

Surgical Management of Panfacial Injury: A Case Report

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ABSTRACT

Pan facial injuries are multiple injuries of the face that involve the upper third, middle third, and lower third of the face. Pan facial injuries occur majorly due to road traffic accidents and physical assaults. Because of multiple facial injuries, it is difficult for the surgeon to re-establish facial contours and regaining anatomical and functional work of the facial region. Persistent deformity of the facial skeleton can occur due to inadequate reduction of all the component of fractured segments or lack to stability in fracture bones. To diagnose multiple facial injuries a better clinical evaluation is necessary and 3 Dimensional computed tomography scans are gold standard in evaluating displaced, non displaced fractures, and finding multiple injuries of the facial region. Treatment protocol for pan facial fractures can be closed reduction or open reduction internal fixation. This case report tells about a brief discussion on the management of a 25-year-old male patient who had suffered from multiple facial injuries.

Key words: Clinical and radiographical evaluation, panfacial injury, persistent deformity, road traffic accidents

INTRODUCTION

Multiple facial injuries often or panfacial injuries are multiple fractures occurring in the face that involves Mandible, Maxilla, Zygomaticomaxillary complex, Naso-orbito – Ethmoidal Complex, Orbital bone, or sometimes frontal bone.^[1] With the result of multiple facial fractures, it may cause loss of bony structures that can lead to post-traumatic deformity and it can be life threatening if the treatment is delayed.

Pan facial trauma is generally difficult to treat as the surgeon has to restore the anatomic, functional, and esthetic rehabilitation of the patient to improve the facial architecture. Pan facial injuries may occur mostly due to motor vehicle accidents, or physical assault, or any sports-related injury.^[2] The severity of the pan facial injury depends upon the high impact forces and forces with greater velocity. More severity of the pan facial injury leads to increase in difficulty in reduction and fixation for the facial fractures.^[3]

The goal of the treatment was to restore the function and 3-dimensional facial contour by maintaining the transverse facial width and vertical height of the face. It is the surgeon's choice of treatment whether to use the centripetal or centrifugal force, bottom to top or top to bottom approach, inside-out or outside-in approach.^[4]

Here is a case report of a patient with multiple facial injuries of the face which was managed surgically with open reduction internal fixation using conventional approaches and had great surgical outcomes.

CASE REPORT

A 25-year-old male patient reported to the Department of Oral and Maxillofacial surgery, Institute Of Dental Sciences, Bareilly with alleged history of Motor Vehicle Accident 1 week prior while driving a motor leading to head on collision with an opposite moving truck. Patient was fully conscious and well oriented to time place and person with GCS score of 15/15. Patient had history of Nasal bleed present at the time of accident.

On examination extra orally there was tenderness and deformity palpated at the frontal region. Sub conjunctival hemorrhage was present with enophthalmos on the left eye, Bilateral Subconjunctival echymosis was present, dish face deformity with racoon eyes. and step was palpated at left and right Zygomaticomaxillary complex region [Figures 1 and 2]. There was facial nerve injury present on the right side of the face as the patient had the inability to close his eyes. On intraoral examination mouth opening was reduced to 8 mm and mild derangement of occlusion was present.

Contrast enhanced computed tomography (CT) scan of the face revealed comminuted frontal bone fracture involving anterior

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Figure 1: (a) Frontal view of patient showing dish face deformity with racoon eyes and left subconjunctival hemorrhage (b) Facial nerve injury of right side (c) Frontal view showing enophthalmos of the left eye

