

Minimally invasive approach of panfacial fractures A Case Report

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ABSTRACT

Background. Panfacial fractures involves fractures of several bones of face. They are associated with malocclusion, dish face deformity, enophthalmos, diplopia, cerebrospinal fluid leak and soft tissue injuries. **Purpose.** The purpose of this paper is to present a case of minimizing surgical wound and morbidity. **Case.** A 40 year old female presented with severe maxillofacial injuries caused by motor vehicle collisions about 5 days prior to admission. The assessment of the patient is mild head injury, panfacial fractures, lacerated wound at face, rupture of globe of ocular sinistra. An open reduction and internal fixation (ORIF) and enucleation of globe ocular sinistra was performed. Intraoral vestibular incision is made in the upper and lower vestibular region. Mucoperiosteal flap elevation of vestibular will exposure of the anterior maxilla and mandibular fractures. Intermaksilary fixation within 3 week and restore aesthetic with prosthesis fitting eyeball and denture. **Discussion.** The goal of treatment of panfacial fracture is to restore both the functions and pre-injury 3-dimensional facial contours. To achieve this goal two common sequences of management of Panfacial fractures are proposed, "Bottom up and inside out" or "Top down and outside in". Other sequences exist but there are variations of these two major approaches. **Conclusion.** A minimally invasive approach to the fracture site is an alternative method to manage panfacial fracture with a simple, effective and lower complication rate.

Keyword: panfacial fracture, ORIF, reconstruction

ABSTRAK

Latar belakang. Fraktur panfasial adalah fraktur yang meliputi beberapa tulang wajah dan trauma jaringan lunak. Fraktur panfasial menyebabkan terjadinya maloklusi, deformitas wajah, enophthalmus, diplopia dan keluarnya cairan serebrospinal. Tujuan. Tujuan penulisan makalah ini adalah untuk mempresentasikan tatalaksanaan kasus panfasial dengan pembedahan minimal dan morbiditas yang rendah. Kasus. Pasien perempuan usia 40 tahun datang dengan cedera maksilofasial yang parah, yang disebabkan oleh kecelakaan sepeda motor sekitar 5 hari sebelum masuk Rumah Sakit Hasan Sadikin. Pasien didiagnosa dengan cedera kepala ringan, fraktur panfasial, luka robek diwajah dan rupture bola mata kiri. Selanjutnya dilakukan operasi open reduction and internal fixation (ORIF) dan enukleasi bola mata kiri. Operasi diawali dengan membuat sayatan didaerah vestibulum rahang atas dan bawah. Selanjutnya dilakukan pembuatan flap mukoperiosteal sehingga dapat terlihat fraktur pada bagian anterior maksila dan mandibula. Selanjutnya dilakukan fiksasi intermaksilar selama 3 minggu dan untuk mengembalikan estetik penderita dilakukan pemasangan protesa bola mata dan gigi tiruan. Pembahasan. Tujuan dari tatalaksana fraktur panfasial adalah untuk mengembalikan fungsi dan penampilan wajah sedapat mungkin seperti sebelum terjadinya kecelakaan, untuk itu diperlukan adanya dua pendekatan yaitu teknik "Bottom up and inside out" atau "Top down and outside in". Kesimpulan. Pendekatan bedah dengan melakukan sayatan yang minimal pada sisi fraktur adalah salah satu metode alternative dalam tatalaksana fraktur panfasial dengan mudah, efektif dan komplikasi yang ringan.

Kata kunci: Fraktur panfasial, ORIF, Rekonstruksi

INTRODUCTION

The facial region has both functional and aesthetic units. Trauma to the facial region may corrupt any of these units, causing aesthetic deformities and functional difficulties.¹

Panfacial fractures are those involving the mandible, maxilla, and zygomatic complex at the same time and usually accompanying naso-orbito-ethmoid (NOE) and frontal bone fractures. They are often associated with soft tissue injuries and loss of bony structures that can lead to severe posttraumatic deformities and disabilities like malocclusion, "dish" face deformity, enophthalmos etc.^{2,3} Cranio-maxillofacial fractures are commonly associated with head and cervical spine injuries that involve predictable patterns of dispersion of force from the maxillofacial skeleton and transmission to the cranial vault and cervical spine.⁴ And because they are often accompanied by complex trauma to other areas like the brain and body that threaten the life of the patient, the treatment of the facial injuries is often delayed. If treatment is not carried out soon after the injury,

facial bone fractures often mal-united, soft tissues shrink and contract, and scarring occurs, all of which makes delayed treatment very difficult.³

Panfacial trauma results in severe injury to the hard and soft tissues of the face and associated structures. These fractures are often comminuted and treatment must be individualized for each patient.⁴ Computed tomography (CT) has greatly added to the preoperative appreciation of the extent of fractures. It allows one to formulate a treatment plan, including surgical approaches and the sequencing of fracture repair. Axial, coronal, and sagittal views are helpful, as well as three-dimensional views, especially in patients with severely comminuted fractures.

