

RECONSTRUCTION OF ORBITAL FLOOR FRACTURE— A CASE REPORT

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ABSTRACT:

Orbit is a conical cavity in which the base lies anteriorly and the apex directed at Optic Foramen .By Age of 5 years orbital growth is 85% complete, finalized between 7 years of age. Orbit is formed from 7 bones (Maxillary, Zygomatic, Frontal, Ethmoid, Larimal, Palatine, and Sphenoid). It consists of Four Walls – roof, lateral, medial, floor .Medial wall and floor are thin ,While Lateral wall and Roof are Stronger. Floor of orbit is weakened due to infraorbital Canal passing through it. In Pure blowout fracture one orbit wall is affected, without involving orbital rims. The inferior and medial walls are affected most frequently. Clinical features are diplopia, infraorbital nerve paresthesia , entrapment of soft tissue within the maxillary sinus, restriction of ocular movements and enophthalmos. CT scan is most helpful method for diagnosis of orbital fracture. For orbit reconstruction, natural and synthetic materials are available. We report a case of 21 years old man, diagnosed with orbital floor fracture after slip and fall from his two wheeler The surgical treatment involved orbital floor reconstruction with titanium mesh under general anesthesia. The outcome was satisfactory and during followup visual disturbances or paresthesia was not present.

KEYWORDS: *Orbital fracture, floor of the orbit, trauma , fracture ,blow out fracture, treatment.*

1. INTRODUCTION:

The term blowout fracture was first coined by Smith and Regan in 1957. In blowout fracture displacement of an orbital wall occurs, but the orbital rim remains intact. Three theories have been proposed to explain the mechanism of blowout fractures- buckling theory, hydraulic theory and bone conduction theory¹.

Clinical features include diplopia or Vertical gage, enophthalmos, paresthesia of infraorbital nerve, dystopia, Circumorbital Edema ,unilateral epistaxis, Subconjunctival Bleeding and soft tissue entrapment, leading to restriction of ocular movements.

Computed tomography is a radiological tool for evaluation of orbital fractures, which helps to identify if there is any entrapment of soft tissue within the adjacent sinus. Orbital wall fractures repair is yet a

surgical problem, due to the drawbacks of the reconstruction materials used ,error in diagnosis, timing of treatment and accuracy during the repositioning of the soft tissue and the placement of the reconstruction materials.

In order to obtain better functional and esthetic result it is needed to reconstruct the anatomical structure of the orbit, against herniation forces. Natural and synthetic materials, are used to reconstruct the orbital walls when it is necessary. It is based on surgeon's expertise and availability of the material. We report a case of orbital floor fracture and reconstruction was done with a titanium mesh.

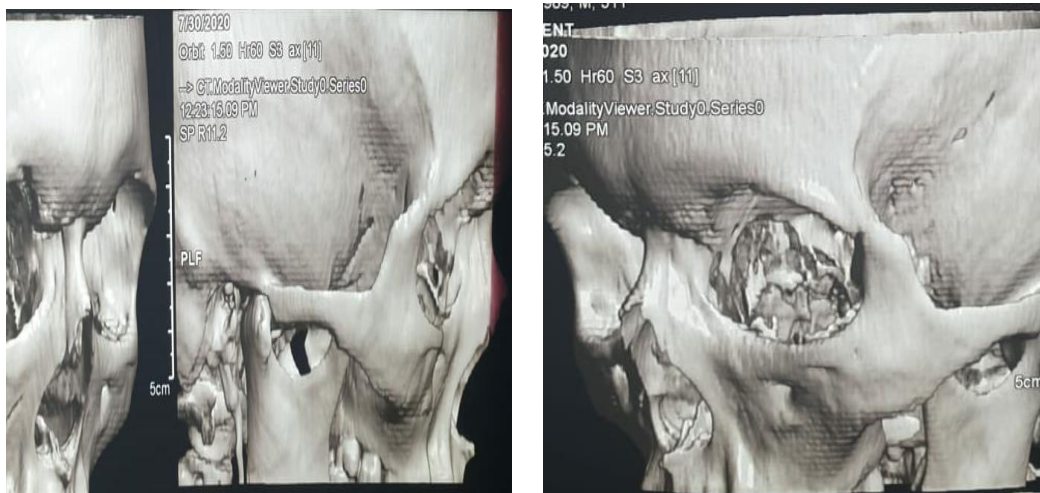
2. CASE REPORT :

