Management of Le Fort II fracture accompanied with blowout fracture of orbital base (case report)

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Abstract

Objective: To present a casereport of a 20 years old male with Le Fort II fracture accompanied with blowout fracture and its management.

Methods: A 20 years old male patient with chief complaint of maxillary fracture and inability to chew food, also felt limitation of right eye movement and double vision was then diagnosed with Le Fort II fracture accompanied with blowout fracture of the right orbital base. The patient was rehabilitated using open reduction internal fixation of the maxilla to achieve good occlusion continue with immobilization. The orbital base fracture was rehabilitated by orbital mesh placement and release of tissue trapped inside

the orbital base fracture fragments to achieve normal position and movement of the eyeball.

Results: One month post-surgery follow-up showed the face was symmetrical and the enophthalmos was corrected. A good occlusion was reached.

Conclusion: Proper management of Le Fort II fracture accompanied with orbital base blowout fracture can restore the function of the eye, mastication and occlusion. Symmetrical and proportional facial esthetics are among the indicators of a successful holistic maxillofacial trauma management.

Keywords: Open Reduction, Le Fort II, Blow out

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Introduction

In everyday practice maxillofacial surgeons often encounter a wide range of midfacial fractures. Le Fort fractures, which account for 10–20% of facial fractures, are often associated with other serious injuries. Nasal, orbitozygomatic, frontal, temporal, maxilla and mandibula are bones composing the facial structure; thus, fractures of those bones can cause facial abnormality causing poor esthetic and disturbance of sense of smell, respiration, digestion, and eyes. The face is also important for the esthetics and self-image.^{1,2}

The etiology of maxillofacial fracture are traffic accident, occupational accident, sport injury, war injury, and injury caused by violent acts. The most frequent cause is traffic accident of two-wheeled motor vehicle. Most of the jaw fracture occurs in young male aged 16–40 years old, and dominantly in age 21 and 25 years old.^{1–3}

Facial trauma commonly involves hard and soft tissue, such as in Le Fort II fracture and blowout fracture of the orbital base. Those trauma cause the disturbance of the function of the eyes, mastication, and occlusion. This case report will describe the basic principles of the management of Le Fort II fracture accompanied with blowout fracture of the orbital base.

Case Report

A 20 years old male patient came to the Department of Oral Surgery with chief complaint of maxillary

fracture caused by motorbike accident 7 days in prior. He was previously treated at Garut Hospital then was referred to Dr. Hasan Sadikin General Hospital. The patient was unable to chew his food properly and felt pain at his cheek and under his eyes. He also felt double vision and his right eyeball was unable to move normally.

On physical examination it was found that the patient was fully conscious and the vital sign was normal. On doing head examination a slight bilateral periorbital edema and bilateral zygoma was found due to post-trauma inflammation, and it had already subsided. Eye examination found medial subconjunctival hemorrhage of right eye, enophthalmos of right eye, and dystopia and diplopia at upper right direction [figure 1](#). The patient was also unable to move his eyeball to the right, upper right, and lower right direction. An intraoral palpation was found floating of nasofrontal suture to maxilla and malocclusion with anterior open bite.

To support the diagnosis, postero-anterior (PA) and lateral Caldwell radiograph, Water's view radiograph, panoramic radiograph, axial, coronal, and 3D CT-scan was taken.

The Water's view radiograph showed radiolucent at fracture site at bilateral zygoma and nasofrontal [figure 2A](#), while Coronal CT-scan showed fracture fragment at right orbital base [figure 2B](#). This was supported by the result of 3D CT-scan imaging that showed fracture line at bilateral zygoma and nasofrontal [figure 3](#). The patient was diagnosed with Le

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Figure 1 Facial profile. (There was enophthalmos of right eye)

Figure 2 A. Fracture line at bilateral zygoma was seen in water's radiograph.
B. Coronal section of the CT scan showed fracture fragment at the orbital base

Fort II fracture accompanied with blowout fracture of orbital base.

The management of this patient was done by open reduction internal fixation (ORIF) for the Le Fort II fracture with general anesthesia. An incision was done intraorally at maxillary vestibulum. A reduction was done with right occlusion direction.

A fixation was done with internal fixation method using mini plates and screw to achieve osteosynthesis directly at the fracture site. An immobilization was planned for 3–4 weeks using intermaxillary fixation (IMF) technique. This technique was done by immobilizing maxilla locked at the mandibular direction to achieve and maintain proper occlusion.

The management of orbital base fracture was done by trans conjunctival incision approach in the right eye. The trapped periorbital fat tissue was released from the fracture fragment. Reposition of orbital base fracture was done by placing mesh and fixing it to the infraorbital rim. A duction test was done to assess the eye movement to the normal limit.

