SURGICAL MANAGEMENT OF 2/3 FACIAL NEGLECTED FRACTURE: A CASE REPORT

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ABSTRACT

Introduction: Maxillofacial fracture is a trauma that often occurs in patients with multiple trauma and can be life-threatening. Maxillofacial fractures can be considered a consequential injury and are accompanied by skull base fractures because they can result in death, severe morbidity, facial deformities, and functional limitations. More than 80% of trauma patients present in an emergency with a head injury. Case report: A 15-year-old male patient complained of limited upper and lower jaw movement. The patient had a history of a traffic accident two months before coming to the hospital with a decrease of consciousness, GCS 13. Clinical examination revealed the mid 2/3 of the face and mandible deformity and malocclusion with an open bite in the anterior and posterior left mandible. Discussion: Fracture of 2/3 of the face is a complex case that requires surgical management. Reposition of fracture fragment, if not treated immediately, will cause the formation of misplacement soft callus or osteogenesis that cause malunion. The placement of the plates is adjusted to the vertical and transverse buttresses as well as Champy’s principle to obtain maximum fixation so that the position of the bones can withstand the movement of the facial muscles. If surgical treatment is delayed, maximal deformity and surgery will become more difficult to achieve results. Conclusion: Surgical management of maxillofacial trauma patients will result if reconstructive treatment is carried out immediately. Delay is a challenge for clinicians to restore facial function and aesthetics.

KEYWORDS 2/3 facial fracture, Neglected fracture, Malocclusion, ORIF

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DOI: 10.5455/IJMRCR.172-1646751860
First Received: March 8, 2022
Accepted: April 27, 2022
Associate Editor: Ivan Inkov (BG); 1
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Introduction

Maxillofacial fracture is a trauma that often occurs in patients with multiple trauma and can be life-threatening. Maxillofacial fractures can be considered a consequential injury and are accompanied by skull base fractures because they can result in death, severe morbidity, facial deformities, and functional limitations. Any part of the face may be affected; the eye with its muscles, nerves and blood vessels may be injured, which can cause visual disturbances, diplopia, displacement of the eyeball, and eye socket bones can be fractured due to a strong blow.\textsuperscript{1,2}

More than 80% of trauma patients present in an emergency with a head injury. Head injuries are open and closed injuries that occur due to skull fractures, cerebral concussions, cerebral bruising, cerebral lesions and subarachnoid, subdural, epidural, intracerebral, and brain stem lesions.\textsuperscript{3} Cerebrospinal fluid leak indicates a torn dura mater, but on the other hand, not all fistulas or torn dura cause cerebrospinal fluid leakage. Skull fracture is divided into three types: anterior fossa fracture, middle fossa fracture, and fracture posterior fossa. fractures of the frontal, ethnice and sphenoid bones cause rhinorrhea on anterior fossa fracture.\textsuperscript{4,5}

A CSF rhinorrhoea occurs when there is a fistula between the dura and the skull base and discharge of CSF from the nose. A spinal fluid leak from the intracranial space to the nasal respiratory tract is potentially very serious because of the risk of an as-
cending infection which could produce fulminant meningitis. CSF leaks have been associated with a 10% risk of developing meningitis per year. CSF fistulae persisting for > 7 days had a significantly increased risk of developing meningitis. Treatment decisions should be dictated by the severity of the neurological decline of GCS 13 during the emergency period and the presence/absence of associated intracranial lesions. The timing for the surgery procedure must be decided with proper handling and strategy.

The maxillofacial region is divided into 3 parts; the first part is the upper face (upper face), which includes the frontal bone and frontal sinus if a fracture can occur. The second part is the middle face (midface), divided into the upper and lower parts. Upper midface fractures of Le Fort II and Le Fort III and/or fractures of the nasal bone, nasoethmoidal or zygomaticomaxillary complex, and orbital floor. The Le Fort I fracture is a fracture of the lower midface. Meanwhile, the third part of the maxillofacial region is the lower face, which is a fracture that occurs in the mandible. The goal of treatment for severe facial trauma is 3D reconstruction with face projection before a traumatic accident as well as formatter and function restorations.

Prevention of complications of maxillofacial trauma can be done by doing a more thorough and complete examination as well as consultation with other relevant departments. The timing for a surgical procedure is based on CSF leak closing, which is spontaneously within 7 to 10 days. This case study aims to provide scientific information on the surgical procedure for 2/3 neglected facial fractures.

Case report
A 15-year-old male patient initially presented with a chief complaint of loss of consciousness and injuries to the head and face due to a motorcycle accident with the mechanism. His face hit the handlebar first, then referred to Emergency Department Hasan Sadikin Hospital Bandung West Java for an emergency procedure two months ago. The patient was treated with oxygen and fluid administration, GCS observation, and administration of analgetic and antibiotics drugs. Meanwhile, from the oral surgery department, Debridement extra and intraorally, followed by suturing of lacerated wounds and fixation of the upper jaw with arch bar wire from teeth 17 to 27 and 36 to 47. Treatment planning ORIF was scheduled for elective surgical procedures with a chief complaint of difficulty closing his mouth. Clinical findings found an open bite, malocclusion, functional impairments, and aesthetic. Complete blood count, chest x-ray, panoramic x-ray, and 3D head CT scan were obtained for surgical preparation. The patient was diagnosed with a neglected fracture of the mandible body with Le Fort II fracture, right tetrapod zygoma, and type 1B palate fractures.

