

Case Report

Traumatic avulsion of the eyeball: a case report

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ABSTRACT

Ocular trauma is very common, but globe avulsion along with optic nerve avulsion is a rare clinical event. Blunt trauma during a road traffic accident can cause rupture or avulsion of the globe and the outcome can range from complete recovery on repositioning to visual loss because of globe perforation or optic nerve injury. Here, authors report a case of a 20-year-old male who presented with history of a road traffic accident causing severe facial injuries. The physical examination revealed oedema and ecchymoses over the right side of the face with avulsion of the right eyeball anteriorly outside the orbit along with avulsion of the optic nerve. The visual acuity in the injured eye was no perception of light and the direct pupillary response was absent. Computed tomography revealed fracture of the roof and lateral wall of the right orbit. As the eye was not salvageable, enucleation surgery was done. Insertion of an ocular prosthesis for rehabilitation was planned. The presentation, investigations, surgery and follow-ups are described.

Keywords: Fracture, Globe avulsion, Optic nerve avulsion, Road traffic accidents, Trauma

INTRODUCTION

Complete prolapse of the eyeball from the orbit is a rare clinical entity, and high energy trauma is required for this to occur. The globe is resistant to mild to moderate trauma due to its anatomical location within the socket, its attachment to the optic nerve and the extraocular muscles, and the resistance of the globe due to its pressure. An important cause of such ocular traumas is road traffic accidents. The global annual incidence of ocular trauma is around 55 million, of which 7,50,000 require hospitalization each year.¹ It may be associated with fracture of the orbital walls or fracture of the maxilla. Complete or incomplete avulsion of the optic nerve may also be seen along with it.

CASE REPORT

A 20-year-old male was brought to the emergency unit of study institute with a history of a road traffic accident. He sustained facial trauma when his two-wheeler slipped in a

bid to avoid a person crossing the road. Immediately after the injury, he was taken to the nearest community health centre where conservative treatment and tetanus vaccine were given and his wounds were patched. He was then referred to our institute. On arrival, he was conscious and oriented with a Glasgow coma scale of 14/15. Following the injury, he complained of pain, bleeding and complete loss of vision in the right eye. Physical examination revealed edema and ecchymoses over the right side of the face, deep forehead laceration, bleeding from the right eye and an avulsed right eyeball. On examination of the eyes, the right globe was displaced outside the eyelid fissure attached to a band of tissue and was rotated laterally (Figure 1). There was no perception of light and the pupil was semi-dilated and not reacting to light.

The conjunctiva was hyperaemic, chemosed and lacerated nasally. The sclera was thinned out nasally, but the eyeball pressure was maintained. The cornea was hazy and cloudy due to exposure keratitis (Figure 2). There was no view of the fundus due to the corneal haze. Right

eyeball movements were absent. The left eye was clinically normal.



Figure 1: Initial presentation of avulsion and lateral rotation of the right globe.



Figure 2: Initial presentation of a torn conjunctiva with hazy cornea with semi dilated pupil.



Figure 3: Presentation on the day of the surgery.

He was started on topical antibiotic and lubricating eye drops. Computed tomography (CT) revealed (1) Subdural and subarachnoid haemorrhage in the right frontal region (2) Comminuted depressed fracture of the frontal bone extending into the roof and lateral wall of the right orbit (3) Fracture of the lateral wall and cribriform plate of the right ethmoid (4) Protrusion of the right eyeball from the

right orbit. Emergent intravenous analgesics, antibiotics and antiepileptics were administered. An initial neurosurgical assessment was done and he was cleared for definitive management to the ophthalmology department. Plastic surgery opinion was taken and he was asked to follow-up after definitive ophthalmic management. Following routine investigations and pre-op evaluation, he was taken for surgery under general anesthesia (Figure 3). Even after attempting a lateral canthotomy, it was impossible to reduce the eyeball back into the orbit. The optic nerve was avulsed. On exploration, the extraocular muscles were unidentifiable and suturing was not possible. Irreversible damage to the optic nerve and extraocular muscles with no perception of light, prompted us to go for enucleation. Post-operatively, topical antibiotic drops and an antibiotic eye ointment were started. Intravenous antibiotics and oral anti-inflammatory drug were continued. Plastic surgery opinion was repeated on the third post-operative day, but no intervention was found necessary for cosmesis or frontal bone fracture and he was asked to follow-up after 3 months. After an uneventful postoperative period, edema and ecchymoses had reduced and the wound was healthy (Figure 4). The distant and near visual acuity and fundus examination of the other eye were found to be normal. So, on the sixth post-operative day, he was discharged. He was reviewed after a week in this OPD. He had no active ocular complaints and the conjunctival sutures were in-situ. Authors planned to insert an ocular prosthesis in the future, but the patient was lost to follow-up.



