Ann Med Res

Current issue list available at AnnMedRes

Annals of Medical Research

journal page: www.annalsmedres.org

Mandible fractures: Retrospective evaluation of 138 patients

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ARTICLE INFO

Keywords:
Mandible fracture
Maxillofacial surgery
Trauma

Received: Sep 14, 2022
Accepted: Sep 26, 2022
Available Online: 27.09.2022

DOI:
10.5455/annalsmedres.2022.09.275

Abstract

Aim: The mandible is one of the most frequently fractured bones of the maxillofacial region. In this study, it was aimed to contribute to the literature by examining the demographic data, etiological causes, fracture types and treatment methods of our patients with mandible fractures.

Materials and Methods: The data of 138 patients who were hospitalized for mandibular fracture in our plastic surgery clinic between 2010 and 2022 were retrospectively analyzed. Demographic and surgical data were evaluated.

Results: 196 fractures of 138 patients were operated for mandibular fractures. The mean age of the patients was 30.5±18 (1-81) years. Twenty-five (18.1%) were female, 113 (81.9%) were male. The most common cause was falls in 70 patients (50.7%), and the second most common cause was motor vehicle crash (32.6%). Most common fracture in the mandible was parasymphysis and second most common fracture site was the body region with 37 (18.8%) fractures.

Conclusion: Fractures of the mandible are frequently encountered in patients presenting with trauma. It is usually seen in male patients in their 30s, and parasymphysis is the most common site. Other facial fractures and general body trauma that may accompany the patient should be considered while evaluating the patient. Thanks to the measures taken, motor vehicle crash, which used to be the most common etiological cause, have decreased. The number of these traumas can be reduced with new measures for etiology.

Introduction

Mandible is an important structure in terms of speech, chewing functions and aesthetic appearance of the lower third of the face. It is one of the most frequently fractured bones of the maxillofacial region. It is exposed to trauma more frequently due to the fact that it is one of the protruding bones of the maxillofacial skeleton and its mobility. Fractures may be isolated or may be accompanied by other system injuries [1]. The three most common causes in its etiology are motor vehicle crash, assault and falls. While motor vehicle crash is more frequent in developing countries, assault is more common in developed countries [2]. Other accompanying injuries should also be considered in the management to the patient. Cosmetic problems resulting from trauma should be considered at least as much as functional problems such as chewing and breathing [3].

Mandible fractures are classified according to the anatomical region of the fracture (symphysis, parasymphysis, body, angulus, ramus, condyle and coronoid) and the direction of force applied by the muscles to the fracture parts (favorable, unfavorable). Favorable fractures are those that are not displaced by the pulling of the muscles, and ramus fractures are usually among these fractures. Fractures in the symphysis, parasymphysis, body, angulus and condyle are displaced as a result of the pulling effect of the attached muscles and are classified as unfavorable fractures [4].

In this study, it was aimed to contribute to the literature by examining the demographic data, etiological causes, fracture types and treatment methods of our patients with mandible fractures.

Materials and Methods

In our study, the data of 138 patients who were hospitalized for mandibular fracture in our plastic surgery clinic between 2010 and 2022 were retrospectively analyzed. Age, gender, trauma etiology, fracture localization, surgical method, time between trauma and surgery were evaluated.

Midline fractures were classified as symphysis, parasymphysis from midline to canine, and body from post canine

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Table 1. Data of patients.

Age-year (mean±SD)		30.5±18.0	
		n	%
Age group	0-15y	20	14.5
	16-40y	84	60.9
	41-60y	23	16.7
	61 and above	11	8.0
Gender	Male / Female	113/25	81.9/18.1
Etiology	Motor vehicle crash	45	32.6
	Falls	70	50.7
	Assault	11	8.0
	Gunshot injury	12	8.7
	Total	138	100.0
Fracture diagnose	CT	120	87.0
	Radiography	18	13.0
Fracture distribution	Symphysis	26	13.2
	Parasymphysis	69	35.2
	Body	37	18.8
	Angle	26	13.2
	Ramus	8	4.0
	Condyle	26	13.2
	Coronoid	4	2.0
	Total	196	100.0
Number of fractures	Only one	95	68.8
	More than one	43	31.2
Association with other facial fractures	Isolated mandible	119	86.2
	Combined	19	13.8
Treatment	Closed reduction	16	11.6
	ORIF	122	88.4
Time between trauma and surgery-day (mean±SD)		6.4±7.7	

SD, standard deviation; CT, computed tomography; ORIF, open reduction+internal fixation.

to angulus. It was evaluated as isolated only for those with mandible fractures, and combined if there were fractures in other facial bones. The patients were operated as soon as the general condition of the patients was suitable for the operation due to the accompanying traumas. Antibiotic and povidone-iodine mouthwash was started in all patients.

