Traumatic Avulsion of the Globe: Report of a Rare Case and Brief Review of Literature

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Abstract

We report a rare, severe case of traumatic globe avulsion and its assessment and management. A 60-year-old man was presented with complete globe avulsion following a facial trauma. Left globe was luxated out of the orbit. No direct or indirect light reflexes or any eye movement could be noted. CT-scan showed complete laceration of the left optic nerve, globe protrusion and multiple orbital bone fractures. After repositioning of the protruded globe tarsorrhaphy was performed. Although visual recovery cannot be achieved after severe orbital or optic nerve trauma, avoiding primary enucleation helps alleviate the psychological burden of the trauma. In case of the eventual development of phthisis bulbi, the patient will have a chance to be fitted with a prothesis over his own eye with a resulting better motility.

***Keywords*:** globe avulsion, trauma, enucleation

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Introduction

Luxation or avulsion of the globe with or without optic nerve avulsion is a rare condition that results from an extreme form of trauma.[1] Globe avulsions are classified as incomplete, in which the optic nerve is severed only, and complete where there is disruption of the extraocular muscles and optic nerve resulting in total luxation of the ocular bulb.[2] Herein we describe a patient with globe avulsion following a car accident.

Case Report

A 60 year-old man sustained severe facial injury after a car accident. He was conscious at admission and had a laceration on his right fronto-temporal area. On ophthalmologic examination, the right eye was normal with $^{20}/_{20}$ vision and only had echymosis on right lower lid. Visual acuity of the left eye was no light perception (NLP). The eyelids of left eye were edematous, but they were open. The globe was protruded to the front of the orbit and the movements of left eye were grossly restricted in all gazes (Figure 1). The eye ball was hypotonic but intact.

There was a large horizontal conjunctival and tenon's capsule laceration on the medial and lateral sides of limbus on which the medical and lateral rectus muscles insert, but the muscles themselves were not visible. The cornea was cloudy and the pupil was widely dilated and had no reaction to neither direct nor indirect light stimuli.

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Figure 1: Preoperative photograph of the patient showing luxated globe (anterior view)

CT-scan images showed protrusion of the left globe with multiple fractures of orbital walls and were suggestive of avulsion of the optic nerve within the left orbit (Figure 2). Intracranial structures were normal. The right eye was normal. The patient was hospitalized and intravenous corticosteroids and antibiotics were started.

The patient underwent surgery. Following exploration of the orbit under general anesthesia and removal of foreign bodies, the right globe was put back into the orbit. A meticulous search was undertaken to retrieve the possibly avulsed distal ends of extraocular muscles. Through careful dissections, ends of the superior and lateral recti were found and sutured to their original insertions. Because of crashing injury to the other extraocular muscles, we couldn't identify the ends of other muscles and suture them. The conjunctiva was then closed and tarsorrhaphy of left globe was done (Figure 3). A week later perimetry of right eye was normal and the chiasma area was suspected to be intact.

One month later, after opening of some tarsorrhaphy sutures, he had varying degrees of motility in some directions, after which the left eye started to show signs of phthisis bulbi. He has tolerated well a dummy prothesis over the left eye and he is currently considering to be fitted electively with ocular prothesis. The right eye visual acuity and visual field were normal throughout the follow up.