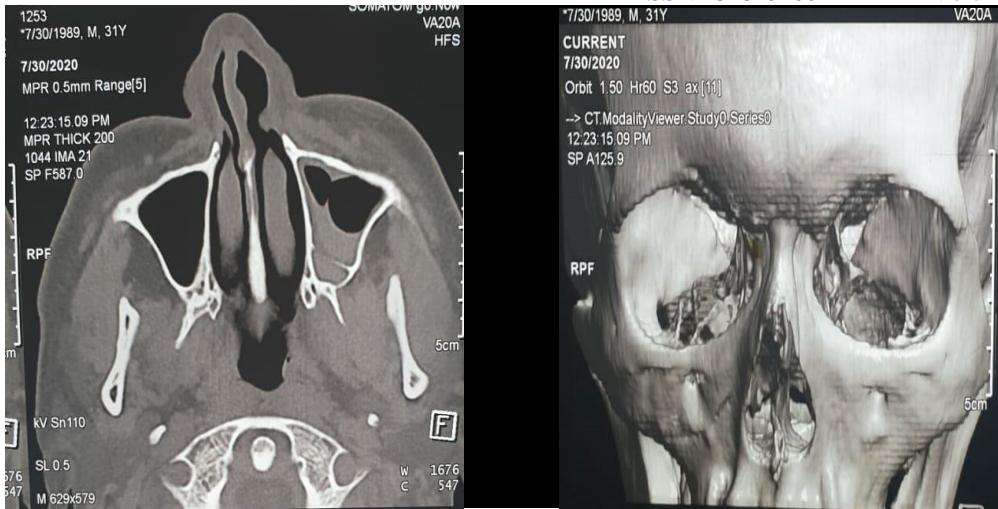
A 21 year old male patient reported to Sree Balaji Medical College and hospital Chennai . The patient had met with a road traffic accident a few days before reporting here . Following the accident , the patient was taken to another private hospital , for immediate care . The patient had no history of loss of consciousness following the accident.

After reporting to our institution , on examination patient had a history of nasal bleed, no history of vomiting or seizures. On general examination the patient was calm , cooperative , well oriented and well built and vitals were all found to be normal .On local examination diplopia was present , while laceration ,tissue loss ,abrasion , contour defects or CSF rhinorrhea were not found . No mobility of maxilla and mandible.

No step deformity in relation to maxilla , mandible ,zygomatic arch , infra or supra orbital rims was found Periorbital ecchymosis was present in the right and left side .Subconjunctival hemorrhage was positive in the right eye . Mild edema was present in relation to the right infra orbital region .Routine blood investigations were carried out – CBC , BT , CT , HIV, HBsAg, RBS , RFT . Investigations such as chest x ray , ECG were taken . All the parameters were found to be normal.

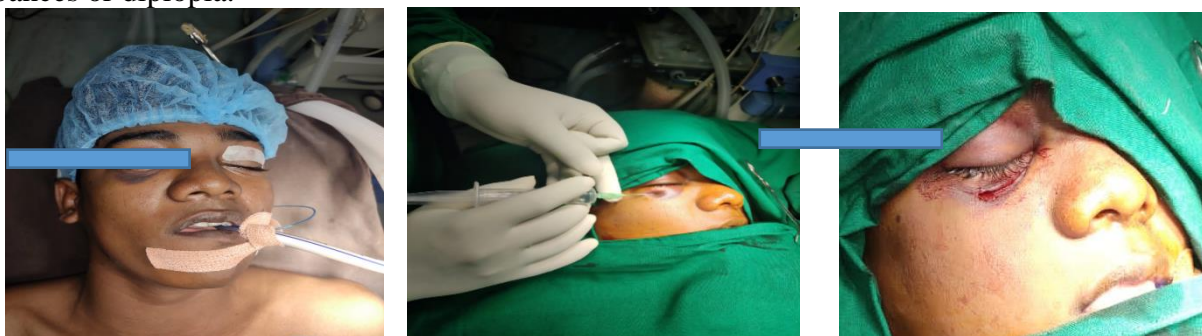
CT facial bones with 3D reconstruction was taken . On examining the CT , fracture involving the inferior and medial wall of left orbit with associated hemosinus in the right maxillary and ethmoid sinuses. Mild herniation of left infraorbital fat and medial rectus muscle into the left ethmoid air cells, Left optic nerve appeared distorted.