Patients with panfacial fractures represent a small proportion of the overall patient population with facial fractures. Because of the force necessary to cause panfacial injury, these patients often have other concomitant injuries.⁴ Motor vehicle collisions, assault, sports-related accidents, industrial accidents, and gunshot wound may cause panfacial fractures that affect the lower, middle and upper part of the face.^{1,5}

CASE REPORT

A 40 year old female consult from Gunung Jati Hospital, presented with severe maxillofacial injuries caused by motor vehicle collisions about 5 days prior to admission. On arrival, his vitals were stable. He was fully conscious, well oriented with time, place, and person. In our examination we found oedem on face, bilateral periorbital ecchymosis, subconjunctival haemorrhage, dish face, deformity, multiple facial fractures and situational suture on face, and had persistent bleeding and cerebrospinal fluid leakage from the nose.

Radiographic and 3-Dimensional Computed tomography (3-DCT) image revealed fracture of

frontal bone, fracture of bilateral inferior orbital rim, Le Fort II, comminuted naso-orbito-ethmoid (NOE) fracture, zygomatico maxillary complex (ZMC) fracture on left side, nasal bone, fracture of palate type 3 and symphysis mandible were present.

Necrotomy, debridement and primary suture of lacerated wound at face and palate under local anaesthesia was performed at emergency room. Interdental wiring using erich bar was performed to stabilize of mandibular and palatal fracture. An open reduction and rigid internal fixation and enucleation of left eye was performed at 14 days after collision. A joint operation between Oral and Maxillofacial Surgery Department and Ophthalmology Department.



Figure 1. Clinical picture.



Figure 2. 3-Dimensional CT showing panfacial fracture (fracture of frontal bone, Le Fort II, comminuted NOE fracture, ZMC fracture on left side and symphysis mandible).



Figure 3. clinical figure post debridement and suturing of lacerated wound at face.



Figure 3. Clinical figure a. post debridement of lacerated wound at palate, b. post suturing of lacerated wound at palate, c. post interdigital wiring.



Figure 4. Enucleation of left eye by Ophthalmology Departement.



Figure 5. a. Reconstruction of mandible buttress, b. reconstruction of maxillar buttress.

Fractures of buttresses were reduced and fixated with miniplates and screw (Fig. 5). An intraoral vestibular incision is made in the lower

vestibular region from canine left to the right side. With the mucoperiosteal flap elevation, exposure of the symphysis mandibula region and fixated of the fracture with miniplate and screw. The dissection is very simple and carries no risk of damaging the branch of the facial nerve.

When the main framework was obtained, the other fracture sites were exposed and treated. An intraoral vestibular incision is made in the upper vestibular region from the first molar at left side to canine region at the right side. With the mucoperiosteal flap elevation, exposure of the anterior maxilla and superior dento-alveolar arch is obtained. After the symphysis and maxilla fracture was reduced, an intermaksillary fixation (IMF) was done in order to achieving good occlusion.



Figure 6. A. occlusion after surgery, there was open bite posterior. B. Intermaksillary fixation (IMF) using rubber for achieving good occlusion.



Picture 7. Clinical picture post treatment and insertion of fabricated orbital prostheses.

DISCUSSION

Panfacial fracture are defined as fracture involving the lower, middle, and upper case.^{4,7} Treatment can be challenging and requires an individualized treatment plan. A firm understanding of the treatment principles of each individual fracture is necessary before attempting to tackle the patient with panfacial fracture. Historically, these fractures were treated conservatively, which led to significant postoperative problems, including crippling malocclusion, significant increase in facial width, and decreased facial projection.⁶

Midface fractures, especially if related to traffic accidents, represent a remarkable problem from a surgical, psychological, and social standpoint. In trauma dynamics, the pattern of the fractures can extend to all bony fragments and is often associated with soft tissue injuries and loss of bony structures. This can lead to posttraumatic deformities that greatly influence the patient psychologically and limit his social rehabilitation, sometimes permanently.⁸

A systematic approach must be planned and used for the treatment of panfacial fractures. Recent articles have reported varied means of skin incision and osteosynthesis, and there is no consensus among the authors for the treatment of facial fractures. Reconstruction of buttresses, frontal bar, and ramus and corpus of the mandibula is very important to provide facial width, length and projection. Bone fractures also affect the skin envelope and lead to soft tissue shrinkage, stiffness and undesirable scarring.¹

The goals of the panfacial fracture treatment are to restore the face to as close to the preinjury state as possible.^{3,4} This is accomplished by accurate

reduction and fixation of the various fractures with special attention directed at restoring facial height, width, and projection. Treatment should focus on restoring both form and function while minimizing the need for secondary surgery.^{2,4} To achieve this goal, various management schemes have been proposed including “bottom to top,” “top to bottom,” “inside-out,” or “outside-in.” Many surgeons prefer the mandible as a foundation on which to reconstruct the occlusion first.^{5,7}

