Surgical Decompression of Optic Nerve following Zygomaticomaxillary Fracture
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Abstract
A case of visual loss following Cranio-maxillofacial trauma is reported. The patient had partial blindness and inability to close the eyelid with right eye; it was associated with displaced fracture of right lateral and inferior wall of the orbit. Access to the fracture site was achieved through incision placed on fronto-zygomatic region (lateral eyebrow approach). The fractured fragment was elevated and fixed with 4 hole miniplate with gap 1.5mm. The patient had total return of visual acuity without surgical complications. He could also close his right eye; the role of orbital and optic decompression in the management of patients with traumatic optic neuropathy is discussed in this article. Indications of such cases are controversial and the procedures should be considered only with the context of specific needs of the individual patients.

Keywords: Visual Loss, Optic Nerve Decompression, Cranio-maxillofacial Trauma, Optic Neuropathy

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Introduction
Although about 40% of maxillofacial fractures involve one or both orbits, blindness was an uncommon complication of facial trauma with a reported incidence of 2 -5% (1, 2). Visual loss after facial trauma may result from several injuries to the orbital and brain components responsible for vision (2). The most frequent are optic nerve or optical canal injuries (1, 3). The optimal management of traumatic optic neuropathy is controversial and depends on the nature and extent of injury causing the visual loss (4). The following report presents a case of lateral and inferior orbital wall fracture, causing partial visual loss. Elevation and fixation of the fractured bony fragment through a simple surgical procedure performed in order to achieve decompression of optic nerve to restore visual acuity with success.

Case Report
A 70 year old male sustained maxillofacial trauma due to stampede of an antelope (Nilgai) reported in a private hospital. Physical examination revealed Glasgow coma scale of 7 (GCS E3V4M0). Patient was conscious, dull responding to verbal command patient with lacerated wound on right zygomaticomaxillary complex (ZMC) region (4-5cm). Other features included, open right eye with restricted movements in abduction, depression, ecchymosis in upper lid, lower lid retracted leading to exposure of the lower half of cornea with shallow accommodation.

Right eye showed iris papillary margin tear and Marcus-gun pupil i.e., pupil mid dilated fixed (3mm). Left pupil (2mm) responding to light. Visual acuity was 1 in left eye and was only able to count fingers at 2 meters in right eye. On palpation step defect evident on right lateral orbital rim region and right ZMC fracture with tenderness. Radiographs revealed fracture of right ZMC without any evidence of frontal fracture. CT showed displaced lateral and
inferior orbital wall fracture impinging an optic nerve. A course of Inj. Amoxycillin + Clavulenic Acid 1gm IV B.D, Inj. Metronidazole 100 ml IV 8 hourly, Inj. Methyl Prednisolone 1 gm IV 24 hourly, Tab. Diclofenac 50 mg t.i.d Tab Acetazolamide (sustained release) 1 o.d. orally, Carboxy methyl cellulose eye drops and gel for local application. The patient showed signs of oculocardiac reflex; hence anticholinergic premedication was administered pre-anesthetically [Atropine (15µg/kg)]. Surgery was performed by lateral eye brow approach; fractured fragment was elevated and plated by mini-plates, lateral rectus entrapment relieved. Right ZMC fracture was not fixed as it was comminuted, and patient was showing oculocardiac reflex hence general anesthesia could not be prolonged. Postoperatively, there was gradual improvement in visual acuity without diplopia, the patient was able to count fingers on first postoperative day and on fourth post operative day had 0.1 vision in RE. Pupils reacted symmetrically to direct and consensual light. Post operative CT revealed bony decompression of the right eye. Three month follow up revealed normal visual acuity of 1 in both the eyes, normal visual fields & no diplopia except depression of right cheek which was not repaired. Oculocardiac reflex was reversed and Heart rate was 74/min.

Discussion:
Visual loss occurs in 1-5% of patients with craniofacial trauma especially with midface or frontal trauma (5-8). The optic nerve may be damaged by section or contusion or increased pressure in the orbit(9, 10). Most optic nerve lesions were believed to be related to damage to intracanalicular segment of the nerve(9), but displaced bone fragments anywhere in the orbital stretch will damage it. Clinical assessment of pupillary size and reactivity to light is essential. The presence of Marcus gun pupil with a normal fundoscopic examination is pathognomic of afferent optic nerve injury(5). A pupil that is sluggish in its reaction to light is often the first sign of progressive optic nerve injury(2, 9). Computed tomography is essential for delineating the nature and location of injury allowing optimal views of optic nerve, optic canal and intracranial lesions that will disturb visual acuity(5, 11-14).

Numerous therapeutic protocols exist for traumatic optic neuropathy, because no single treatment has proved optimal(9). The treatment must address the underlying problem and an immediate intervention may well be the deciding factor between a reversible or irreversible event. Indication for optic nerve decompression include Delayed visual loss non responsive to mega dose of steroids, initial improvement in vision while receiving steroids followed by a deterioration in visual acuity and subtotal or delayed visual loss in patients in whom CT shows a retro bulbar hematoma or displaced fracture fragments(5, 15).

Oculocardiac reflex caused by orbital floor trapdoor fractures is an indication for urgent repair(16). In our case oculocardiac reflex, inability to close the eye and loss of visual acuity justified the attempted surgery. Treatment with a mega dose of corticosteroids and surgical decompression is considered the corner stone of management. Corticosteroids may reduce the post traumatic edema and limit the severity of contusion necrosis of optic nerve(9).

Numerous surgical approaches of optic nerve decompression have been proposed(17) i.e., trans frontal craniotomy, orbitotomy, transethmoidal,
transanal ethmoidal and sphenoidethmoidal etc. The method chosen should be carefully used to elevate in the right location and extent of orbital injury, in order to select the most direct approach with the least morbidity(5). In this case a lateral eye brow incision was given and fragment was elevated. Lateral facial approach was justified as zygomatic complex was involved. And the other approaches are indicated for medial orbital fractures and are complicated procedures.

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