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Comparison of Open Reduction and Internal Fixation in Case of Symphysis and Parasymphysis Mandible Fracture

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Abstract: ***This is prospective, non-randomized study to evaluate and compare the results. Morbility and surgical time for open reduction and internal fixation (ORIF) and intermaxilliary fixation(IMF) for mandible fracture. 50 consecutive patients of symphysis and parasymphysis mandible fracture were selected for study. 20 patients under went IMF and 30 had ORIF. selection of type of operation was left to the patient's choice. All the patients had preoperative counselling and both the procedures were explained in details with their advantages and disadvantages. Both the groups compared in relations to operative time consumption, airway problems, nutrition , oral hygiene, phonation difficulties, insomnia workloss and difficulties in recovering normal range of jaw function. thus we came to conclusion that ORIF is better surgical option in symphsis and parasymphysis mandible fracture with shorter surgical time and well tolerated by patients***

Keywords: Mandible fracture, open reduction, internal fixation, intermaxilliary fixation.

1. Introduction

Madible fracture. also known as fractures of jaws are breaks through the mandible bone. Fractures of mandible account for 36 -70% of all maxillofacial injuries (1,2,3) the symphysis and parasymphysis account for 17%of mandible fracture (4) 75 % to 85 % of mandible fracture occurs in males with majority occuring in their twenties & thirties (5,6,7). 43% of the patients had an associated injury. Of these patients, head injuries occurred in 39% of patients, head and neck lacerations in 30%, midface fractures in 28%, ocular injuries in 16%, nasal fractures in 12%, and cervical spine fractures in 11% - 53% of patients had unilateral fractures, 37% of the patients had 2 fractures, and 9% had 3 or more fractures(8)

1.1 Classification

- Symphysis - Fracture in the region of the central incisors that runs from the alveolar process through the inferior border of the mandible
- Parasymphyseal - Fractures occurring within the boundaries of vertical lines distal to the canine teeth
- Simple or closed - Fracture that does not produce a wound open to the external environment, whether it be through the skin, mucosa, or periodontal membrane
- Compound or open - Fracture in which an external wound, involving skin, mucosa, or periodontal membrane, communicates with the break in the bone
- Comminuted - Fracture in which the bone is splintered or crushed Comminuted mandibular fracture.
- Greenstick - Fracture in which one cortex of the bone is broken and the other cortex is bent
- Pathologic - Fracture occurring from mild injury because of preexisting bone disease
- Multiple - Variety in which two or more lines of fracture on the same bone are not communicating with one another
- Impacted - Fracture in which one fragment is driven firmly into the other
- Atrophic - Fracture resulting from severe atrophy of the bone, as in edentulous mandibles
- Indirect - Fracture at a point distant from the site of injury
- Complicated or complex - Fracture in which considerable injury to the adjacent soft tissues or adjacent parts occurs; may be simple or compound

1.2 Signs & Symptoms

By far, the two most common symptoms described are pain and the feeling that teeth no longer correctly meet (traumatic malocclusion, or disocclusion). Other symptoms may include loose teeth, numbness and trismus . Outside the mouth, signs of swelling, bruising and deformity can all be seen. Intraorally, a step may seen between the teeth on either side of the fracture or a space can be seen (often mistaken for a lost tooth) and bleeding from the gingiva in the area. There can be an open bite where the lower teeth, no longer meet the upper teeth. Sometimes bruising will develop in the floor of the mouth (sublingual eccymosis) and the fracture can be moved by moving either side of the fracture segment up and down.

1.3 Panoramic Radiography

Panoramic radiographs are tomograms where the mandible is in the focal trough and show a flat image of the mandible. Fractures are easier to spot. In addition, broken, missing or malaligned teeth can often be appreciated on a panormic image which is frequently lost in plain films.

- Computed tomography
- Computed tomography is the most sensitive and specific of the imaging techniques.

1.4 Reduction

Reduction refers to approximating the ends of the bones edges that are broken. This is done with either an open technique, where an incision is made, the fracture is found and is physically manipulated into place, or closed technique where no incision is made. The mouth is unique, in that the teeth are well secured to the bone ends but come through epithelium (mucosa). A leg or wrist, for instance, has no such structure to help with a closed reduction. In addition, when the fracture happens to be in a tooth bearing area of the jaws, aligning the teeth well usually results in alignment of the fracture segments. To align the teeth, circumdental wiring is often used where wire strands (typically 24 gauge or 26 gauge) are wrapped around each tooth then attached to a stainless steel arch bar. When the maxillary (top) and mandibular (bottom) teeth are aligned together, this brings the fracture segments into place. Higher tech solutions are also available, to help reduce the segments with arch bars using bonding technology.

Open reduction with direct skeletal fixation allows the bones to be directly mandipulated through an incision so that the fractured ends meet, then they can be secured together either rigidly (with screws or plates and screws) or non-rigidly (with transosseous wires). There are a multitude of various plate and screw combinations including compression plates, non-compression plates, lag-screws, mini-plates and biodegradable plates.

