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TREATMENT APPROACH TO ORBITO-OCULAR TRAUMA IN LE FORT III

Maxillofacial Surgery

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ABSTRACT

Orbital and Ocular trauma is frequently associated with significant soft tissue loss which can lead to obliteration of vital structures with catastrophic sequelae to the patient and obscure bony landmarks. Assessment can be challenging and requires a systematic approach encompassing examination of the periorbital tissues, eyelids, lacrimal apparatus and globe. Orbital fractures with concomitant ocular injuries are often complicated by Facial fractures. These injuries require observation or surgery spanning from simple to complex. The purpose of this article is to illustrate the manifestations, sequence of complications developed post orbital trauma in Le fort III, subsequent inter-disciplinary surgical approach and outcome of post traumatic injury to the eye associated with bony orbit fractures which impacts the overall facial profile.

KEYWORDS

Orbital trauma, Le Fort III, facial fractures

INTRODUCTION

Le Fort fractures account for approximately 10–20% of all facial fractures with the Le Fort III category being the least common, and there is a high association of intracranial head injuries and cervical spine injuries in patients that have sustained Le Fort fractures[1]. Le Fort III Fractures cause dilapidation to the bony architecture, functional derangements,loss of anatomy with damage to soft tissue.

These fractures typically present with bilateral periorbital swelling, ecchymosis, oedematous face, enophthalmos, haemo-tympanum, and possibly rhinorrhoea and otorrhoea[2].

The definitive management of facial fractures becomes even more challenging when there is association of complex orbito-ocular injuries.

It has been reported that penetrating injury is a component of 50% of all trauma to the eye [3]. The spectrum of objects involved in penetrating injuries is widespread.The mechanism of injury in our case was due to motor vehicular collision.Prompt Ophthalmic examination in patients having sustained multiple facial fractures is vital to prevent morbidity and to limit further deterioration of the eye.[4]

CASE DESCRIPTION

A 47 year old male was brought in to the emergency unit of our hospital ,with the alleged history of head on collision with another vehicle and sustained injury.

History of Loss of Consciousness for 3min,with persistent oral and nasal bleed noted.No known comorbidities, no relevant family history, and no obvious drug history or psychological history.

Clinical Examination

Fig.1 Pre-Operative clinical aspect of the Patient, Frontal view

Patient was Conscious, obeying simple commands

Heart rate (HR): 60 beats per minute (bpm), Blood Pressure (BP): 160/ 90 mmHg, Temperature: 99.5◦F, Respiratory rate(RR):18 breaths per minute(bpm),Glasgow Coma Scale (GCS) of 12/ 15, E2V4M6 ; saturation SPO2 : 88% on room air. GRBS-172 mg/dl.

Pupils -sluggish and reactive to light

Patient had sustained penetrating soft tissue injury extending from supraorbital region to medial canthus of the left eye[Fig.1].

Bilateral periorbital oedema with extensive facial oedema

Depressed nasal bone with traumatic telecanthus noted.

Patient was clinically examined and shifted to the ICU.

Emergency care

Cervical collar placed as means of C-spine immobilization, and controlled endotracheal intubation was undertaken to secure the airway.Patient was then connected to a ventilator on Synchronized Intermittent Mandatory Ventilation (SIMV) mode.

Adjuncts-Urine catheter placed , Chest X Ray and ECG was advised which revealed no significant findings.

Emergency Focused Abdominal Sonography of Trauma (eFAST) performed which was negative.No other concomitant injuries noted outside head and face.Patient was evaluated with imaging studies and routine laboratory tests.

CT Imaging

CT Scan of the brain revealed subtle SDH along the Posterior interhemisphere and mild SAH along the left parietal occipital convexity.

CT Spine showed no obvious fragment distraction.Posterior neural arches appeared normal.

CT Face with 3D reconstruction showed comminuted fracture involving multiple facial bones, Bilateral maxillary sinus fracture along with involvement of maxilla, hard palate, body of mandible, bilateral zygomatic arch, bilateral pterygoid plates, blow out fracture of bilateral orbits [Fig.2].