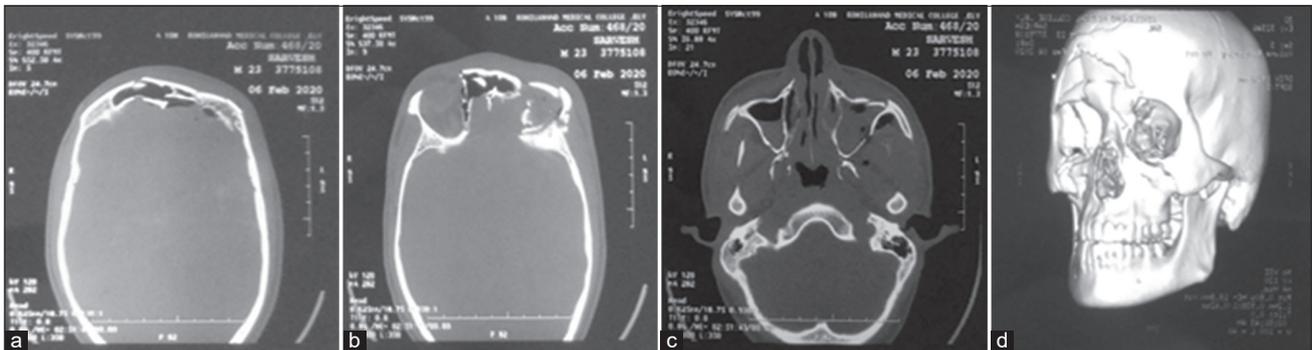


Figure 2: (a) Axial section of computed tomography (CT) scan showing comminuted fracture of the anterior and posterior table of the frontal bone (b) Axial section of CT scan showing fracture of the lateral wall of the orbit (c) Axial section of the patient showing right and left Zygomatico-complex # (d) Three-dimensional section of the face showing comminuted frontal bone fracture

and posterior table of the frontal bone, on the mid face region fracture line, was running in bilaterally in the pyramidal shape depicting of Le-Fort II fracture and bilateral maxillary sinus was seen filled with blood.

On the basis of clinical and radiographical examination patient was diagnosed as Pan facial injury having Frontal Bone fracture as well as Le-Fort II fracture. And hence treatment plan was carried out accordingly.

The patient was prepared for open surgery under general anesthesia and was treated in the top to bottom approach. A bicoronal approach was used to reach out comminuted frontal bone fracture where fixation was done with a titanium mesh of thickness 1.5 mm and 1.5 mm × 6 mm mini-screws to recontour the facial deformity. Bilateral intraorally vestibular degloving incision was given to reach out the fracture line over Zygomatico-complex (ZMC) region and fixation was done using a continuous 6 hole plate with 2 mm × 6 mm screws and an L plate of hole with gap with 2 mm × 6 mm screws [Figure 3].

Post-operatively patient had better esthetic results and getting anatomical and functional stability in the facial region [Figure 4].

DISCUSSION

Pan facial injuries are generally caused by high impact forces or high-velocity forces which necessitate high degree of fracture of facial bones.^[5] Historically these fractures were treated with

a conservative approach which led to problems that includes malocclusion, increase in facial width, and decrease in facial projections.^[6]

There is no accepted definition for panfacial trauma, but it can be said as simultaneous fractures of the facial region that involve, cranium (upper third), mid-face, and mandible region.^[7]

During concomitant fractures of the maxilla and mandible arch if becomes difficult to re-establish the occlusion. When both the fractures are concomitant, Manson and Glassman advised fixation of palatal fracture first and using the maxillary arch as a template to get to the occlusion with the mandibular arch.^[8] The difficulty of treatment increases when the fracture is unfavorable or undisplaced or having multiple associated fractures. The fracture occurring in symphysis and parasymphysis region with associated fracture of condyle that may result in retro displacement of the mandible with widening of angles. In such conditions, all the fracture segments should be exposed prior to reduction and fixation and pressure should be applied at gonial angles to close the lingual gap to achieve lower facial width.^[9]

The purpose of treatment of pan facial injuries is to protect the airway, restore the facial width and functional and anatomical aspects of the patient. Delay of the treatment in panfacial trauma or multiple facial fractures leads to improper reduction or inadequate outcomes leading to loss of anatomical or functional rehabilitation.^[10] Advantages of early treatment of pan facial fractures reduces the risk of post-operative infection and maintains

