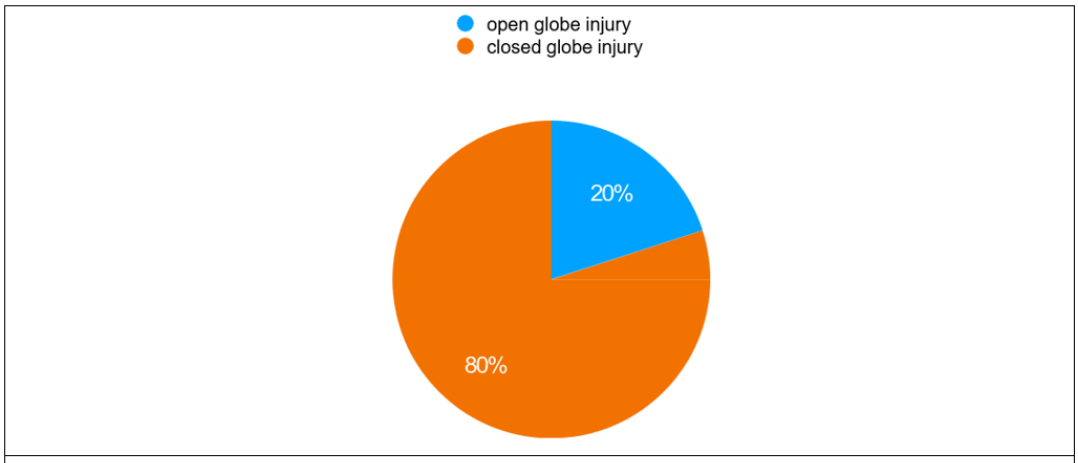
RESULTS

Table 2. Eliciting pre op and post op parameters

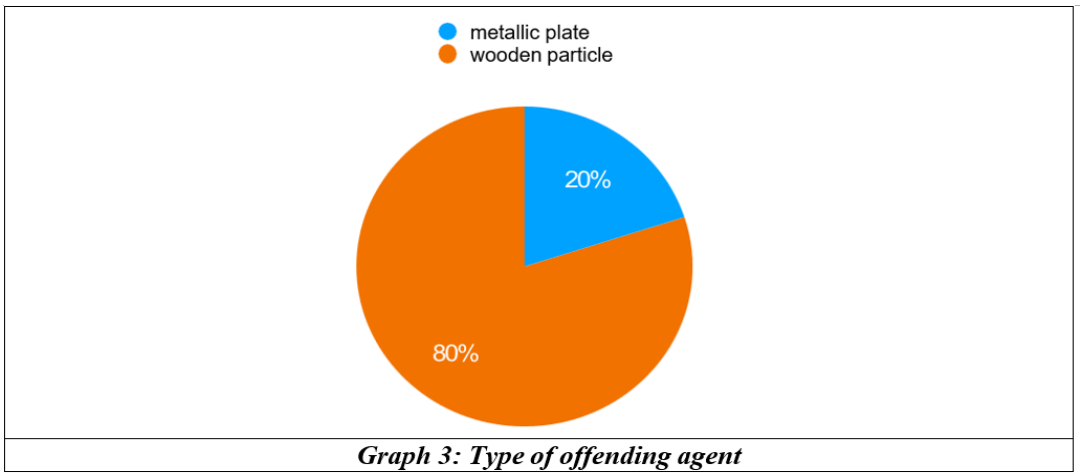
Sl. No.	Age	Pre op BCVA	Pre op IOP (mm of hg)	Post op BCVA	Post op IOP (mm of hg)	Clinical features on presentation
1	35	6/6;LE	15	6/6;LE	12	A large wooden piece was lodged in the superolateral formix with partial thickness scleral perforation
2	50	No PL;RE	5	No PL;RE	8	NCCT orbit revealed globe rupture with vitreous haemorrhage
3	38	HM (+VE);RE	6	HM (+VE); RE	8	NCCT orbit revealed linear hypodense foreign body in extraconal space
4	18	6/12;LE	12	6/12; LE	12	NCCT orbit revealed foreign body in left orbito maxillary region
5	27	6/6;RE	14	6/6; RE	12	X ray face and paranasal sinus was normal. Slit lamp examination revealed small wooden particle lodged in right lower palpebral conjunctiva



