

Complications in the Treatment of Mandibular Condylar Fracture, Surgical Versus Non-Surgical Treatment

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ABSTRACT

Background: The facial fractures include Condylar fractures are most common in mandibular fractures, which have the highest fracture incidence after nasal bone fractures. Three different traumatic forces can result in condylar injury: the first is energy imparted to a static person by a moving object, such as a blow to the face from a cricket bat; the second is a moving person striking a static object, such as a child falling and striking the ground; and the third is a combination of the first two forces, such as when a person is moving and an automobile is moving and is hit by an automobile. This kind of force typically has the biggest impact and causes the most severe injury patterns.

Objective: To compare frequency of Complications of two procedures for the treatment of mandibular condylar fracture surgical versus conservative treatment.

Methodology: This Randomized control trial was held in the Tertiary Care Hospital Karachi for 6 months from 12 Jul, 2019 to 12 Jan, 2020. ERC were taken before data collection. Patients suffering from mandibular condylar fracture and fulfilling exclusion and inclusion criteria and who were ready to give informed consent after explaining study protocol, risk benefit ratio and data usage for research were included in our study. The first group labelled as "A" was treated by closed reduction and immobilization and second group labelled as group "B" was undergone internal fixation and open reduction.

Results: The mean age and standard deviation of the 72 patients was determined to be 40.85 ± 12.93 years, respectively, with the 18 years was the minimum age and the 65 years being maximum. Frequency of gender was shown in Graph 1. The minimum duration of fracture was 1 day, and maximum were 7 days. The minimum mouth opening was 15mm and maximum was 35mm (Table 1). Trismus was present in 5/72 (6.9%) patients while it was absent in 67/72 (93.1%) patients (Table 2). Malocclusion was present in 20/72 (27.8%) patients while it was absent in 52/72 (72.2%) patients. Unilateral Side of fracture was present in 40/72 (55.6%) patients while Bilateral was present in 32/72 (44.4%) patients (Table 3)

Conclusions: In conclusion, closed reduction had clinically satisfactory results, although open reduction and internal fixation produced more accurate to reduce the complications.

Keywords: Closed reduction, Internal fixation, Open reduction, complications

INTRODUCTION

The strongest and largest facial bone is the mandible. The tenth most frequent fracture in a person's body is a fracture of the mandibular bone, which is also the most common face bone after the nasal bones¹⁻². The condylar area accounts for around 26–34% of all mandibular bone fractures. Condylar fractures are typically brought on by a direct hit to the chin or to the lateral side of the mandible as a result of aggression, sports injuries, falls, and road traffic accidents. Due to its structural distinctions and ability for healing, injury to the mandibular condyle fracture warrants special treatment in contrast to the rest of the mandible³⁻⁴. There are numerous approaches to treating condylar fractures, which has led to considerable debate and discussion in the field of oral and maxillofacial trauma. For every condylar fracture type, the technique must be selected while considering the patient's masticatory system, adaptation, deviation of the mandible, disturbance of occlusal function, ankylosis of the joint and internal TMJ derangements, which results in the jaw restricted movement⁵⁻⁶. These fractures can be treated using either an open reduction, which requires surgery, or a closed reduction, which doesn't require surgery. There are many disagreements over if, when, and how to treat mandibular condyle fractures. Maxillomandibular fixation (MMF) with arch bars, eyelet wires, or splints appears to be a closed treatment method that many surgeons seem to prefer⁷⁻⁸. The majority of condylar fracture cases respond better to closed reduction or nonsurgical treatment. The avoidance of morbidity and problems related to surgery is the obvious benefit. When there is no considerable displacement, the major goal of nonsurgical treatment is to either allow bone union to take place, or, in the instance of a fracture dislocation, to use re-education of the neuromuscular pathways to create an acceptable functional pseudarthrosis⁹⁻¹⁰. Condylar fractures can be managed nonsurgically in a variety of ways, from monitoring and a soft diet prescription through varying amounts of immobilization followed by vigorous physical therapy. In order to minimize problems such muscle atrophy, joint hypomobility, and ankylosis, the

immobilization period must be lengthy enough to allow initial union of the fracture segments but brief enough to avoid them. Currently, the immobilization time spans between 7 and 21 days¹¹⁻¹³. Depending on concurrent factors such the patient's age and nutritional state, the degree of displacement, the type of the fracture, and the occurrence of other fractures, the duration may be extended or shortened. However, condylar fractures open treatment has increased recently, most likely as a result of the development of screw and plate fixation devices that enable the fractures stabilization¹⁴⁻¹⁵.

The most frequent reason for mandibular symphysis and condylar fracture is RTA. Other factors include a fall and an assault. Three times as often as bilateral condylar fractures are unilateral fractures of the condylar area. Children most frequently sustain condylar fractures from falls. Intracapsular fractures (35.6%), condylar neck area (26.9%) and Subcondylar fractures (37.5%) are the three forms of condylar fractures that occur most frequently¹⁶⁻¹⁷. The aim of this study is to compare frequency of Complications of two procedures for the treatment of mandibular condylar fracture surgical versus conservative treatment.