Descriptive statistics for continuous variables; were expressed as mean, standard deviation, minimum and maximum values, while categorical variables were expressed as numbers and percentages. Statistical significance level was taken as 0.05% by using SPSS 17.0 statistical package program in calculations. Ethical approval for this study was obtained from the Inonu University Health Sciences Non-Interventional Clinical Research Ethics Committee (date: 20.09.2022, decision no: 2022/3856). Our study was conducted in accordance with the Declaration of Helsinki.

Results

Between March 2010 and May 2022, 196 fractures of 138 patients were operated for mandibular fractures in our clinic. There was an average of 1.4 fractures per patient. The mean age of the patients was 30.5±18 (1-81) years, and 84 patients (60.9%) were between the ages of 16-40. Twenty-five (18.1%) were female, 113 (81.9%) were male (F/M: 1/4.5). The mean time between the occurrence of the event and the treatment was 6.4±7.7 (1-45) days. The diagnosis of fracture was made by computed tomography (CT) in 120 patients (87%), and by direct radiography in 18 patients (13%). Considering its etiology; the most common cause was falls in 70 patients (50.7%), and the second most common cause was motor vehicle crash (32.6%). One hundred and nineteen patients (86.2%) had isolated mandible fractures, while 19 patients (13.8%) had multiple facial bone fractures. Sixty nine of the fractures (35.2%) were parasymphysis fractures, and the most common fracture in the mandible was parasymphysis. The second most common fracture site was the body region with 37 (18.8%) fractures (Table 1).

Discussion

Mandible fractures are the most common facial fractures after nasal fractures. Almost all of the patients are male, and more than 1/3 of them are seen between the ages of 25-34 [4]. Consistent with the literature, the mean age of the cases in our study was 30.5, and 60.9% of them were in the 16-40 age group. At these ages, which are active periods of life, people are faced with more traumas. It was observed that the majority of our patients were male (81.9%) and the female-to-male ratio was 1/4.5%. The fact that men are active in traffic and business life and are prone to violence may explain the high number of cases in men.

The etiology of mandibular fractures may vary according to the years of the study, the country and even the hospital. While motor vehicle crash were the most frequent ones before, reasons such as improving highways, traffic precautions taken and giving importance to safety in vehicle production have decreased motor vehicle crash over time. While the most common cause in developing countries is motor vehicle crash, the most common cause in developed countries is assault. In studies conducted in military hospitals, sports accidents are more common than in other hospitals [2, 5, 6, 7]. Motor vehicle crash are the most common cause of mandible fractures in our country [2, 8, 9]. However, one study reported that the most common cause was falls [10]. In our study, the most common etiologic cause was falling from a height (50.7%).

Imaging of the mandible fracture is made with at least two planes radiography or CT. Recently, CT has been used more than radiography. The reasons for this situation are that CT allows for detailed evaluation, is available in all emergency services today, and allows evaluation of other parts of the body at once in traumas. Fracture diagnosis was made by CT in 87% of our patients.

There are different results for the most common site of fracture in the mandible. Parasymphysis [2], condyle [11] and angulus [12] are said to be the most frequently fractured places. In our study, the most frequently fractured region of the mandible was as stated by Aksoy et al. [2], it was the parasymphysis region (35.2%), followed by the body (18.8%). Fractures may be one or more. In the literature, the percentage of patients with only one fracture

ranges from 45.3% to 64.3% [8]. Similarly, 68.8% of our patients had only one fracture. The rate of accompanying mandibular fractures with other facial fractures is up to 30% in the literature [13]. In our study, this rate was 13.8%.

Although there is no strong evidence for the use of antibiotics in mandibular fractures, its use is recommended in current practice [14]. Parenteral cefazolin+metronidazole were prescribed for all of our patients while they were hospitalized, and oral amoxicillin-clavulanic acid was prescribed at discharge.

The approach to the patient with mandibular fracture is the same as in all trauma patients. First, the patient's basic life parameters such as airway, breathing and circulation are checked and corrected if necessary. Spinal trauma that may accompany maxillofacial injury should be kept in mind during the examination. It is known that early treatment has a positive effect on the outcome [7]. It is recommended to be operated as soon as possible for patient comfort, early discharge and avoiding edema [14]. In a study, it was stated that performing the treatment in the first 3 days or after it did not increase the complications [15]. In our clinic, the patient whose general condition is suitable for surgery is taken to surgery at an early time. However, surgery may be delayed due to general deterioration and edema caused by trauma [7]. In our study, the mean time between the trauma and the surgery was 6.4±7.7 (1-45) days.

The goals in the treatment of mandibular fractures can be listed as cleaning and reducing the fracture ends, providing occlusion and obtaining a rigid fixation that allows early postoperative mobilization. Closed reduction, open reduction+internal fixation or both can be used as treatment methods. In deciding the treatment to be applied, the location of the fracture, type, patient age, tooth structure (dentulous or not) and patient compliance are taken into consideration. Open reduction is used in displaced fractures and comminuted fractures due to the action of the muscles. Conservative approach is applied in non-displaced fractures and fractures in children. Intraoral incisions (upper and lower gingivobuccal sulcus incisions) are preferred for open reduction, while extraoral incisions (Risdon, preauricular incisions) are used in cases where it is not possible. Closed reduction was performed in 11.6% of our patients, and open reduction was performed in 88.4%.

