Cumhuriyet Dental Journal 2017;20(1):40-44
Doi: 10.7126/cumudj.306117

RETROSPECTIVE ANALYSIS OF MANDIBULAR FRACTURES CASES IN CENTER OF THE EASTERN ANATOLIA REGION OF TURKEY

Türkiye'nin Doğu Anadolu Bölgesi Merkezinde Mandibula Kırıklarının Retrospektif Analizi

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Makale Kodu/Article code *: 88765*
Makale Gönderilme tarihi *: 05.05.2016*
Kabul Tarihi *: 30.06.2016*

ABSTRACT

Objectives: The aim of this retrospective study is to evaluate the etiology of mandibular fractures, the distribution of the age and gender of mandibular fracture patients, the anatomical regions where these fractures are located, and the treatment modalities used in mandibular fracture cases.

Materials and Methods: This study employed data obtained via clinical records and the files of patients diagnosed with a mandibular fracture who were treated from 2011 to 2015 at the Department of Oral and Maxillofacial Surgery, Ataturk University. The etiology of these patients' mandibular fractures, the distribution of these patients' age and gender, the anatomical regions where these patients' fractures were located, and the treatments applied to these patients were recorded by analyzing the obtained data. Descriptive statistical analysis was performed using Microsoft Excel software.

Results: 137 mandibular fracture sites were seen in 103 patients. Of these patients, 81 (79%) were male and 22 (21%) female, making the male-to-female ratio 3.7:1. The patients' ages ranged between 4 and 78 years, and the mean age was 31.4. Of the various etiologies of mandibular fractures, traffic accident (42 patients, 41%) was most frequent, followed by violence (28 patients, 27%), fall (24 patients, 23%). Of the various anatomical sites where mandibular fractures occurred, the condylar site (36 patients, 26%) was the most common, followed by the body (24%), symphysis and parasymphysis (23%), angle (18%). 58 patients (56%) were treated with closed reduction 42 patients (41%) were treated with open reduction. Three patients (3%) did not receive any treatment.

Conclusions: Traffic accidents are the most common etiologic factor of mandibular fracture cases in center of the Eastern Anatolia Region of Turkey. Males and young individuals are the most affected. The condylar site is the most common anatomical site. Both closed and open reduction methods are commonly used for the treatment of mandibular fractures.

Key words: Mandibular fracture, etiology, treatment

ÖZ

Amaç: Bu retrospektif çalışmanın amacı, mandibula kırıklarının etiyolojisini, hastaların cinsiyet ve yaş dağılımlarını, bu kırıkların oluştuğu anatomik bölgeleri ve tedavi yöntemlerini değerlendirmektir.

Gereç ve Yöntem: Bu çalışma da kullanılan veriler, 2011-2015 yılları arasında Atatürk Üniversitesi, Dişhekimliği Fakültesi Ağız, Diş ve Çene Cerrahisi Anabilim Dalı'nda mandibula kırığı teşhisiyle tedavi edilen hastaların dosyaları ve klinik kayıtlarından elde edilmiştir. Bu veriler üzerinden, mandibula kırıklarının etiyolojisi, yaş ve cinsiyet dağılımı, kırıkların anatomik bölgeleri ve uygulanan tedaviler analiz edilerek kaydedildi. Verilerin yüzdeleri, ortalamaları ve standart sapmaları Microsoft Excel yazılımı kullanılarak hesaplandı.

Bulgular: 103 hastada 137 mandibula kırığı görüldü. Bu hastalardan 81'i (% 79) erkek, 22'si (% 21) kadın, erkek-kadın oranı 3,7:1'dir. Hastaların yaşları 4 ile 78 yıl arasında değişiyordu ve ortalama yaş 31,4'tür. Mandibula kırıklarının çeşitli etyolojileri arasında trafik kazaları (42 hasta, %41) en sık olarak görülmekle birlikte, bunu şiddet (28 hasta, %27) ve düşme (24 hasta, %23) izledi. Mandibula kırıklarının meydana geldiği çeşitli anatomik bölgeler arasında kondil bölgesi en sık görülmekle birlikte (36 hasta, %26), bunu korpus (%24), semfiz ve parasemfiz (%23) ve angulus (%18) izledi. 58 hasta (%56) kapalı redüksiyonla ve kırk iki hasta (% 41) açık redüksiyonla tedavi edildi. Üç hasta (%3) herhangi bir tedavi görmedi.