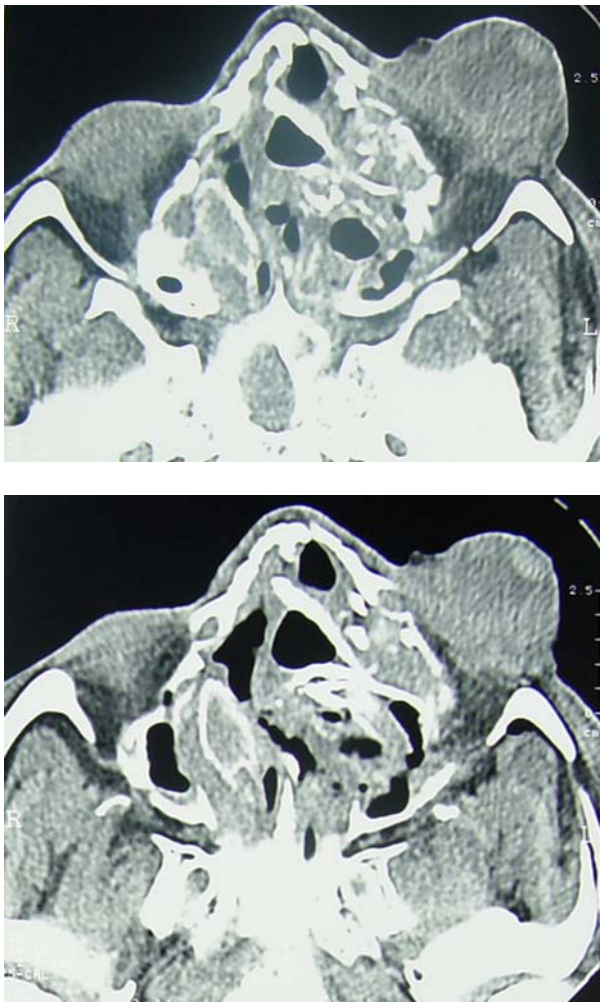

Figure 2: CT-scan of left orbit shows protrusion of the left globe and multiple fractures of orbital and nasal walls, and is suggestive of avulsion of the optic nerve within the left orbit with bony fragments.

Figure 3: The same patient after tarsorrhaphy

Discussion

The optic nerve and the globes are very resistant to mild and moderate trauma.[2] Many years ago, globe luxation used to be seen as a result of "gouging" in which a combatant was successful if he would press the adversary's eye ball out with his thumb.[1,3] A few case reports are also available following severe head trauma, self-enucleation or oedipism in which a psychiatric patient (psychotic depression) enucleates the globe by his/her own fingers![1-7]

Traumatic globe subluxation has been reported in the literature rarely. Head trauma or delivery in obstructed labor can cause globe luxation.[1] Following trauma, the most commonly injured and avulsed extraocular muscles in decreasing order of frequency are the medial rectus, inferior rectus, superior rectus, and the obliques.[5] It has been suggested that reoperation on a lost muscle should be performed within 7 to 10 days after the initial surgery before contracture of muscles supervenes.[3] During globe avulsion, severance of ophthalmic artery and subarachnoid hemorrhage can occur. Tears beyond the optic foramen do not usually cause orbital hemorrhage.[4] Optic nerve is rarely avulsed during playing basketball[6] or even golfing.[7]

Bilateral globe subluxation with complete optic nerve transaction is very rare.[2,8] In one of these reports that had been occurred following car accident, both globes were enucleated primarily and although the patient regained consciousness, he died secondary to infection in ninth day after recovery.[2] In the second case,[8] the contents of both globes were reposited into the orbits, although vision was NLP. This procedure helped the patient to accept this sudden loss of vision and reduce his psychological stress.

Life-threatening neurologic sequelae may result from any type of traumatic enucleation including orbital infection, intracranial or subarachnoid hemorrhage, cerebrospinal fluid leakage, meningitis, or hypothalamic infarcts.[9] A neurologic examination for signs of meningitis is essential. Brain and orbital CT-scans are required to exclude intracranial bleeding, optic chiasmal injury, and bone fractures.[10]

Since infectious orbital and cranial complications such as cellulitis, abscess, or both can occur, patients should be treated with broad-spectrum intravenous antibiotics. Traumatic optic neuropathy should be managed aggressively by evacuation of intraorbital hemorrhage in the presence of retobulbar hemorrhage, lateral canthotomy, and antiglaucoma drugs.[10] Treatment with megadoses of intravenous methylprednisolone for traumatic optic neuropathy is controversial.[11]

Conclusion

In globe avulsion, if the globe is viable, it is important to find and repair all extraocular muscles.[10] A complete tarsorrhaphy or pad and bandage helps in keeping the globe in position.[1] Prompt reposition of the globe and reattachment of ends of muscles by sutures in comparison with initial enucleation, has two advantage; first, the patient has not to sacrifice an organ after such severe accident; secondly, we can easily fit an ocular prosthesis with better motility on phthisic eye.[3]

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