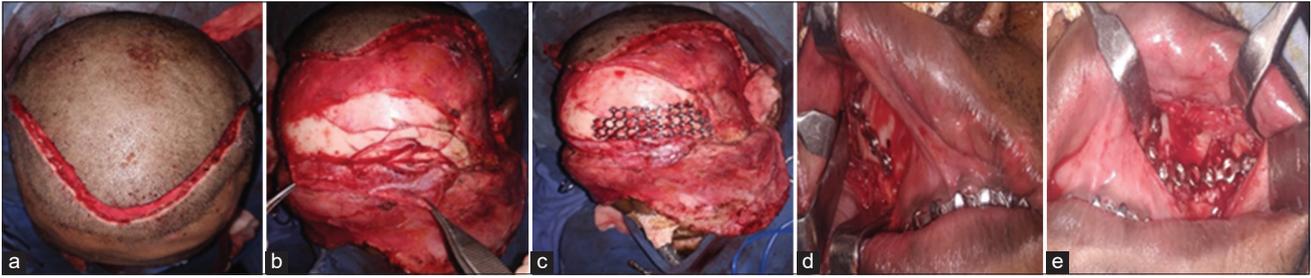


Figure 3: (a) Bicoronal approach (b) Exposure of the frontal bone (c-e) Stability and reconstruction of the fracture is done by titanium mesh with 1-5 mm screws



Figure 4: (a) 15 days follow-up (b) 1 month follow-up of patient (c) patient reflexes of closure of eyes was achieved

soft tissue reconstruction. Treatment of facial fractures can get delayed if the fracture is associated with neurologic or systemic injuries. More than 2 weeks of delay in the treatment can lead to difficulty in obtaining adequate reduction.^[11]

Pan-facial trauma should be managed according to Advanced Trauma Life Support guidelines. The role of 3 Dimensional CT scans are one of the important diagnostic tool for the pan facial injuries.^[12] It helps in detecting the extensive nature of the trauma and also guides the surgeon in reaching the correct diagnosis and aids in proper management and reconstruction of the patient. In our case Contrast CT imaging was carried out which was a diagnostic aid in our surgical planning.

The naso-orbital region (NOE) plays an important role in facial esthetics and if fractured should be treated for better esthetic results.^[13] There are various approaches to treat pan facial fractures. Bottom to up and inside – out approach allows stability and reduction of mandibular fracture first, setting the occlusion with maxillary and mandibular teeth using IMF fixation, then treatment of maxilla followed by ZMC to fix the transverse dimension of the face, followed by reduction and fixation of the upper third of the face.

The another approach for pan facial fractures are “Top to down and outside-in” that allows stability and fixation of the upper third and middle third followed by lower third of the face. Frontal bone fracture is stabilized and fixed first followed by Zygomatic region to maintain the transverse width of the face, then NOE complex is positioned followed by maxilla and maxillo-mandibular fixation and finally reduction and fixation of the mandibular condyle, angle region, body region or symphysis region.

In our case top to down and Outside- in approach was taken as mandibular was not involved and their was comminuted fracture

in the frontal bone which was of primarily concern. Bicoronal approach was taken for the exposure of the fracture segment of frontal bone followed by Maxillary vestibular degloving incision was given to fix the zygomatic buttress region and internal fixation was done with titanium mesh on the frontal bone and mini-plates at the zygomatic buttress region.^[14]

Bicoronal approach is one of the commonest approaches for the frontal bone fractures as it gives a good exposure of the frontal bone. One of the most common complication arises is with the paralysis of the temporal branch of the facial nerve.

Any of the above techniques will achieve optimal results in every situation, but it can be according the surgeon’s as which part to deal first. Thus, maxillofacial surgeon should be comfortable with both approaches according to ease of the surgeon to achieve optimal results.

CONCLUSION

Pan facial injuries are one of the most challenging injuries occurring on the maxillofacial region that involve multiple facial fractures that can be difficult to manage until a thorough anatomical knowledge is known.^[15] Minimal invasive approaches should be used wherever necessary to treat pan facial fractures. In this case, we went for open reduction internal fixation by taking the bicoronal approach which made better accessibility and scarless for the patient. Open reduction and internal fixation give better outcomes for patient with multiple facial fractures rather than closed reduction as open reduction and internal fixation can maintain better transverse facial width and vertical height of the face. Early surgical intervention also leads to better surgical outcomes as delay in the treatment