Sonuç: Trafik kazaları, mandibula kırıklarında en sık görülen etyolojik faktör olmakla birlikte erkekler ve genç bireyler en fazla etkilenmektedir. Kondiler bölge kırığın meydana geldiği en yaygın anatomik bölgedir. Mandibula kırıklarının tedavisinde hem kapalı hem de açık redüksiyon tedavi yöntemleri yaygın olarak kullanılmaktadır.

Anahtar Kelimeler: Mandibular kırık, etyoloji, tedavi

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INTRODUCTION

Mandibular fractures are an important part of maxillofacial traumas.[1] These fractures account for 36-59% of all maxillofacial fractures.[2] Various functional and aesthetic disorders can result from mandibular fractures.[3] Many factors can be involved in the etiology of these fractures, with traffic accidents being the most common of these factors.[4,5] Fractures can occur in different anatomical regions of the mandible depending on the mechanism of the trauma.[6] Different treatment approaches can be applied in the mandibular fractures depending on various factors, such as patient characteristics, fracture type and localization, and the preference of the surgeon treating the patient.[5,7] The type and etiology of fractures and the anatomical region where mandibular fractures are reported occur at different rates in studies conducted on different populations or in different geographic locations.[4,6,8]

The aim of this retrospective study is to evaluate the etiology of mandibular fractures, the distribution of the age and gender of mandibular fracture patients, the anatomical regions where these fractures are located, and the treatment modalities used in mandibular fracture cases in center of the Eastern Anatolia Region of Turkey.

MATERIALS AND METHODS

This study employed data obtained via clinical records and the files of patients diagnosed with a mandibular fracture who were treated from 2011 to 2015 at the Department of Oral and Maxillofacial Surgery, Ataturk University. The etiology of these patients' mandibular fractures, the distribution of these patients' age and gender, the anatomical regions where these patients' fractures were located, and the treatments applied to these patients were recorded by analyzing the obtained data. The etiology of mandibular fractures was divided into six categories: traffic accident, violence, fall, sports accident, work accident, and other. The anatomical location of the fractures was divided into six regions: the symphysis and parasymphysis, the body, the angle, the condyles, the alveolar, and the ramus. The treatment methods used to treat mandibular fractures were divided into closed and open reduction. The percentage, mean, and standard deviation of the data were calculated using Microsoft Excel software. This study has local ethics committee approval.

RESULTS

During the five-year period covered by this study, 137 mandibular fractures were seen in 103 patients. Of these patients, 81 (79%) were male and 22 (21%) female, making the male-to-female ratio 3.7:1. The patients' ages ranged between 4 and 78 years, and the mean age was 31.4 (Figure 1 shows the patients' age distribution).

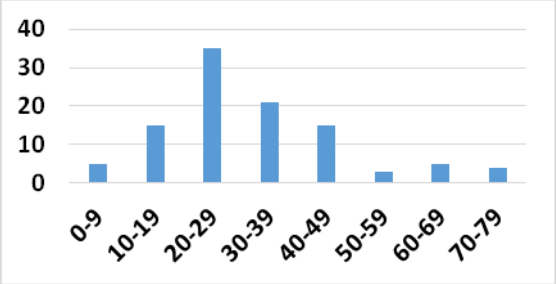

Figure 1. Distribution of Patients' age

Of the various etiologies of mandibular fractures, traffic accident (42 patients, 41%) was most frequent, followed by violence (28 patients, 27%), fall (24 patients, 23%), sports accident (4 patients, 4%), work accident (3 patients, 3%) and other (2 patients, 2%) (Figure 2 shows the distribution of the etiology of mandibular fractures). Of the two types of mandibular fractures, 70 (68%) patients had one fracture site and 33 (32%) had multiple mandibular fracture sites. Of the various anatomical sites where mandibular fractures occurred, the condylar site (36 patients, 26%) was the most common, followed by the body (24%), symphysis and parasymphysis (23%), angle (18%), alveolar (8%), and ramus (1%)

(Figure 3 shows the distribution of the anatomical sites of mandibular fractures). Of the two types of treatment methods, 58 patients (56%) were treated with closed reduction via intermaxillary fixation (IMF) with arch bars (54 patients) or circummandibular wires with an acrylic splint (4 patients). 42 patients (41%) were treated with open reduction via internal rigid fixation with miniplates and screws with short-term IMF. Three patients (3%) did not receive any treatment; they were only given recommendations.

