

COMPARISON OF POST OPERATIVE COMPLICATIONS IN MANDIBULAR ANGLE FRACTURES TREATED BY SINGLE VERSUS TWO MINIPLATES

¹SYEDA NOSHEEN BUKHARI

²AHMAD LIAQUAT

³RIAZ AHMED WARRAICH

⁴NABEELA RIAZ

⁵KASHIF SIDDIQUE

ABSTRACT

The objective of this study was to compare the complications (infection and non union) when fractures through the angle of the mandible are treated with a single noncompression miniplate versus 2 noncompression miniplates. 300 patients were randomly divided in two groups, 150 patients in each. Group A was treated by single non compression miniplate plate at superior border of angle of mandible using intraoral approach. Group B was treated by two noncompression plates one at superior border as in group A, and other plate at lower border using extra oral approach. Patients were assessed for infection and non union on 21st, 45th and 60th days after the procedure. Mean age of patients in Group-A was 35.87±1.90 and in Group-B mean age of patients was 31.30±3.45 years respectively. Gender distribution showed that there were 241 (80.34%) [Group-A=124, Group-B=117] male and 59 (19.67%) female patients [Group-A=26, Group-B=33]. There were 10(6.67%) patients in Group-A and 22(14.67%) patients in Group-B who got infection at fracture site at 21st day.. At 45th day 6 (4%) patients in Group-A and 17(11.33%) patients in Group-B had infection. At 60th day infection was present in 10 (6.67%) patients and in Group-A only 2 patients had infection. This study shows that there are less chances of Infection when the patients are treated with one miniplate as compared to two miniplates for the treatment of displaced mandibular angle fractures.

Key Words: Maxillofacial trauma, Mandible fracture, Angle.

INTRODUCTION

Fractures of the mandibular angle represents a high percentage¹ and an important clinical challenge because their treatment has the highest post surgical complication rate of all mandibular fractures ranging from 0% to 32%.² According to a study by Stacey et al, fracture of condylar process accounts for 36%, 21% at the corpus, and 20% at mandibular angle region.³ The angle of mandible is more prone to complications among all the mandibular fractures.⁴ Many treatment options are suggested in literature but still the treatment of angle of mandible is subject to many controversies.² Many different forms of treatment have been used to manage such fractures like open reduction and nonrigid fixation with transosseous wires, circummandibular

wires, AO reconstruction plates, mini dynamic compression plates, compression plates, lag screws and non compression plates.⁵ One decade ago, the popular treatment for angle of mandible was two point fixation with miniplates and monocortical screws,⁶ but it was related with higher complication rate as compared to single fixation point by mini plate.⁷ Champy et al recommended application of single non compression mini plate at superior border of angle of mandible for treatment of angle fracture.⁸ In Pakistan, limited data is available with this reference. So, this study was conducted which provides information regarding the comparison of post operative complications in mandibular angle fractures treated by single versus two miniplates by using infection and non union as variables.

METHODOLOGY

This study of 300 patients was conducted in the Department of Oral & Maxillofacial Surgery, Mayo Hospital, Lahore, from 17th October 2011 to 17th April 2012. Data were collected by using non-probability sampling technique. Criteria for inclusion was as follows; patients with non infected closed mandibular

¹ Syeda Nosheen Bukhari, BDS, FCPS Resident

² Ahmad Liaquat, BS, BDS (Gold Medalist) FCPS Resident, Res: 27-E, PIA Colony, Lahore Cell: 0345-4155798

³ Riaz Ahmed Warraich, BDS, MDS, FCPS (OMFS), FCPS Hons

⁴ Nabeela Riaz, BDS, MCPS (Perio), FCPS (Prosthodontics) FCPS (OMFS)

⁵ Kashif Siddique Statistician

Received for Publication: June 17, 2014

Revision Received: February 18, 2015

Revision Approved: February 25, 2015

angle fractures, which were displaced on clinical examination and panoramic radiographs. The patients were established to have displaced fracture on the basis of displacement of the inferior alveolar canal as assessed on panoramic radiograph (>2mm), patients from both gender, patients of age range 17-55 years. Exclusion criteria was: comminuted mandible fractures, systemically ill patients e.g. suffering from leukemia or diabetes mellitus on the basis of history and patients with adjacent midface fractures. Informed consent was taken from all the patients for using their data in research. Ethical issues were considered and dealt with during the study after approval from Ethical Review Committee of the Institute. Patients were randomized into 2 groups by lottery method.