Neurosurgery and anaesthetic fitness was obtained to carry out the surgery . The patient was operated under general anaesthesia , using oral intubation. Tarsorrhaphy suture was used to protect the cornea, followed by a subtarsal approach to access the orbital floor . The herniated soft tissue was repositioned and the orbital floor defect was covered with trapezoidal titanium mesh which was adapted and fixed on the orbital rim and secured with 4 – 2*8 mm screws.

A forced duction test was conducted with a negative result and the globe mobility was intact. Layer suturing was done. Final closure done with 5-0 ethion. There were no complications and the patient was discharged 1 day after surgery. During follow ups there was no complaint of paresthesia, no signs of visual disturbances or diplopia.





3. DISCUSSION:

Management of any globe injury takes precedence over any other maxillofacial fractures. Most commonly conservative management is done for orbital blowout fractures. Post-traumatic diplopia, extraocular muscle herniation may improve over time, and oedema or muscle injury resolves.

Patients are instructed not to blow their nose for several weeks after the trauma to prevent orbital emphysema². Nasal decongestant sprays are commonly used. Prophylactic antibiotics are also used to prevent possible orbital cellulitis from bacterial spread if fracture forms a direct communication with the sinuses.³ When orbital edema is severe, steroids may also be used to decrease orbital edema, whether or not surgery is indicated.

Though the modern transconjunctival incision technique has decreased complications when compared to other approaches, surgery remains associated with risk of an extraocular muscle, or optic nerve injury. This is because soft tissue swelling requires increased surgical exposure and retraction. Indications for surgical repair include – enophthalmos, muscle entrapment, diplopia⁴.

The three mechanisms, which lead to blowout fractures, have been the aim for many researches. A study published in 1943 explained the globe-to-wall contact theory, reporting 24 cases of internal orbital fractures, and explained that the posteriorly displaced eyeball transmitted the force of a blow directly to the walls of the orbit⁵. Hydraulic theory was proposed in 1957, in which blowout fractures are caused by the increase of intraorbital pressure⁶. Bone conduction theory, proposed in 1972, suggested that the soft tissue entrapment into the maxillary sinus, paresthesia of the infraorbital nerve causing numbness.⁷

The approach depends upon the type of fracture, surgeons expertise and equipments. Subciliary, transconjunctival and subtarsal incisions are the most commonly used. The subciliary approach has been associated with higher complication rate. Transconjunctival approach is most widely used approach to the orbital floor because there is no visible scar and the complication rate is very low – less than 1%⁸. Most common approaches are transcutaneous, transconjunctival, transcaruncular, The transcaruncular approach is very common because it easily combines with the transconjunctival approach.

Limit of Dissection- Inferiorly Upto 28-30mm (safe limit) – optic canal is at around 40mm, Laterally – Superior Orbital Fissure, Superiorly – Orbital roof dissection is stopped at periorbital surrounding Recurrent Meningeal Artery – passing through bony canal within the Sphenofrontal suture line Medially – Posterior Ethmoidal vessels, running in the Fronto-Ethmoidal Suture line Anterior to Optic foramen. The periorbital dissection along the orbital floor proceeds posteriorly in a two handed technique using a malleable ribbon retractor with a wide rounded tip and a periosteal elevator. After periorbital dissection is performed, adequate exposure, (proper retraction) and illumination of the fractured area is imperative⁹. Malleable retractors, spoons and special orbital retractors designed for the globe are used.

Reconstruction of the orbit can be done using a wide variety of implants. Autografts were the older method for orbital reconstruction, while alloplasts have gained popularity with improvement in biocompatibility, and at present its the most widely used implants for reconstruction. Titanium is highly

biocompatible and excellent osseointegration which provides strong support, it can be easily attached to adjacent bone and morphology and location will not be changed. Studies have reported good post operative outcomes¹⁰.

4. CONCLUSION :

The goal of orbital fracture reduction is restore the anatomy of the internal orbit and to prevent complications like persistent enophthalmos and paresthesia. Clinical evaluation and radiologic examination, determines the successful management of orbital fracture. When surgical management is necessary, the approach and the material used for reconstruction should be the one which leads to a minor morbidity and greater stability for the patient.

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