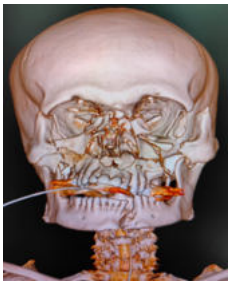

Fig.2 Preoperative three-dimensional CT scan depicting the extent of

fractures

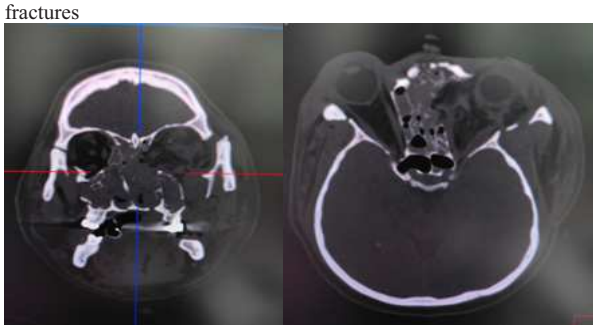

Fig.3,Coronal section of CT Scan depicting extensive bilateral blow out fracture of orbits

Fig.4, Axial section of CT scan shows enophthalmos, tortuous Optic nerve, herniation of medial orbital fat and Comminuted Naso-ethmoidal fracture.

Laboratory Findings

Preoperative laboratory tests revealed increased LDH , low potassium levels ,hence correction was done by infusion of potassium binders to maintain the homeostasis. Haemoglobin was 11.3gm/dl.No other significant findings noted.

Pre-operative Management

Based on CT scan findings, the neurology team was consulted and opinion was sorted.No CSF leak or evident brain injury noted ,thereby no surgical intervention was suggested by the neurosurgery team.

Ophthalmology team was consulted in view of ocular injury associated with orbital fractures.Fundoscopy performed by the team revealed exposure keratopathy, corneal epi defect,for which lid taping was advised by the team.Contused lacerated wound w.r.t left upper eyelid was sutured.The patient was put on antibiotic (Moxicip) eye drops along with lacrigel and Ocupol(Lubricant).Since the patient had sustained multiple facial fractures , Tracheostomy was planned.Patient was then put on RT for feeding purpose 150ml/2 hourly.Post Tracheostomy the general condition of the patient was monitored and vitals were normal.

Consents and Clearances were obtained and the patient was posted to OT for Open reduction and internal fixation(ORIF) of multiple facial fractures.

SURGICAL DESCRIPTION

General Anaesthesia was achieved through tracheostomy tube. Bicoronal incision was used to approach the Naso-ethmoidal region. Comminuted fracture of Naso-ethmoidal region was explored and fixed using 2 holed miniplates of 2mm dimension. Maxillo-mandibular unit was stabilised using arch bar The midface fractures along with mandibular symphyseal fractures were identified, reduced and fixed used miniplates.

For orbital fracture fixation, infraorbital incision was used,The incision was 2 mm below the inferior eyelash, paralleling the infraorbital rim[Fig.5]. Dissection was made between the orbicularis muscle and orbital septum to expose the orbital floor fracture,the periosteum was not stripped to maintain blood supply to the comminuted fracture fragments, and then internal fixation was carried out with 6 holed with gap orbital miniplate secured using three 4 mm and three 8 mm screws[Fig.6] .The closure was achieved using 5-0 prolene suture.Patient was extubated and shifted to recovery.

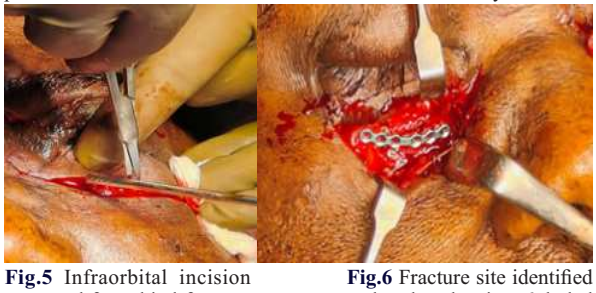

Fig.5 Infraorbital incision was used for orbital fracture fixation.

Fig.6 Fracture site identified and reduced using 6 holed with gap orbital plate

The patient was then transferred to ICU on ventilatory support and for neuroprotection for 48 hours thereafter. On 5th postoperative day the patient was weaned off from the ventilator and weaning off was well tolerated by the patient. Patient was put on CPAP mode along with venturi, patient condition improved. The patient was then shifted to ward with T-piece connected to humidifier.