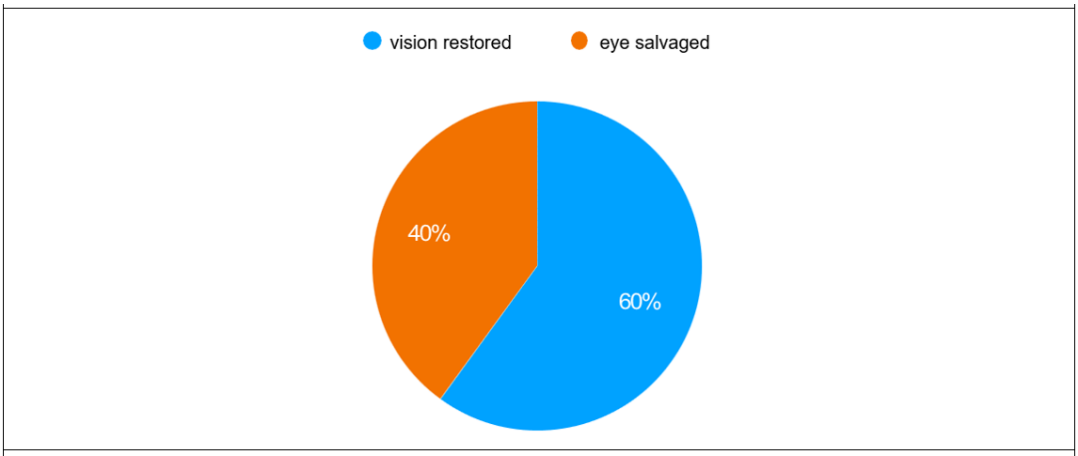
Graph 1: Age distribution of patients



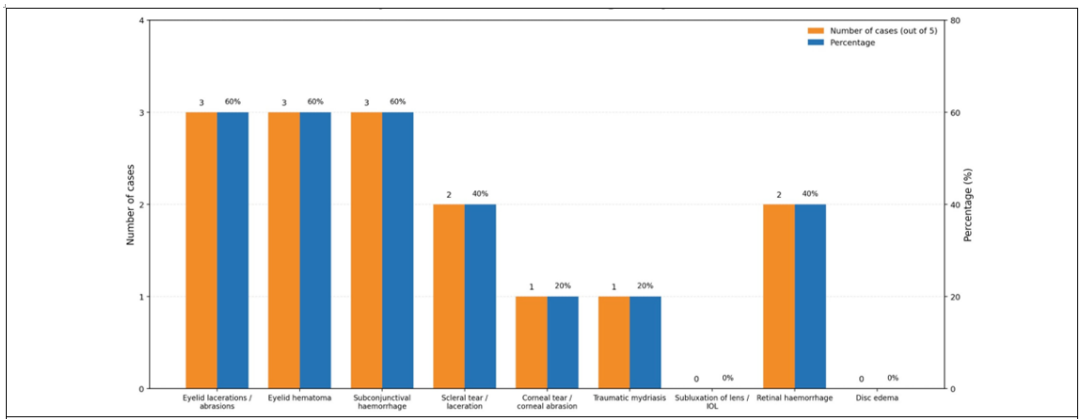
Graph 2: Type of injury among five patients



Graph 3: Type of offending agent



Graph 4: Prognosis after treatment



Graph 5: Complications of intraocular foreign body retention

DISCUSSION

This series comprises of 5 patients with intra ocular foreign body retention following trauma with various types of materials mostly at their workplace. All of the above patients were under the age group of 18 to 50 years. Three out of the five patients had injury to the right eye while rest two had injury to the left eye. Four out of the five patients had injury with wooden particle while one of them had injury with a metallic plate. All of the patients underwent appropriate imaging ie. NCCT brain and orbit, and x ray face and paranasal sinuses to exactly localise the foreign body and to rule out any posterior segment pathology. Two out of the five patients had penetrating type of open globe injury while in rest three the foreign body was present in the cul- de- sac or in the extra conal spaces. Three out of the five patients who did not have any open globe injury had a good pre operative vision which remained so after surgical removal of the foreign body. The two patients who had open globe injury had very poor vision (Hand movement positive and perception of light negative) to begin with. Their vision remained so even after surgical removal of the foreign body. We managed to remove the foreign body in all of the cases. The contour of the globe was able to restore in all of the cases. None of the patients had to undergo any destructive procedures. Timely removal of the foreign body and intravenous corticosteroids helped us in avoiding the dreaded complication of sympathetic ophthalmia in all of the cases. Two patients with open globe injury had vitreous haemorrhage; one out of which had globe rupture as showed in NCCT orbit; These patients were referred to a vitreo-retina centre following removal of the foreign body for further management of the posterior segment pathology. None of the patients had any foreign body injury to the posterior segment. All of the patients were treated post operatively with intravenous antibiotics and intravenous corticosteroids to reduce the of inflammation as well decrease chances of endophthalmitis and avoid sympathetic ophthalmia. Three out the five patients recovered uneventfully with total restoration of vision.

CONCLUSION

Intraocular foreign body (IOFB) injury is a

serious form of ocular trauma in which the clinical course and visual prognosis are influenced by the nature and characteristics of the foreign body, as well as the extent of concomitant ocular damage. A comprehensive diagnostic evaluation, including a detailed history, thorough ophthalmic examination, and appropriate radiological imaging, is essential to confirm the presence of an IOFB and accurately establish its intraocular location. The decision regarding the timing of surgical removal should be individualized according to the clinical status of the affected eye and the anticipated risks and benefits of intervention. The surgical approach should be selected based on the composition, size, shape, and anatomical location of the foreign body, together with any associated ocular injuries. Following removal, meticulous postoperative surveillance and management are necessary to prevent complications and facilitate their early detection and treatment. Prompt diagnosis, comprehensive assessment, timely surgical intervention, and appropriate postoperative care are therefore critical determinants of favorable anatomical and visual outcomes in patients with IOFB trauma.

Patient Consent

Written informed consent was taken from all patients for their participation in the study. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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