Group A: In this group open reduction internal fixation with single miniplate, at upper border of the mandible (Champy's line) was carried out.

Group B: In this group open reduction internal fixation with 2 miniplates, one at upper border (Champy's line) and one at lower border of the mandible was done. Patients were followed up and checked clinically post-operatively for infection and nonunion on 21st, 45th and 60th day. The results were documented on 60th day postoperatively. All the complications were managed. Infection was treated with antibiotics or plate removal at follow up while non union was treated by plate removal and rigid fixation using reconstruction plate.

RESULTS

Total 300 patients were randomly divided into 2 groups. Mean age of patients in Group-A was 35.87±1.90

TABLE 1: AGE & GENDER DISTRIBUTION OF PATIENTS

Variable	Group-A	Group-B
Age (years)	35.87±1.90	31.30±3.45
Gender	Male	124
	Female	26
Total	150	150

SD and in Group-B mean age of patients was 31.30±3.45 SD years respectively. Gender distribution shows that there were 241(80.34%) [Group-A=124, Group-B=117] male and 59(19.67%) female patients [Group-A=26, Group-B=33]. Infection was noted in both treatment groups at 21st day. There were 10(6.67%) patients in Group-A and 22(14.67%) patients in Group-B who had infection. At 45th day 6(4%) patients in Group-A and 17(11.33%) patients in Group-B had infection. In terms of p-value infection at 45th day was significantly associated with treatment groups. i.e. (p-value=0.016). At 60th day infection was present in 10(6.67%) patients and in Group-A only 2 patients had infection. It was observed that infection was less in group A than group B.

At 21st day non union was observed in 5(3.33%) patients in Group-A and in Group-B 8(5.33%) patients had non union. No significant association was present between treatment group with respect to non union at 21st day. (p-value=0.394). At 45th day there were total 8 patients who had non union among these patients 3 were from Group-A and 5 were from Group-B. Non union at 45th day was independent of the treatment group of patients. i.e. (p-value=0.473) At 60th day there were total 8 patients who had non union among these patients 3 were from Group-A and 5 were from Group-B. Non union at 60th day was independent of the treatment group of patients. i.e. (p-value=0.473).

DISCUSSION

Due to complex biomechanics of the angle region, the treatment of the angle fracture is controversial.² Treatment ranges from close reduction to open reduction with nonrigid fixation, transosseous wires, circum-mandibular wires, AO reconstruction plates,¹⁰ mini dynamic compression plates, compression plates,¹¹⁻¹² non compression plates,¹³ and lag screws.¹⁴ But still there is lack of understanding in the biomechanics of angle, so no consensus has been made yet for the ideal treatment modality for angle fracture. A comparative study of Razukevicius D et al 2005 compared many treatment methods and presented their views.¹⁵⁻¹⁶ The duration of maxillomandibular fixation in the treatment

TABLE 2: INFECTION & NON UNION IN TREATMENT GROUPS DURING FOLLOW UP TIME PERIOD

Variable	Follow Up			
		21st Day	45th Day	60th Day
Infection	Group-A=150	10	6	2
	Group- B=150	22	17	10
P-value		0.024*	0.016*	0.005*
Non Union	Group-A=150	5	3	3
	Group- B=150	8	5	5
P-value		0.394	0.473	0.473

of angle fracture is also a topic of controversy.¹⁷

Ellis⁴ has concluded that postoperative complication rates-malocclusion, infection wound dehiscence and plate exposure were higher when patients were treated with two miniplates as compared to the patients who were treated by single miniplate. Our results of study are also the same.

Choi BH¹⁸ and Shetty V¹⁹ have advocated that two plates are more stable than single plate fixation for angle fractures. Levy et al²⁰ compared single versus two miniplates for mandibular angle fracture without post surgical MMF. There were two complications in 10 patients who had single plate as compared to the 18 patients who had two plates and there was no complication among them. Our study didn't support this study as in our study infection rate was high in the group whom was treated with two plates. This might be the reason that levy et al didn't do post operative MMF while we did MMF postoperatively for 4 weeks in every case.

