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Management of Lefort Fractures

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ABSTRACT

Fractures of the maxillary facial bones, also described as LeFort fractures, are potentially disfiguring and potentially lethal injuries that require careful examination and expectant management skills. This review article provides an overview of fracture patterns, patient assessment, and the specific management of patients with LeFort fractures.

Key words: Lefort fractures.

INTRODUCTION

In everyday practice maxillofacial surgeons often encounter a wide range of midfacial fractures. At the beginning of the 20th century, René Le Fort mapped typical locations for facial fractures; these are now known as Le Fort I, II, and III fractures. Le Fort I fractures, also called Guérin or horizontal maxillary fractures, involve the maxilla, separating it from the palate.Le Fort II fractures, also called pyramidal fractures of the maxilla, cross the nasal bones and the orbital rim. Le Fort III fractures, also called craniofacial disjunction and transverse facial fractures, cross the front of the maxilla and involve the lacrimal bone, the lamina papyracea, and the orbital floor, and often involve the ethmoid bone. are the most serious. Le Fort fractures, which account for 10–20% of facial fractures, are often associated with other serious injuries. Le Fort made his classifications based on work with cadaver skulls, and the classification system has been criticized as imprecise and simplistic since most midface fractures involve a combination of Le Fort fractures. Although most facial fractures do not follow the patterns described by Le Fort precisely, the system is still used to categorize injuries.

Much has changed in the 50 years since Dr Parker described the development of rapid means of transportation as a portent of an increase in maxillofacial trauma. Contemporary surgeons must concern themselves with a host of nonsurgical care issues that are an integral part of oral and maxillofacial surgery practice. Standards of care are high and surgeon and patient needs are more complex. Dramatically improved diagnostic capabilities, use of open surgical techniques, improved rigid fixation devices, advances in techniques of resuscitation, and more focused surgical training have markedly improved the care of the facial trauma patient. (Robert D marciani)

Maxillo-facial injuries have increased in incidence due mainly to road traffic accidents. Approximately 4500 cases are seen annually in the Singapore General Hospital. A review of 50 consecutive cases of severe maxillo-facial injuries seen in the Department of maxillofacial Surgery showed that the majority were Lefort II type fractures (64%) followed by Lefort I fractures (14%) and Lefort III fractures (8%). There were seven cases which had a combination of multiple facial fractures. The significant associated injuries occurred in the limbs (32%), the head (30%) and in the chest (8%)(*Ann*

Acad Med Singapore.)The emergency management of maxillo-facial trauma is discussed in some detail and some of the problems in the treatment of severe or multiple facial fractures are also highlighted in this article.

Reconstruction of multiple area injuries is simplified by a highly organized treatment sequence that conceptualizes the face in two groups of two units. Each unit is divided into sections, and each section is assembled in three dimensions. Sections are integrated into units and units into a single reconstruction. Conceptually, in each unit, facial width must first be controlled by orientation from cranial base landmarks. Projection is then (and often reciprocally with width) established. Finally, facial length is set both in individual units and in the upper and lower face.

soft tissue is considered the "fourth dimension" of facial reconstruction. Bone reconstruction should be completed as early as possible to minimize soft tissue shrinkage, stiffness and scarring of soft tissues in nonanatomic positions. Soft tissue that heals from a single insult over anatomically constructed bone support provides the most natural facial appearance.(1990 Mutaz B. Habal, MD)

Signs and symptoms

Lefort 1

*Mobility of whole of tooth bearing segment of upper jaw
*Disturbed occlusion
*Palpable crepitation in upper buccal sulcus
*'Cracked pot' percussion note from upper teeth
* Haematoma intra-orally over root of zygoma
* Haematoma in palate
* Fractured cusps of cheek teeth
* Bruising of upper lip and lower half of mid-face

Lefort II

* Mobile maxilla
* Gagging on posterior teeth
* Anterior open bite
* Periorbital echymosis/haematoma
* Nose included or separate
* Eyes – diplopia, subconjunctival haemorrhage
* Steps – zygomatic buttress, infraorbital margin
* Infra-orbital nerve damage

Lefort III

* Mobile middle third of face
* Gagging on posterior teeth
* Anterior open bite
* Periorbital ecchymosis/haematoma
* Nose included or separate
* Eyes – diplopia, subconjunctival haemorrhage
* Steps – zygomatic buttress, infraorbital margin
* Infraorbital nerve damage
* Separation at F-Z suture
* CSF Rhinorrhea

Diagnosis

Radiological diagnosis of Lefort fractures are made using plain film techniques or computer tomography.(Sylvia Aparicio,Gillian Lieberman) plain film technique includes waters view, Caldwell view,submentovertex view and lateral view. An orthopantomogram is usually employed in the process of diagnosis.computer tomography is more favourable due to its precision and accuracy. fractures existing beneat intact mucosa can escape diagnosis and result in occlusal abnormalities during treatment.Manson, Paul N. M.D.; Shack, R. Bruce M.D.; Leonard, Larry G. M.D.; Su, C. T. M.D.; Hoopes, John E. M.D)