METHODOLOGY

This Randomized control trial was held in the Tertiary Care Hospital Karachi for six months from Jul 2019-Jan, 2020. Sample size was calculated using WHO sample size calculator taking statistics for malocclusion in surgical group as 16.67% and non-surgical 43.3% power of test 90%, so 36 were included in each group. Total sample size was 72, selected by non-probability consecutive sampling technique.

In this study, patient of both genders, in-between age of 18-65 years were included. Patients with unilateral or bilateral mandibular condylar fracture with or without facial fracture assessment on CT scan, and Fractures within one week were also included. We excluded patients with significant medical history i.e. diabetes mellitus, Osteoporosis, chronic disease and patients on long term corticosteroids, patients with pathological bone fracture

as assessed on radiograph, patients taking betel quid, gutka, betel nuts, patients with Oral Submucous Fibrosis and who already had malocclusion.

Prior to data collection, an ethical approval letter (ERC) was taken. Our study included patients with mandibular condylar fractures who met the inclusion and exclusion criteria, were prepared to provide informed consent after being told about the study procedure, the use of data for research, and the risk-benefit ratio. following a thorough medical history, detailed clinical examination, and a CT scan evaluation. The patients were divided randomly into 2 groups using a computer-generated random number table; group "A" received treatment with closed reduction and immobilization, and group "B" received treatment with open reduction and internal fixation. A unique questionnaire including pertinent demographic questions, questions about medical history, and questions about the frequency of trismus and malocclusion following both surgeries was used by the researcher to gather the data.

SPSS version 22 was used to enter and evaluate the data. Calculating the frequency and percentages of gender, the unilateral and bilateral fracture sides, as well as the complications of trismus and malocclusion, was done as a descriptive analysis. Age, fracture duration, and mouth opening are examples of quantitative variables for which mean and standard deviation have been determined. Using the chi square test, malocclusion and the presence of trismus were compared between the two groups. Through stratification, effect modifiers like age, gender, fracture duration, and fracture side were managed. The post-stratification chi-square test was used, with p=0.05 being considered significant.

RESULTS

The mean age and standard deviation of the 72 patients was determined to be 40.85 ± 12.93 years, respectively, with the 18 years was the minimum age and the 65 years being maximum. The minimum duration of fracture was 1 day, and maximum were 7 days. The minimum mouth opening was 15mm and maximum was 35mm (Table 1).

Table 1: Descriptive statistics (n = 72)

Variable	Minimum	Maximum	Mean	Std. Deviation
Age	18	65	40.85	12.93
Duration of fracture	1	7	3.99	2.17
Mouth opening (mm)	15	35	25.13	5.79

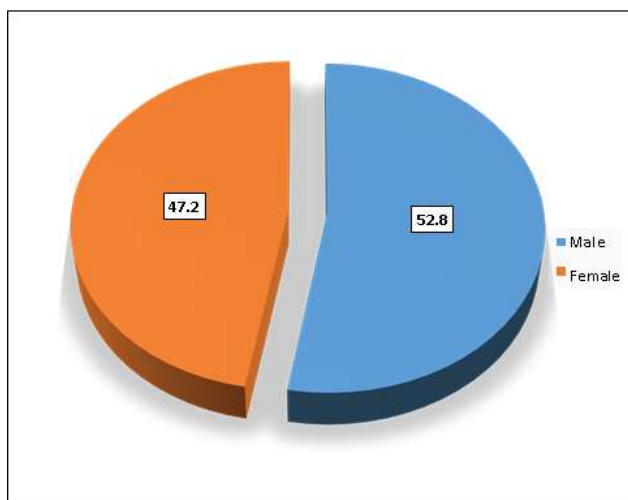


Figure 1: Males were 38/72 (52.8%) while females were 34/72 (47.2%)

Trismus was present in 5/72 (6.9%) patients while it was absent in 67/72 (93.1%) patients (Table 2).

Table-2: shows the presence of trismus and malocclusion

Trismus	Frequency	Percent
Yes	5	6.9
No	67	93.1
Total	72	100.0
Malocclusion	Frequency	Percent
Yes	20	27.8
No	52	72.2
Total	72	100.0

Malocclusion was present in 20/72 (27.8%) patients while it was absent in 52/72 (72.2%) patients. Unilateral Side of fracture was present in 40/72 (55.6%) patients while Bilateral was present in 32/72 (44.4%) patients (Table 3).

Table 3:

Side of fracture	Frequency	Percent
Unilateral	40	55.6
Bilateral	32	44.4
Total	72	100.0

By using chi-square test, it was observed that there was a significant association between groups and malocclusion having p-value = 0.009 (Table 4).