Another similar study was done by Siddiqui A et al in 2007 in which they compared the use of one miniplate (n = 36) with that of two miniplates (n = 26) for the treatment of the mandibular angle in a randomized trial. There were no significant differences between the groups in total morbidity (22/36 compared with 14/26) or for individual complications. They concluded that two miniplates seem to confer no extra benefit to patients, but a much larger trial would be required to show this conclusively. So, it is another evidence that both treatments methods are same. Our study is also comparable to Siddiqui A et al.⁶

CONCLUSION

This study should that there are less chances of Infection in the patients treated with one miniplate as compared to the patients treated with two miniplates for the treatment of displaced mandibular angle fractures.

REFERENCE

- 1 Singh Erol B, Tanirikulu, Gorgun B. Maxillofacial fractures, analysis of demographgc distribution and treatment in 2901 patients (25-years experience). J craniomaxillofac surg 2004; 32: 308-13.
- 2 SV, et al. superior border versus inferior border fixation in displaced mandibular angle fractures:prospective randomized comparative study. int j oral Maxillofac surg 2014; 43: 834-40.
- 3 Stacey DH, Doyle JF, mount DL, et al. management of mandible fractures. plast Reconstr surg 2006; 48: 117.
- 4 Ellis E. treatment methods for fractures of the mandibular angle. Int j oral Maxillofac surg 1999; 28: 243.

- 5 Danda KA. comparison of a single noncompression miniplate versus 2 noncompression miniplates in the treatment of mandibular angle fractures: a prospective, randomized clinical trial. J Oral Maxillofac surg 2010; 68: 1565-67.
- 6 Siddiqui A, Markose G, Moos KF, MCMahoon J, Ayoub AF. one plate versus two in the management of mandibular angle fracture. a prospective randomized study. Br j Oral Maxillofac surg 2007; 45: 223-25.
- 7 KV, Lalitha MR, Prasad K, Ranganath K, Shwetha V, Singh J. A comparative evaluation between single noncompression titanium miniplate and three dimensional titanium miniplate in the treatment of mandibular angle fracture- a randomized prospective study. J cranio maxillofac surg 2013; 41: 103-109.
- 8 Champy M, Lodde JP, Schmitt R, et al. mandibular osteosynthesis by miniature screwed plates via a buccal approach. J Maxillofac surg 1978; 6: 14-21.
- 9 Passeri L, Ellis III E, Sinn D. Complications of non-rigid fixation of mandibular angle fractures. J Oral Maxillofac Surg 1993; 51: 382-84.
- 10 Ellis E. Treatment of mandibular angle frac-tures using the AO reconstruction plate. J Oral Maxillofac Surg 1993; 51: 250-54.
- 11 Bassetti, C. new concepts in maxillofacial bone surgery. Springer, 1976.
- 12 Spiessl, Bernd, and Berton Rahn. Internal fixation of the mandible: a manual of AO/ASIF principles. Springer Verlag, 1989.
- 13 Champy M, Lodde JP, Schmitt R, Jaeger JH, Muster D. Mandibular osteosynthesis by miniature screwed plates via a buccal approach. J Maxillofac Surg 1978; 6: 14-21.
- 14 Niederdellmann H, Akuamoa-Boat-Eng E, Uhlig G. Lag screw osteosynthesis a new procedure for treating fractures of the man-dibular angle. J Oral Surg 1981; 39: 938-40.
- 15 Hendler B. Maxillofacial trauma. In: Rosen P, Barkin R. Emergency Medicine: Concepts and Clinical Practice. 4th ed. California. Mosby-Year Book; 1998: 1093-103.
- 16 Prein, Joachim, ed. Manual of Internal Fixation in the Cranio-Facial Skeleton.: Techniques as recommended by the AO/ ASIF-Maxillofacial Group. Springer Science & Business Media, 1998.
- 17 Chritah, A., SK. Lazow, et al. "Transoral 2.0-mm locking miniplate fixation of mandibular fractures plus 1 week of maxillomandibular fixation: a prospective study." Journal of oral and maxillofacial surgery 63(12): 1737-41.
- 18 Choi, B. H., K. N. Kim, et al. "Clinical and in vitro evaluation of mandibular angle fracture fixation with the two-miniplate system." Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology 1995; 79(6): 692-95.
- 19 Shetty, V., D. McBrearty, et al. (1995). "Fracture line stability as a function of the internal fixation system: an in vitro comparison using a mandibular angle fracture model." Journal of oral and maxillofacial surgery 1995; 53(7): 791-801.
- 20 Levy, Frederic E., et al. "Monocortical miniplate fixation of mandibular angle fractures." Archives of Otolaryngology-Head & Neck Surgery 117.2 (1991): 149-54.