The preferred sequence in complex panfacial fractures starts with mandibular reconstruction.⁹ The “Bottom up and inside out” approach allowed stable reconstruction of mandibular fracture & establishes the mandible as foundation for setting the rest of face especially when reasonable dentition is present and with at least one intact condyle.² The used of this approach is based on the assumption that the mandible can be reconstructed to provide an intact craniomandibular relation for maxillary positioning.¹⁰

Plate and screw fixation allowed spatial control and position of multiple facial fracture fragments and thereby did two things that affected the sequencing of panfacial fracture. First it allowed stable reconstruction of mandibular fractures so that the mandible could be used to position the maxilla without fear that telescoping of fragments might occur in the subcondylar region. Second, it allowed the possibility of providing a stable occlusal base in the maxilla.¹⁰

The occlusion is set by placing IMF. This would ensure maxilla is in proper position.² Because occlusion is the touchstone of mandible and maxillary fracture treatment. Intermaxillary fixation or rigid fixation with miniplates and screws is used for osteosynthesis. Intermaxillary fixation provides better occlusion and has a lower

infection rate, so it should be the first choice if possible.¹¹ In this case we use a rubber to fixated the maxilla and mandible in order to achieving a good occlusion. And at gross loss of teeth case may affect the ability to relate the maxilla to the mandible. Intraoral vestibular incision is made in the upper vestibular region, With the mucoperiosteal flap elevation, this local incisions are gaining in popularity recently because the dissection is simple and the scar may be hidden in the natural crease.¹

An ocular defect may affect the patient psychologically. So that an ocular prosthesis will be part of the facial prosthesis. Ocular prosthesis is given to uplift the patient psychologically and improve the confidence.^{12,13} To improve the comfort and matching of the prosthesis with that of the natural eye, an custom made ocular prosthesis is preferred.¹³ In this case, patient use readymade (stock ocular prosthesis) because of time limitation and cost factor is taken.

CONCLUSION.

When there are multiple facial fractures involving upper & lower face, reconstruction should be approached as puzzle. A systematic approach must be planned and used for the treatment of panfacial fractures. A minimally invasive approach to the fracture site is an alternative method to manage panfacial fracture with a simple, effective and lower complication rate.

REFERENCES

1. Güven E, Uğurlu AM, Kuvat SV, Kanliada D, Emekli U. Minimally invasive approaches in severe panfacial fractures. *Turkish J Trauma Emerg Surg* 2010;16(6):541-5.
2. Asnani U, Sonavane S, Baig F, Natrajan S. Panfacial trauma - A Case Report. *Internat J Dent Clin* 2010;2(2):35-8.
3. He D, Zhang Y, Ellis E. Panfacial fractures: analysis of 33 Cases Treated Late. *J Oral maxillofac Surg* 2007;65:2459-65.
4. Bagheri S, Bell RB, Khan HA. Current Therapy in Oral and Maxillofacial Surgery. Missouri: Elsevier Mosby. 2012. p. 354-60.
5. Louis PJ. Management of panfacial fractures: peterson's principles of oral & maxillofacial surgery. Missouri: Elsevier Mosby. 2004. p. 547-59.
6. Curtis W, Horswell BB. Panfacial Fractures : An Approach to Management. *Oral Maxillofacial Surg Clin N Am* 2013;25:649-60.
7. Pae A, Choi CH, Noh K, Kwon YD, Kim HS, Kwon KR. The prosthetic rehabilitation of a panfacial fracture patient after reduction: A clinical report. *J Prosthet Dentis* 2012;108. (Issue 2):123-8.
8. Clauser L, Galie M, Mandrioli S, Sarti E. Severe Panfacial Fracture With Facial Explosion: Integrated and Multistaged Reconstructive Procedures. *J Craniofac Surg*:Vol. 14. Issue 6. November 2003:893-898
9. Hardt N, Kuttnerberger J. Craniofacial trauma: Diagnosis and management. Berlin Heidelberg: Springer-Verlag. 2010. p. 218-21.
10. Fonseca RJ, Walker RV, Betts NU, Barber HD, Powers MP. Oral and Maxillofacial Trauma 3rd Edition. Vol:1. Missouri: Elsevier-Saunders. 2005. p. 359-61.
11. Ehrenfeld M, Manson PN, Prein J. Principle of internal fixation of the craniomaxillofacial skeleton trauma and orthognathic surgery. Stuttgart:GeorgThiemeVerlag. 2012. p. 115-23.
12. Fonseca RJ, Walker RV, Betts NU, Barber HD, Powers MP. Oral and Maxillofacial Trauma 3rd ed. Vol 2. Missouri: Elsevier-Saunders. 2005. p. 1102-4.
13. Gunaseelaraj R, Karthikeyan S, Kumar MN, Balamurugan T, Jagadeeshwaran AR. Custom-made ocular prosthesis. *J Pharm Bioallied Sci.* 2012;4(Suppl 2)Aug:S177-9.