The patient was treated with I.V antibiotics, analgesics, and other supportive measures,he improved with the treatment.The ocular vision of right and left eye was normal. Extraocular motility was appreciable w.r.t right eye on the day of discharge.Lid taping was done to the left eye.There were no signs of infection in relation to right and left eye on the day of discharge. Patient was advised to continue with lacrigel , ocupol ointment along with Moxifloxacin(specifically for the left eye) and refresh liquigel(lubricant) eye drops.The patient was discharged in a stable state with no signs of focal neurology or cerebral vascular incident[Fig.7]

Fig.7 Postoperative view on the day of discharge

Patient was reviewed after 2 weeks.Right eye showed significant improvement and healing was satisfactory. Ocular ultrasound (B Scan) was performed which revealed Corneal ulcer,hypopyon and hyphema w.r.t left eye. Hypopyon is a condition which causes whitish layer to form in the lower portion of the eye's anterior chamber due to accumulation of white blood cells and hyphema is collection of blood in the anterior chamber of the eye[Fig.8]

Fig.8 External photograph of left eye depicting hyphema

The posterior segment of eyeball appeared normal in B Scan.Thereby, patient underwent temporary partial tarsorrhaphy[Fig.9] under 2%lignocaine local anesthesia to treat epithelial defect and promote healing of the corneal ulcer.The Patient was put on Fortified Vancomycin,tobramycin and hyaluronate eye drops along with polymyxin B eye ointment.

Fig.9 Temporary partial tarsorrhaphy done w.r.t left eye

Subsequent follow ups were done, the patient was reviewed again, eye examination was done using slit lamp. Retraction of medial upper eyelid and multiple scars at the medial canthal margin seen, lagophthalmos of 10mm medially noted w.r.t left eye.

Patient was planned for extensive scar revision using skin graft reconstruction with permanent medial tarsorrhaphy w.r.t left eye under guarded prognosis under general anaesthesia.Consents and Clearances were obtained.Patient was explained about the complications and skin

graft rejection and the patient was posted to OT.

General Anaesthesia achieved via oral intubation. Painting draping done following standard protocols.Scar tissue excised at the medial canthus region.Full thickness skin graft [FTSG] harvested from the left supraclavicular region of the patient[Fig.10&11] hemostasis was established at the recipient site before the graft could be placed in the recipient bed .The FTSG was soaked in saline and then placed over the upper eyelid defect.The graft was stabilised and sutured[Fig.12], which was followed by tarsorrhaphy,wherein the upper and lower eyelids were sutured.Pressure bolus placed over left eye region.Patient extubated and shifted to recovery.Patient was treated with antibiotics and analgesics subsequently and patient was discharged in a stable condition.After a week the dressing and suture was removed .The Patient was again reviewed after 1 month post surgery[Fig13].The graft was well taken up at the recipient site with no tissue necrosis. Patient is on regular follow up with our team.

Fig.10 **Fig.11**

Fig.10 and 11 depicts Full thickness skin graft harvested from the left supraclavicular region of the patient

Fig.12 The skin graft was stabilised onto the medial aspect of upper eyelid and sutured

Fig.13. Postoperative 1 month review shows healing of Skin graft with no tissue necrosis

DISCUSSION

Orbital fractures associated with ocular and periocular injury in Le Fort 3 or Panfacial trauma cases present with potentially devastating functional and cosmetic consequences. The prevalence of ocular injuries associated with facial fractures has been widely reported to be 2.7% to 90.6%. Overall, 95% of severe ocular injuries are associated with fractures of the facial middle third[5]It has been suggested that there is an increased risk of ocular injuries with maxillofacial trauma by a factor of 6.7 as compared to other major trauma patients with no facial injury.[6]

All traumas to the face, particularly above the level of the mouth, require a careful ocular examination, including an estimation of the visual acuity for each eye[7]

Assessment can be challenging and requires a systematic approach encompassing examination of the periorbital tissues,eyelids,lacrimal apparatus and globe.

Patient unconsciousness, head injury, intubation, cervical spine care are factors that can delay the most basic ocular and visual acuity examinations[7].

Complications, unfortunately, arise as a result of traumatic or iatrogenic injuries,the causative factor in our case is motor vehicular collision.

The sequelae can range from the most insignificant to the most debilitating. The complications noted in the diagnosis and treatment of orbital fractures associated with facial trauma are outlined in our case.