Modes of management

Address emergencies related to maxillofacial trauma prior to definitive treatment. These include airway compromise and excessive bleeding. If the airway is compromised and orotracheal intubation cannot be established, the midface complex may be impacted posteroinferiorly, causing obstruction. Disimpaction may be attempted manually or with large disimpaction forceps around the alveolar arch and premaxilla. If the segments do not move readily and the airway is obstructed, an emergent tracheotomy or cricothyrotomy may be necessary. Severe bleeding may occur from soft tissue lacerations or intranasal structures. A combination of pressure, packing, cauterization, and suturing may be useful in such situations. Stabilize the patient and treat serious insults to the airway, neurologic system, cervical spine, chest, and abdomen prior to definitive treatment of the maxillofacial bones.(Kris S Moe, MD, FACS) Maxillary fractures are treated by reduction and immobilization. Establishment of preinjury occlusion and midface buttress alignment provides the foundation for this treatment

the goals of treatment of lefort fractures are to reestablish preinjury occlusion with normal face height and projection of face. The proper occlusal relationship between dental arches is established with intermaxillary fixation. Recent advances in the treatment of maxillary fractures have been use of extended open reduction techniques with rigid plate and screw fixation of the facial buttresses. Bone grafts have been used to replace missing or comminuted bone with early treatment of these injuries. This more aggressive surgical approach has dramatically improved the aesthetic results now obtainable with fewer secondary deformities. (Erl anger health systems: Tennessee Craniofacial Center)

Orthognathic surgery involving osteotomy and repositioning of the mandible, maxilla or both is performed to treat skeletal disproportion of the lower face.(James I beck MBBS FRCS, Kevin D johnstonMBcHB)

Most alveolar fractures occur in the premolar and incisor regions. The treatment of these fractures involves proper reduction and rapid stabilization. Manipulation by pressure and rigid stabilization of the fragments are accepted closed-reduction techniques.(Sertac Aktop, Onur Gonul, Tulin Satilmis,Hasan Garip and Kamil Goker)

Major displacement or difficulty with close reduction may necessitate open reduction. Alignment of the involved teeth, edema of the segments, restoration of proper occlusion, and edema of the teeth in the fractured segment are important. The removal of teeth with no bony support may be considered, but should not be performed before the fractured bony segments have healed,even if the teeth are considered to be unsalvageable. Segment edema can be performed with acrylic or metal cap splints, orthodontic bands, fibreglass splints, transosseous wires, small or mini cortical plates, or transgingival lag screws.

The timing and treatment indications for orbital facial fractures are evolving. For orbital floor fractures, nonresolving oculocardiac reflex, the “white-eyed” blowout fracture, and early enophthalmos or hypoglobus are indications for immediate surgical repair. Surgery within 2 weeks is recommended in cases of symptomatic diplopia with positive forced ductions and evidence of orbital soft tissue entrapment on computed tomography examination or large orbital floor fractures, which may cause latent enophthalmos or hypo-ophthalmos. For midfacial, lateral, supraorbital, medial wall, and nasoethmoidal fractures, repair within 2 weeks is indicated to avoid difficult repair from immediate posttraumatic wound healing.(MA Burnstine)

A comparison between two samples of patients with facial fractures is reported: the first treated non-surgically and the second with open reduction and rigid internal fixation. The functional results for both groups were similar. However, open reduction gave better occlusal results, anatomic restoration and faster recovery rates than non-surgical techniques(Giacomo De Riu, Ugo Gamba, Marilena Anghinoni, Enrico Sesenna)

The incidence of severe hemorrhage secondary to facial fractures is rare; however, it can be life threatening. The incidence of life threatening hemorrhage from facial fracture was 1.2%.(Bynoe, Raymond P. MD; Kerwin, Andrew J. MD; Parker, Harris H. III MD; Nottingham, James M. MD; Bell, Richard M. MD; Yost, Michael J. PhD; Close, Timothy C. MD; Hudson, Edwin R. MD; Sheridan, David J. MD; Wade, Michael D. MD) When common modalities of treatment such as pressure, packing, and correction of coagulopathy fail to control the hemorrhage, transcatheter arterial embolization offers a safe alternative to surgical control

REFERENCES

1. Robert D marciani
2. *Ann Acad Med Singapore*
3. Mutaz B. Habal, MD
4. Kris S Moe MD, FACS
5. Erlanger health systems: Tennessee Craniofacial Center

6. James I beck MBBS FRCS, Kevin D Johnston MBcHB
7. .Sertac Aktop, Onur Gonul, Tulin Satilmis,Hasan Garip and Kamil Goker
8. MA Burnstine
9. Giacomo De Riu, Ugo Gamba, Marilena Anghinoni, Enrico Sesenna
10. Bynoe, Raymond P. MD; Kerwin, Andrew J. MD; Parker, Harris H. III MD; Nottingham, James M. MD; Bell, Richard M. MD
11. Yost, Michael J. PhD; Close, Timothy C. MD; Hudson, Edwin R. MD; Sheridan, David J. MD; Wade, Michael D.
12. Sylvia Aparicio IV,Gillian Lieberman MD
13. Manson, paul N: Shack,R ,Bruce MD: Leonard, Larry G.MD: hoopes, John, E.MD
14. Allsop D, Kennett K (2002). "Skull and facial bone trauma". In Nahum AM, Melvin J. *Accidental injury: Biomechanics and prevention*. Berlin: Springer. pp. 254–258. ISBN 0-387-98820-3. Retrieved 2008-10-08.