Conclusion

In conclusion, fractures of the mandible are frequently encountered in patients presenting with trauma. It is usually seen in male patients in their 30s, and parasymphysis is the most common site. Other facial fractures and general body trauma that may accompany the patient should be considered while evaluating the patient. Thanks to the measures taken, motor vehicle crash, which used to be the most common etiological cause, have decreased. The number of these traumas can be reduced with new measures for etiology.

Ethics approval

Ethical approval for this study was obtained from the Inonu University Health Sciences Non-Interventional Clinical Research Ethics Committee (date: 20.09.2022, decision no: 2022/3856).

References

1. Gassner R, Tuli T, Hachl O, Rudisch A, Ulmer H. Craniomaxillofacial trauma: a 10 year review of 9,543 cases with 21,067 injuries. J Craniomaxillofac Surg. 2003; 31(1): 51-61.
2. Aksoy E, Ünlü E, Şensöz O: A retrospective study on epidemiology and treatment of maxillofacial fractures. J Craniofac Surg. 2002; 13(6): 772-5.
3. Gönüllü H et al. Bir acil servise başvuran maksillofasiyal travma olgulari: retrospektif bir çalişma. Türk Plastik Rekonstrüktif ve Estetik Cerrahi Dergisi, 2012, 19.3: 121-4.
4. Stacey DH, Doyle JF, Mount DL, Snyder MC, Gutowski KA. Management of mandible fractures. Plast Reconstr Surg. 2006 Mar;117(3):48e-60e. doi: 10.1097/01.prs.0000209392.85221.0b. PMID: 16525255.
5. Rocton S, Chaine A, Ernenwein D, Bertolus C, Rigolet A, Bertrand JC, et al. Mandibular fractures: epidemiology, therapeutic management, and complications in a series of 563 cases. Rev Stomatol Chir Maxillofac 2007; 108:3-12.
6. Brasileiro BF, Passeri LA. Epidemiological analysis of maxillofacial fractures in Brazil: a 5-year prospective study. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2006; 102:28- 34.
7. Morkoc O, et al. A retorspectıve analysıs of 143 mandıbular fracture cases. Turkısh Journal of Plastıc Surgery, 2010, 18.1: 1-5.
8. Eskitaşcıoğlu T, Ozyazgan I, Coruh A, Günay GK, Yontar Y, Altıparmak M. Fractures of the mandible: a 20-year retrospective analysis of 753 patients. Ulus Travma Acil Cerrahi Derg. 2013 Jul;19(4):348-56. doi: 10.5505/tjtes.2013.56313. PMID: 23884678.
9. Şenen D, et al. Mandibula kırıklarına klinik yaklaşımlarımız. Türk Plastik Rekonstrüktif ve Estetik Cerrahi Derg., 2006, 14.2: 102-4.
10. Er Y, et al. Ege Üniversitesi Dis Hekimligi Fakültesine Basvuran Mandibula Kirigi Olgularinin Retrospektif Incelenmesi: Epidemiyolojik Çalisma/A Retrospective Analysis of Fractured Mandible Cases Referring to the Faculty of Dentistry Ege University: An Epidemiological Study. Turkiye Klinikleri. Dishekimligi Bilimleri Dergisi, 2012, 18.2: 151.
11. Bormann KH, Wild S, Gellrich NC, Kokemüller H, Stühmer C, Schmelzeisen R, et al. Five-year retrospective study of mandibular fractures in Freiburg, Germany: incidence, etiology, treatment, and complications. J Oral Maxillofac Surg 2009; 67:1251-5.
12. Sakr K, Farag IA, Zeitoun IM. Review of 509 mandibular fractures treated at the University Hospital, Alexandria, Egypt. Br J Oral Maxillofac Surg 2006; 44:107-11.
13. Czerwinski M, Parker WL, Chehade A, Williams HB. Identification of mandibular fracture epidemiology in Canada: Enhancing injury prevention and patient evaluation. Can J Plast Surg. 2008 Spring;16(1):36-40. doi: 10.1177/229255030801600107. PMID: 19554163; PMCID: PMC2690628.
14. Morrow BT, Samson TD, Schubert W, Mackay DR. Evidence-based medicine: Mandible fractures. Plast Reconstr Surg. 2014 Dec;134(6):1381-1390. doi: 10.1097/PRS.0000000000000717. PMID: 25415101.
15. Biller, J. A., Pletcher, S. D., Goldberg, A. N., et al. Complications and the time to repair of mandible fractures. Laryngoscope115: 769, 2005.