Enophthalmos has been thought to be caused by a decrease in volume of the orbital contents, increase in volume of the bony orbit, loss of ligament support, scar contracture, or combination of these[9].It's a definitive indication of radiological imaging to confirm fractures of orbital wall.Amrith et al. recorded a 6% incidence of enophthalmos, with 81% of it occurring in orbital fracture patients[8].Enophthalmos in our case was primarily due to orbito-ocular injury,which was dealt with orbital fracture fixation causing decrease in orbital volume and later reconstruction of soft tissue defect by skin grafting to the upper eyelid region.The goal of surgery is to reduce orbital volume by reconstructing the internal orbit Even after restoration of the orbital rims and floor at the time of surgery, defects located posteriorly along the medial and/or lateral walls are common and frequently overlooked, and are probably the main reason for postoperative enophthalmos.[9]

In our case,Lid laceration with loss of orbicularis oculi reflex resulted in lagophthalmos, corneal epithelial defect,progressed to exposure keratopathy, which further advanced to corneal ulcer formation, hypopyon further progressed to hyphema secondary to orbito-ocular trauma.Once identified,targeted pharmacological interventions such as, antimicrobial ,anti-inflammatory and lubricants were initiated.Lid Taping was advised,Tarsorrhaphy was undertaken to promote healing of corneal ulcer and exposure keratopathy.Tarsorrhaphy is a surgical procedure in which the eyelids are sutured together to protect the cornea.Indications for a tarsorrhaphy were persistent epithelial defects or other ocular surface problems associated with neurotrophic ulcers, penetrating keratoplasty (PK), postinfection, exposure keratopathy,radiation keratopathy, ocular cicatricial pemphigoid, Stevens–Johnson syndrome, entropion, and application of tissue adhesive.[10]

Tarsorrhaphy helps in Immobilisation of the lid over the epithelial defect.[11] Tarsorrhaphy is an effective and a safe procedure in the management of nonhealing epithelial defects and other surface problems, with a 90.9% success rate and only minor complications[10].

Post trauma medial retraction of upper eyelid and extensive scars were noted in the left eye of our patient , thereby reconstruction of defect was done using skin graft harvested from supraclavicular region.Reconstruction using full thickness split graft was well tolerated by our patient.

Further clinical studies and research are significant to enhance management strategies.

In Conclusion,prompt diagnosis, comprehensive care and standardised treatment protocol greatly facilitates patient outcomes.

REFERENCES

1. Pswarayi R, Burns C. Le Fort III fractures: An approach to resuscitation and management. Annals of Medicine and Surgery. 2022 Sep 1;81:104513.
2. M. Reddy, K. Baugnon, Imaging of cerebrospinal Fluid rhinorrhea and otorrhea, Radiol. Clin.55 (1) (2017 Jan) 167–187.
3. Go JL, Vu VN, Lee KJ, Becker TS. Orbital trauma. Neuroimaging Clinics. 2002 May 1;12(2):311-24.
4. Perry M, Moutray T. Advanced Trauma Life Support (ATLS) and facial trauma: can one size fit all? Part 4:'Can the patient see?'Timely diagnosis, dilemmas and pitfalls in the multiply injured, poorly responsive/unresponsive patient. International journal of oral and maxillofacial surgery. 2008 Jun 1;37(6):505-14.
5. Umarane S, Kale T, Tenagi A, Manavadaria Y, Motimath Sr AS, Manavadaria YC. A clinical study of the evaluation and assessment of the etiology and patterns of ocular injuries in midfacial trauma in a tertiary care hospital. Cureus. 2020 Sep 2;12(9).
6. Guly CM, Guly HR, Bouamra O, Gray RH, Lecky FE: Ocular injuries in patients with major trauma. Emerg Med J. 2006, 23:915-917.
7. Vi□jayan K, Sundaresh D, Ramanujam L. Ocular trauma in mid face fractures-an interdisciplinary approach. Clinical and Experimental Ocular Trauma and Infection. 2021 Apr 4;3(1):2-9.
8. Amrith S, Saw SM, Lim TC, Lee TK: Ophthalmic involvement in cranio-facial trauma. J Craniomaxillofac Surg. 2000, 28:140-147
9. Ellis E. Fractures of the zygomatic complex and arch. In Oral and maxillofacial trauma 2012 Jan 1 (pp. 354-415). Elsevier.

10. Cosar CB, Cohen EJ, Rapuano CJ, Maus M, Penne RP, Flanagan JC, Laibson PR. Tarsorrhaphy: clinical experience from a cornea practice. Cornea. 2001 Nov 1;20(8):787-91.
11. Mohan M, Natarajan R, Kaur K, Gurnani B. Treatment Approach to Corneal Ulcer. tnoa Journal of Ophthalmic Science and Research. 2023 Oct 1;61(4):396-407.