Original Article

Treatment of Mandibular Fracture

Comparison Between Extraoral and Intraoral Surgical Procedures for the Treatment of Mandibular Angle Fractures Using Semirigid Fixation or Rigid Fixation

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ABSTRACT

Objective: The purpose of this study was to determine various post operative complications associated with two surgical procedures used for reduction of mandibular angle fractures.

Study Design: Experimental study.

Place & Duration of Study: The study was conducted in Department of Oral & Maxillofacial Surgery Liaquat University Hospital Hyderabad from February 2012 to February 2013.

Materials and Methods: Thirty patients with mandibular fractures were divided in to two categories. Fifteen patients were treated by intra oral approach (Group A) and Fifteen by extra oral approach (Group B). At different intervals of their post operative visits, these patients were evaluated for post operative complications of infection, nerve damage, keloid scar, facial cosmetic dissatisfaction, malocclusion and limitation in mouth opening.

Results: 23 male patients and 07 female patients were affected with mandibular fracture. Most common etiology was RTA in 66.6% case. Most common complication with intraoral approach was postoperative infection while facial dissatisfaction was most commonly noticed with extraoral approach.

Conclusion: The intra oral approach with rigid fixation is our effective and superior technique as compare to the extra oral approach.

Key Words: Mandibular angle fracture, Intra/Extra Oral approach, Semirigid fixation or rigid fixation Postoperative complications

INTRODUCTION

Mandibular fractures are one of the most common facial fractures. It is a frequent occurrence in Pakistan and is associated with high incidence of facial fractures in different combinations.[1]

Management of mandibular angle fractures is often challenging and results in the highest complication rate among fractures of the mandible. Optimal treatment of angle fractures remains controversial. The large number of studies on mandibular angle fracture treatment attests to the fact that no single approach has been shown to be ideal and that treatment of mandibular angle fractures remains conceptually controversial, with a bothersome complication rate. During the past decade, significant attention has been placed on fixation of angle fracture using a variety and combination of small plates secured with monocortical screws[2-4].

Different modalities available for the treatment of mandibular fractures are:

Maxillo mandibular fixation (MMF) alone eg.dental wiring, arch bar etc.

Maxillo mandibular fixation with osteosynthesis: eg. Transosseous wiring, circumferential wiring, external pin fixation.

Osteosynthesis without maxillo mandibular fixation e.g., Mini plating, Non compression and compression plates, Lag screws.[5]

Mandibular angle fractures are prone to the highest complication rate of all fracture sites, ranging from 0% to 32%.The ideal treatment for these fractures remains controversial, and the reported complication rates, though many involve noncompliant populations, remain unacceptably high.

The goal of our study was to evaluate and describe our clinical experience and complication rate associated with two surgical procedures used for stabilization of displaced mandibular angle fractures.[6]

MATERIALS AND METHODS

This clinical study which followed a Quasi Experimental design was carried out on 30 patients presenting with mandibular angle fracture at the department of Oral and maxillofacial Surgery, Liaquat University Hospital Hyderabad. Both male and female patients aged 20-40 years were included in the study which was carried out from 8th February, 2011 to 8th February, 2012. The patients were divided into two groups A and B by using random number table. After randomization, any patient who was not found to be

suitable for the assigned treatment group was excluded from the study. Two standarized surgical techniques were used to treat these patients. 15 patients of group A were treated with intra oral approach and 15 patients of group B were treated with extra oral approach. Patients were selected by following inclusion and exclusion criteria.

Inclusion Criteria: Patient aged 20 to 40 years, medically fit to undergo surgery, sufficient bilateral dentition to allow Maxillo-Mandibular Fixation, Patient consent to participate in the study.

Exclusion criteria: Pathological fractures, Condylar and sub-condylar fractures, edentulous patients, fractures of the middle third of face.

A standard history and clinical examination chart was completed for each patient included in the study to reach a conclusive diagnosis. A preformed proforma was used to obtain the following information:

Age and gender of the patient. The etiology of the injury, recorded as road traffic accident, falls, assaults, and sports injuries.