The patient was followed-up until one-month post-surgery. The facial examination showed symmetrical face and no deformity. The right eye was able to move normally and the enophthalmos and diplopia was corrected [figure 4A](#). Good occlusion and mastication function was achieved [figure 4B](#). The wound healing was good and there was no sign of infection.

Discussion

Clinically, Le Fort II fracture commonly has the following clinical signs; edema of the upper third of the face, which is also known as ballooning or moon face, bilateral circumorbital edema, and ecchymosis (black eyes and a bilateral subconjunctival hemorrhage of the medial side of the eyes), flat and depressed nose, bilateral epistaxis, elongation of the face and premature occlusion contact of the posterior teeth which causes anterior open bite, mastication and speech disturbances, airway obstruction caused by posterior and inferior displacement causing dorsal tongue obstruction, emphysema that occurs due to air released from paranasal sinus caused by the fracture, leakage of cerebrospinal fluid, and anesthesia or paresthesia of both cheeks caused by orbital foramen injury.^{2,4}

The main principles of Le Fort II fracture management are infection control, fracture fragment reduction, fixation, and immobilization. The management of fracture has to eliminate the movement of fracture fragments, because excessive fracture movement can inhibit new bone formation and predisposes it to infection. Proper prophylaxis antibiotic is sometime needed for good wound closure.⁶

Reduction has to be done immediately and accurately to restore the function and esthetics. To achieve a good reduction, occlusion has to be used as guidance, so when the occlusion is achieved, the mastication function also works properly. Delay of reduction will affect the function and esthetics and

Figure 3 Fracture of bilateral zygoma and fracture line at nasofrontal suture was seen in 3D CT-scan imaging

Figure 4 A. Onemonth post-surgery followup. The face was symmetrical and the enophthalmos was corrected, B. A good occlusion was reached

become difficult due to its delay. The reduction will be more difficult if it is delayed more than 10 days in mandibula and 3 weeks in maxilla.⁶

Movement of fracture line after reduction and fixation will interfere the bone healing process. This can cause deformity. An immobilization has to be done until the bone healing process is completed. The immobilization is done for 4–6 weeks for mandible and 3–4 weeks for maxilla. One of the management plans for maxillary or mandibular fracture is by IMF immobilization. This technique is done by immobilizing the mandible locked in the maxillary direction. This is done to achieve good occlusion.^{6,7}

The orbital base blowout fracture can cause eyeball disturbance due to the inferior rectus and

inferior oblique muscle disturbance. The diplopia is a symptom that frequently develops early. This is because of the edema and hemorrhagic effusion inside and around the extra ocular muscles. The diplopia is usually temporary. The diplopia can also be caused by enophthalmos and ptosis is caused by eyeball shift which is caused by the trauma. An orbital base trauma can also cause enophthalmos if the orbital fat gets inside the maxillary sinus. This type of diplopia needs special care because a repair is impossible unless the orbital base fracture is reduced.²

An eyeball movement examination of patient in this case report showed inability to move right eyeball towards right, lower right, and upper right direction. The eyeball had to be assessed by evaluation of cardinal eyeball movement. A forced duction test was done because it was suspected that there was eye muscle trapped inside the fracture fragment. The movement limitation could also be caused by post-trauma edema and orbital body prolapse. It could also be a sign of the presence of scar tissue and contracture. An infra-orbital nerve damage is also possible in orbital base blowout fracture. If there is paresthesia at the distribution of infraorbital nerve with limitation of eyeball movement, suspicion of blow-out fracture needs to be considered. An orbital exploration is done if the diagnosis is confirmed supported by the result of the CT scan as a gold standard. Besides, careful examination showed limited extra ocular muscle function, orbital tissue herniation, enophthalmos, dystopia, and diplopia which does not improve in 7–14 days, and positive forced duction test. Based on these indications, we planned orbital exploration for this patient. Access to orbital base is made by making subciliary and trans conjunctival incision. The orbital base exploration is done by peripheral fat release and orbital bone reduction. Basic reconstruction of orbital base is completed with reduction and stabilization of orbital rim. In large defect, the orbital base defect can be reconstructed by auto graft, allograft, or prosthetic implant. Sources for auto graft are calvaria, iliac crest, or nasal septum cartilage. Sources for allograft are lyophilized dura and cartilage. Alloplastic material such as titanium mesh has durable characteristic and can be accurately adjusted to the range of orbital base defect. Porous polyethylene implants and polydioxanone resorbable sheet have also been used for orbital base reconstruction. Apart from the technique, restoration of orbital anatomy and volume is needed to prevent post-surgical enophthalmos. A forced duction test has to be done before and after the exploration of orbital base and after the reconstruction.^{6–8}

Conclusion

Proper management of Le Fort II fracture is accompanied with orbital base blowout fracture can restore the function of the eye, mastication and occlusion. Symmetrical and proportional facial esthetics are among the indicators of a successful holistic maxillofacial trauma management.

Conflict of Interest

The authors report no conflict of interest.

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