Figure 2 (a) Clinical examination showing asymmetry over the right side of the face. (b) Intraoral clinical examination shows avulsion of tooth 13-21, 32-42, arch bar 17-27, 36-46. (c) Skull X-ray shows a fracture body of the mandible. (d) 3D head ct scan shows fracture of right zygoma, right sphenozygomatic suture, comminuted medial and lateral wall, right posterior maxilla, complete fracture body of the mandible. (e) A panoramic x-ray shows a fracture body of the mandible.

The patient underwent a surgical procedure 2 months later after emergency treatment. Open reduction with internal fixation was made by placing 2.0 mm and 1.5 mm miniplates. An intraoral incision was made 30-35 mm at the vestibulum of teeth 15-23 region. An extraoral incision was made 15 – 20 mm at the border of the mandible adjacent to the fracture area. The reconstruction and anatomical.

Figure 3 (a) Exposure body of mandible fracture. (b) (c) Reduction and stabilization of fracture with 2.0 mm plate. (d) wound closure with nylon 5.0 sutures at border of mandible region. (e) Exposure of right maxilla fracture, intraoral approach with an incision at vestibulum region. (f) Reduction and stabilization of fracture with 1.5 mm plate according to transverse and vertical buttress. (g) wound closure with silk 4.0 at the vestibulum region

Repositioning of the fragments with plates and screws was placed adjacent to the mandible and maxilla contour with 10mm and 8mm screws perpendicular to the plate according to buttress and Champy’s principle. The incision was closed after irrigating the surgical site and checking for bleeding. The vestibulum was closed with interrupted 4.0 silk sutures and the border of the mandible with 5.0 nylon sutures.
Discussion

Oral and maxillofacial fractures can assume complex forms related to their origin mechanism, the most common causes are traffic accidents, assaults, work-related injuries, sporting accidents and falls.\(^3\) Classifications, pathophysiology and biomechanics of facial fractures are described in the literature as the current approaches to fracture reduction and fixation. Rene Le Fort classifies maxillofacial fracture into three major groups Le Fort 1, Le Fort 2, and Le Fort 3.\(^10\) The decision to choose the open or closed technique in Le Fort fractures depends on the mobility of the maxilla, and the severity of displacement results in malocclusion. There are two principal therapeutic approaches to these fractures: conservative and surgical.\(^11\) The main goal of treatment is to restore the underlying bone architecture to its preinjury position as noninvasively as possible with minimal residual aesthetic and functional impairments.\(^12\) The pattern of maxillofacial fractures should be addressed in two sections. The first is the facial bone’s anatomy and buttress system, and the second is the mechanism and pathogenesis of facial injury.\(^3,13\)

Delayed treatment of facial fracture leads to complications as well as chronic pain, sensory abnormalities, facial disfigurement, trismus, malocclusion, dental and speech disabilities, and ophthalmologic disability such as eye disfigurement, visual loss, diplopia, and retrobulbar hematoma.\(^2\) In this case, treatment planning was scheduled after the CSF leaks were closed means the patient will undergo an inadequate healing process, such as malunion fracture fragments.

Clinicians will be faced with restoring both function and aesthetics from this patient. In cases with neurosurgical conditions or underlying medical disease, surgical manipulation may be difficult, and the success rate of the surgery may be lowered due to the delay in treatment. Fracture sites start to heal spontaneously 10 to 14 days after trauma without immediate management.\(^4,6\)

It is generally accepted that fracture reduction is difficult or impossible in delayed cases, even with the maximal force possible with an extractor. Such delayed cases may require surgical loosening of the bony fragment by re fracturing previous fracture sites with an osteotome or plugging up the defect area using a graft. In this case, there is difficulty in performing reduction because of the malalignment of the fracture line. After sufficient mobility, the fragments were fixed using miniplates and screws.

In this case, the patient was diagnosed with neglected fracture body of mandible with Le Fort II fracture, Right tetrapod zygoma fracture, and type 1B palate fracture; based on the diagnosis above can be concluded that the treatment choice was based on the analysis of complete clinical and radiographic examination, considering the possible sequel, both aesthetic and functional. Radiography images show a pattern of trauma mechanism in both the maxilla and mandible. After sufficient mobility, the fragments were fixed using miniplates and screws.

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Champy’s principle was used to achieve better outcomes to restore normal active movements of the skeletal unit during bone healing. Using this principle, the case we present achieved that with a 2.0 mm straight plate placed along the mandible. Physiological movements of the jaw produce tension forces along the alveolar border and compression forces along the mandible’s lower border. These forces produce flexion of the body of the mandible, which is maximum at the angle region and minimum at the premolar region.\(^17,18\) The plates are thus placed in a biomechanically favourable zone, known as the tension zone, which lies just below the apices of the teeth roots.

Figure 4 Horizontal buttress of the facial skeleton and Vertical buttress of the facial skeleton.\(^16\)

Figure 5 Champy’s ideal line of osteosynthesis in mandible\(^18,17\)
2/3 neglected facial fracture is defined as discontinuity of facial bone structures that are not handled or handled correctly, resulting in a delay in treatment usually followed by aesthetic and functional impairments. In cases that have neurosurgical conditions or underlying medical diseases, surgical manipulation may be difficult. Thus, the success rate of the surgery may be decreased due to the delay in treatment. Whenever possible, fractures of the facial bones should be reduced at the earliest possible time after the injury to restore optimal function and minimize late skeletal and associated soft-tissue deformity.

Funding
This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest
There are no conflicts of interest to declare by any of the authors of this study.

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