Orthopantomogram was the standard radiograph which was supplemented by posterior anterior view of face. Patient with history of trauma, swelling, pain and step deformity on palpation at the angle of mandible along with disturbed occlusion, showing bony discontinuity on radiograph were diagnosed as fracture. The experimental outcome of the surgical procedure was explained to every patient included in this study and informed consent was taken before surgery.1-week duration of postsurgical oral antibiotic therapy and every patient was followed for 4 weeks. Postoperative radiograph was taken in follow-up for each patient, whenever required. During follow-up period any postoperative complication found, was recorded on the preformed Performa under the following heading for the two treatment modalities of the mandibular angle fracture:

Immediate postoperative complication (nerve damage)

Late post operative complication (i.e. infection, limited mouth opening, malocclusion, keloid scar and facial cosmetic dissatisfaction).

These have been explained with the help of tables. The collected data was entered and analyzed using SPSS version 16.0.

RESULTS

The detailed distribution of gender of the patients is shown in Table 1.

The results related to the etiology of the fracture have been categorized as a road traffic accidents, falls, assaults, sports injuries and iatrogenic.

The key findings of table 3 are that the post operative marginal mandibular nerve damage was not present in any of the patients treated with intraoral approach (Group A), as compared to this post operative marginal mandibular nerve damage was present in 20% of the patients treated with extraoral approach (Group B). Post operative facial cosmetic dissatisfaction was present in only 6.6% of the patients (Group A) as compared to 60% patients (Group B).

Table No1: Gender distribution of patients

Gender	Number &Frequency
Male	23(76.6%)
Female	7(23.3%)
Total	30(100%)

Table 2 shows the distribution of sample according to the etiology of fracture.

Table No.2: Etiology of fracture

Etiology of fracture	No of patients
Road traffic accidents	20 (66.66%)
Assaults	4(13.33%)
Falls	4(13.33%)
Sports	1 (3.3%)
Iatrogenic	1 (3.3%)

Details about postoperative complications related to both types of treatment modalities are given in Table 3.

Table No.3: Complications rates in the entire treatment:

Postoperative Complications	Intra oral approach		Extra oral approach	
	Present	Absent	Present	Absent
Post operative Infection	2 (13.3)	13 (86.6%)	3 (20%)	12(80%)
Marginal Mandibular nerve damage	0 (0%)	15 (100%)	3 (20%)	12 (80%)
Malocclusion	1 (6.6%)	14 (93.3%)	2 (13.3%)	13 (86.6%)
Mouth opening Compromise	1 (6.6%)	14 (93.3%)	2 (13.3%)	13 (86.6%)
Facial Cosmetic dissatisfaction	1 (6.6%)	14 (93.3%)	9 (60%)	6 (40%)
Keloid scar	0 (0%)	15 (100%)	1 (6.6%)	14 (93.3%)

DISCUSSION

The aim of this study was to compare the two surgical procedures i.e. intraoral approach and extraoral approach, used for reduction of mandibular angle fractures in terms of various post operative complications i.e. infection, nerve damage, malocclusion, Facial Cosmetic dissatisfaction, keloid scar and limited mouth opening to determine which of the two procedures show better post operative results.[6-8] In this study, Road traffic accident with motor-cycle riding was the common cause of mandibular fractures