Figure 4: Enucleated eye with healthy wound and conjunctival sutures in-situ with hyperaemic and chemosed conjunctiva.

DISCUSSION

Avulsion of the globe occurs when the equator of the globe protrudes anterior to the eyelid aperture.² A etiology of avulsion of the globe may be due to (1) facial trauma (2) avulsion due to forceps during forceps delivery, and (3) self-enucleation in psychotic patients.³ Trauma is the most common cause, which may be accidental or inflicted-as seen in a brutal sport called

gouging, where the contender tries to press the opponent's eyeball out with his thumb.^{4,5}

Facial injuries are most often associated with orbital wall fractures usually fractures of the floor, medial wall or roof which leads to herniation of the globe into the surrounding structures. In a study by Amaral et al orbital fractures were associated with traumatic globe luxation in 67.6% of the cases. Traumatic globe luxation without orbital fractures were less infrequent (26.5%).⁶ Traumatic globe luxation can be of two types (1) when the globe is displaced anteriorly outside the orbit; (2) when the globe is displaced into the paranasal sinuses. Many theories have been proposed like the hydraulic or buckling theory, medial penetration theory of Morris, orbital fractures reducing the orbital space, sudden deceleration force, sudden rise of intraocular pressure, and direct traction on the eye ball.^{7,8}

In a study by Amaral et al most cases of traumatic globe luxation could be found in patients who had suffered traffic accidents (52.9%), followed by falls (8.8%), hitting (5.9%), and assaults (5.9%). Other causes accounted for the remaining cases (26.5%). Traumatic globe luxation is more common in young male adults, who have had a history of road traffic accident.⁶ According to Bajaj et al the commonly avulsed extraocular muscles in decreasing order of frequency are the medial rectus, inferior rectus, superior rectus, and the obliques.⁹

The management of an avulsed but intact globe is controversial. In most cases, the eyes were enucleated.¹⁰ But when the globe is intact, initial globe repositioning remains the first choice of treatment for traumatic globe avulsion. In the study by Amaral et al repositioning was carried out in 73.5% of the cases analysed and proved to provide better functional, cosmetic, and psychological outcomes for the patient. Enucleation or evisceration was performed in 5.9% of the cases, due to pain, phthisis, or unsatisfactory cosmetics.⁶ The presence of an intact globe prevents contracture of the socket for future ocular prosthesis.³ Enucleation and evisceration are the two an ophthalmic surgery which are indicated in severe ocular trauma. In enucleation, the entire globe is removed whereas in evisceration sclera and extraocular muscles are left intact.³ They are only preferred in cases of completely avulsed globe together with optic nerve and extraocular muscles or in patients presenting late with severe exposure, corneal perforation or phthisis. After an ophthalmic surgery, the socket should be rehabilitated either as a delayed primary procedure or secondarily with an orbital implant and ocular prosthesis to restore normal appearance and aiding psychological rehabilitation.

In this case, the globe was unsuitable for repositioning. Due to severe ocular disruption, avulsed optic nerve, unidentifiable extraocular muscles and no perception of light, enucleation was planned even though the patient was young. The post-operative period was uneventful

with no orbital infection or neurological sequelae like intracranial or subarachnoid haemorrhage, cerebrospinal fluid meningitis, or hypothalamic infarcts which are associated with traumatic enucleation. Insertion of an ocular prosthesis was planned, but the patient was lost to follow-up.³

CONCLUSION

Globe avulsion due to road traffic accidents, though a rare entity, when encountered can be challenging for an ophthalmologist. Early intervention is not always possible due to delay in reaching the hospital in most developing countries. Despite all confounding factors, one must attempt prompt reposition of the globe and reattachment of ends of muscles by sutures. But if the globe is not intact or not salvageable, enucleation can be done and later an orbital implant or appropriate prosthesis can be inserted for cosmesis.

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