2. Patients and Methods

Fifty patients aged 4-65 years presented at ENT department at GAIMS Bhuj kutch. The patients is evaluated using OPG and CT Scan facial bone. 40 patients were male and 10 patients were females. 26 patients had single fracture. 17 patients had two fractures and 4 patients had multiple fractures. All patients were operated between 1-10 days of injury. The patients were divided into two groups. Group A included 20 patients who operated by closed reduction by IMF and Group B in which remaining patients were operated by ORIF. An informed consent was taken from the patients involved in research. The both group Compared in relation to operative time consumption. intra operative and postoperative bleeding and other postoperative complications namely.airway problems, nutrition , oral hygiene, phonation difficulties, insomnia workloss and difficulties in recovering normal range of jaw function. All patients were followed up to 6 month and given postoperative physiotherapy

3. Results

The results presented as a significant difference in between two procedures regarding the intra operative time consumption. ORIF takes less time as compared to IMF. The average surgical time in cases of ORIF in our series was 30 minutes as compared to 45 minutes in IMF. Difficulties associated with closed reduction include airway problems, nutrition, oral hygiene, phonation difficulties, insomnia workloss and difficulties in recovering normal range of jaw function, In Contrast, ORIF allow early mobilization and restoration of jaw function, airway control , improved nutritional status , improved speech, better oral hygiene, patients comfort and earlier return to work place(9-10). Financial analysis comparing patients treated with IMF with those treated with ORIF found that IMF was more cost effective. there is no increase in complication with a delay of repair beyond 24 hours. The healing time for a routine mandible fracture is 4-6 weeks whether IMF or ORIF was used. those who received ORIF had higher infection rates the most common complication was loss of sensation in mandibular nerve

4. Discussion

Treating mandibular fractures involves providing the optimal environment for bony healing to occur: adequate blood supply, immobilization, and proper alignment of fracture segments. As a result, most fractures require reduction and fixation to allow for primary or secondary bone healing IMF provides Secondary bone healing occurs when fractured bone segments are placed in approximation, stabilized with allowance for some degree of micromotion, without significant devascularization of bone segments. Subsequently, bony healing occurs through a callous intermediate and ensuing ossification.ORIF provides Primary bone healing with rigid fixation bypasses the callous intermediate by approximation and fixation, which inhibits micromotion of the fracture site.

There are advantages and disadvantages to both methods of fixation. Closed reduction does not traumatize the vascular envelope and is less expensive for the patient; however, it is associated with a significant period of immobilization and closure of the oral cavity, and requires intact dentition or some form of dental records. Open reduction and internal fixation (ORIF), in contrast, allows for direct visualization and reduction of fractured bone segments and restoration of the patient's preinjury occlusion without complete fixation of the mandible and maxilla. Another important factor to take into consideration is patient compliance. Patients are best treated with ORIF to reduce the risk of premature release of IMF/MMF and subsequent complications.

The indications for closed versus open reduction have changed dramatically over the last century. The ability to treat fractures with open reduction and rigid internal fixation (ORIF) has dramatically revolutionized the approach to mandibular fractures.
Nondisplaced favorable fractures: Open reduction carries an increased risk of morbidity, thus use the simplest method to reduce and fixate the fracture.

Grossly comminuted fractures: Generally, these are best treated by closed reduction to minimize stripping of the periosteum of small bone fragments.

Fractures in children involving the developing dentition: Such fractures are difficult to manage by open reduction because of the possibility of damage to the tooth buds or partially erupted teeth

Displaced unfavorable fractures through the angle of the mandible: Often, the proximal segment is displaced superiorly and medially and requires an open technique for proper reduction. The proper approach depends on both fracture and patient characteristic one that takes into consideration. The one that takes into consideration the skill set and ability of the surgeon along with the pros and cons associated with each management plan.

References

[1] Sinclair D, Schwartz M, Gruss J, McLellan B. A retrospective review of the relationship between facial fractures, head injuries, and cervical spine injuries. J Emerg Med. 1988;6:109–112.
[2] Haug R H, Wible R T, Likavec M J, Conforti P J. Cervical spine fractures and maxillofacial trauma. J Oral Maxillofac Surg. 1991;49:725–72.
[3] Luce E A, Tubb T D, Moore A M. Review of 1,000 major facial fractures and associated injuries. Plast Reconstr Surg. 1979;63:26–30.
[4] Ellis E, III, Throckmorton G S. Bite forces after open or closed treatment of mandibular condylar process fractures. J Oral Maxillofac Surg. 2001;59:389–395.
[5] Erdmann D, Follmar K E, Debruijn M, et al. A retrospective analysis of facial fracture etiologies. Ann Plast Surg. 2008;60:398–403.
[6] Sojot A J, Meisami T, Sandor G K, Clokie C M. The epidemiology of mandibular fractures treated at the Toronto general hospital: a review of 246 cases. J Can Dent Assoc. 2001;67:640–644.
[7] Ellis E, III, Moos K F, el-Attar A. Ten years of mandibular fractures: an analysis of 2,137 cases. Oral Surg Oral Med Oral Pathol. 1985;59:120–129.
[8] Ellis E, III, McFadden D, Simon P, Throckmorton G S. Surgical complications with open treatment of mandibular condylar process fractures. J Oral Maxillofac Surg. 2000;58:950–958
[9] Beltrán-Aguilar E D, Barker L K, Canto M T, et al. Surveillance for dental caries, dental sealants, tooth retention, edentulism, and enamel fluorosis–United States, 1988–1994 and 1999–2002. MMWR Surveill Summ. 2005;54:1–43.
[10] Ellis E, III, Price C. Treatment protocol for fractures of the atrophic mandible. J Oral Maxillofac Surg.2008;66:421–435.