which is different than the study of Zaki MA[9] and Muzzafar K[10] who have reported falls as the second most commonest factor of mandibular fractures[13-15]. The results confirm that post operative complication rates in terms of nerve damage (20%) and Facial Cosmetic dissatisfaction (60%) were much higher in patients where extra oral approach was used. This finding is similar to other studies which have reported the advantages of the intraoral route over the extraoral route. The results of the study show that infection occurred in13.3% of the patients treated through intra oral approach whereas it was 20% with extra-oral approach. These results are comparable with the study conducted by Lawoyin DO[11], in which the infection rate in patients treated with open reduction and internal fixation for mandibular fractures was 12.5%.Malocclusion was assessed in this study solely through patient complaints as in other studies. It was observed in 6.6% of the cases operated by intra-oral approach and 13.3% in the cases operated by extra-oral approach. Nerve damage in terms of both sensory and motor neuropathies was noted according to the patient's complaint. Motor disturbances were seen in the patient's treated by extra oral approach, which is similar to study by Renton TF[12]. Hypertrophic(keloid) scars were seen in 6.6% of the patients in extraoral approach which is comparable with study which reported 2.56 % hypertrophic scar through extra oral approach.

The possible limitation of the study is duration. However since this study followed an experimental study design, the sample size was sufficient enough to fulfill the aims and objectives of the study. Based on the findings of this study it is recommended that the motor-cycle persons must used helmet while driving.

CONCLUSION

Based on this single study, at a single institution, we can conclude that the intra oral approach with rigid fixation is our effective and superior technique as compare to the extra oral approach but distal to last molar difficulty in placement of mini-plate via a intraoral approach.

REFERENCES

1. Ajmal S, Khan MA, Jadoon H, et al. Management protocol of Mandibular fractures at Pakistan Institute Of Medical Science, Islamabad, Pakistan. J Ayub Med Coll Abottabad 2007;19(3):51-5.
2. Fridrich KL, Pena-Velasco G, Olson RA. Changing trends with mandibular fractures. J Oral Maxillofac Surg 1992;50:586-589.
3. Haug RH, Barber E, Reifeis R. A comparison of mandibular angle fracture plating techniques Oral Surg Oral Med Oral Pathol 1996;82:257-263.
4. Singh V, Gupta M, Bhagol A. Is a Single Miniplate at the inferior Border Adequate in the Management of an Angle Fracture of the Mandible. American Academy of Otalaryngology – Head and Neck Surgery Foundation 2011;145:213.
5. Ali S, Ahmed R, Dastagir MU, Comparison of two surgical procedures in reduction of mandibular angle fractures. Pakistan Oral & Dental J 2010;30:2.
6. Mehra P, Murad H, Internal fixation of mandibular angle fractures. A comparison TWO techniques. J Oral Maxillofacial Surg 2008;66(11):2254-60.
7. Chritah A, Lazow S, Berger J. Transoral 2.0-mm miniplate fixation of mandibular fractures plus 1 week maxillomandibular fixation: A prospective study, J Oral Maxillofacial Surg 2005; 63:1737.
8. Andrew J, Gear L, Apasova E, John P. Schmitz et al. Treatment modalities for mandibular angle fractures. J Oral Maxillfac Surg 2005; 63: 655-663.
9. Zaki MA, Islam T, Memon S, Aleem A. Pattern of maxillofacial injuries received at Abbasi Shaheed Hospital, KMDC, Karachi. Annual Abbasi Shaheed Hosp 2002;7:291-93.
10. Muzzafar K. Management of maxillofacial Trauma. AFID Dent J 1998; 10: 18-21.
11. Lawoyin DO, Lawoyin JO, Lawoyin TO. Fractures of facial skeleton in Tabuk North West Armed Forces Hospital. A five-year review. African J Med & Med Sci 1996; 25: 385-87.
12. Renton TF, Wiesnfeld D. Mandibular fractures osteosynthesis: a comparison of three techniques. Br J Oral Maxillofac Surg 1996; 34: 166-73.
13. J.E barrera, MD; Arlen, D Meyer, MD. Mandibular Angle Fractures. Medscape 2010.
14. Alkan A, Celebi N, Ozden B, Bas B, Inal S. Biomechanical comparision of different plating techniques in repair of mandibular angle fractures. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2007;104:752-6.
15. Maloney PL, Lincoln RE, Coyne CP. A protocol for the management of compound mandibular fractures based on the time from injury to treatment. J Oral Maxillofac Surg 2001;59: 879–884.

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