Table 4: Stratification of Malocclusion in both groups

Group	Malocclusion		Total	p-value
	Yes	No		
A	15 (41.7%)	21 (58.3%)	36 (100%)	0.009
B	5 (13.9%)	31 (86.1%)	36 (100%)	
Total	20 (27.8%)	52 (72.2%)	72 (100%)	

Significant association was not found between groups and Trismus having p-value 0.643 (Table 5).

Table 5: Stratification of Trismus in both groups

Group	Trismus		Total	p-value
	Yes	No		
A	2 (5.6%)	34 (94.4%)	36 (100%)	0.643
B	3 (8.3%)	33 (91.7%)	36 (100%)	
Total	5 (6.9%)	67 (93.1%)	72 (100%)	

Stratification of malocclusion in both groups with regards to gender and shown no significant association. Stratification of Malocclusion in both groups with regards to Duration of fracture shows no significant association was found between them. Stratification of Trismus in both groups with regards to gender shows no significant association was found between them.

Table 6: Stratification of trismus in both groups concerning Duration of fracture

Duration of fracture	Group	Trismus		Total	p-value
		Yes	No		
< 5 days	A	1 (4.8%)	20 (95.2%)	21 (100%)	0.923
	B	1 (4.2%)	23 (95.8%)	24 (100%)	
> 5 days	A	1 (6.7%)	14 (93.3%)	11 (100%)	0.411
	B	2 (16.7%)	10 (83.3%)	12 (100%)	
Total		5 (6.9%)	67 (93.1%)	72 (100%)	

Stratification of trismus in both groups concerning Duration of fracture is shown in table 6. Stratification of Malocclusion in both groups concerning Side of fracture is shown in table 7 and no significant association was found between them.

Table 7: Stratification of Malocclusion in both groups concerning Side of fracture

Side of fracture	Group	Malocclusion		Total	p-value
		Yes	No		
Unilateral	A	10 (45.5%)	12 (54.5%)	22 (100%)	0.083
	B	2 (11.1%)	16 (88.9%)	18 (100%)	
Bilateral	A	5 (35.7%)	9 (64.3%)	14 (100%)	0.217
	B	3 (16.7%)	15 (83.3%)	18 (100%)	
Total		20 (27.8%)	52 (72.2%)	72 (100%)	

DISCUSSION

The aim of this study is to compare frequency of Complications of two procedures for the treatment of mandibular condylar fracture surgical versus conservative treatment. The present survey was held among the patients of Department of Oral and Maxillofacial Surgery, at tertiary care Hospital, Karachi¹⁸. Therefore, seventy two patients were included by using non-probability consecutive sampling who were undergoing surgical or non-surgical treatment after fulfilling the inclusion criteria. The mean age and standard deviation of the 72 patients was determined to be 40.85 ± 12.93 years, respectively, with the 18 years was the minimum age and the 65 years being maximum. The minimum duration of fracture was 1 day, and maximum were 7 days. The minimum mouth opening was 15mm and maximum was 35mm. Males were 38/72 (52.8%) while females were 34/72 (47.2%). Trismus was present in 5/72 (6.9%) patients while it was absent in 67/72 (93.1%) patients. Unilateral was present in 40/72 (55.6%) patients while Bilateral was present in 32/72 (44.4%) patients. By using chi-square test, it was observed that there was a significant association between groups and malocclusion having p-value = 0.009. Significant association was not found between groups and Trismus having p-value 0.643. Stratification of malocclusion in both groups concerning age shown no significant association having p-value greater than 0.05 (table 7).

Stratification of malocclusion in both groups with regards to gender and shown no significant association. Stratification of Malocclusion in both groups with regards to Duration of fracture shows no significant association was found between them. Stratification of Trismus in both groups with regards to gender shows no significant association was found between them. Stratification of trismus in both groups with regards to age shows no significant association was found between them. Stratification of Malocclusion in both groups concerning Side of fracture shows no significant association was found between them.

A previous study was held at the Oral and Maxillofacial Surgery Department of Mayo Hospital/ King Edward Medical University, Lahore to compare the nonsurgical (immobilization and closed reduction) and surgical (open reduction internal fixation) treatment of mandibular condylar fracture in terms of maximum mouth opening (inter-incisal distance of the jaws) and occlusion after two procedures. sixty individuals (neck and/or sub-condylar) with unilateral condylar fractures¹⁹⁻²⁰. Thirty patients had nonsurgical treatment, while thirty received surgical treatment. Patients were assessed for occlusion and maximum mouth opening at various points during their post-operative visits in order to determine the differences between the two groups²¹⁻²². In comparison to patients treated surgically, i.e., open reduction and internal fixation (8.3%), patients treated non-surgically, i.e., closed reduction, had a higher percentage of malocclusions (44%) at the final postoperative visit, i.e., one year²³⁻²⁵.

CONCLUSION

In conclusion, closed reduction had clinically satisfactory results, although open reduction and internal fixation produced more accurate to reduce the complications.

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