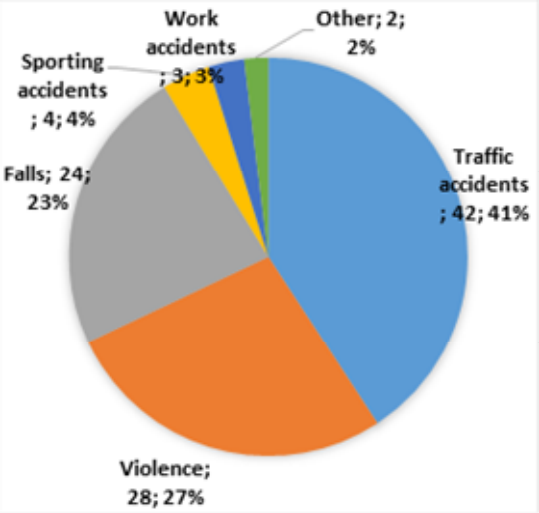

Figure 2. Distribution of etiologies of mandibular fractures.

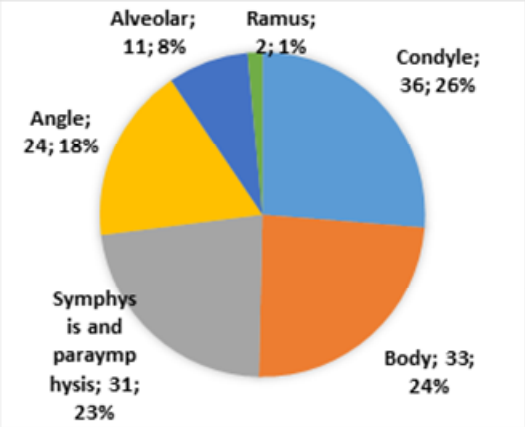

Figure 3. Distribution of mandibular fractures sites.

DISCUSSION

In this study, most patients were male (the male-to-female ratio was 3.7:1) and the peak incidence of mandibular fractures was in the 20-29-year-old group (see Figure 1). These results confirm the findings of other studies, which indicated that young people and males suffer more mandibular fractures than other groups.[2,4,5,9-11]

The most common etiologies of mandibular fractures described in the literature are traffic accidents, violence, falls, sports accidents, work accidents, and gunshot and explosion injuries.[4,6,7,12] The results of this present study indicate that the most frequent etiologies were traffic accidents, followed by violence and falls. This same distribution is observed in the findings of various other studies.[4,6,11,13] Some studies[14-16] have reported violence as the most common etiology. These varied results may be caused by the differences in socioeconomic status or motor vehicle use rate between different populations.[8] Traffic accidents are the most common etiology of mandibular fractures in developing countries, but sports accidents are the most common cause in developed countries.[4,17] Fights (violence) are the most common cause of mandibular fractures in rural and farming populations and in various ethnic groups.[8,13] Alan *et al.*[2] reported that interpersonal violence and the use of motor vehicles are more common among men than women may cause men to be more affected by this type of trauma.

The most commonly observed anatomical sites of mandibular fractures have varied between the results of different studies. Several studies have reported that the most common fracture sites are the angle,[18,19] body,[9,11] symphysis and para symphysis,[7,10] condylar[4,6,12,13] sites. In this study, the most common sites were the condylar site, followed by the body, symphysis and parasymphysis, and angle sites. The same distribution of fracture sites is reported in two other studies.[4,5] Additionally, the distribution of the etiologies of mandibular fractures found by this study are similar to the findings of these same two studies.[4,5] The similarities between this study and the other two studies suggest that the

etiology of a mandibular fracture affects the anatomical site of the fracture.

When treating mandibular fractures, clinicians intend to establish a stable occlusion, maintain normal mandibular arch form, regain the symmetry of the face and mandible, restore mandibular function, and avoid the progression of a developmental disorder.[3,7] There are many treatment options for mandibular fractures, and there is a general agreement on the best treatment options. Treatments generally vary according to clinician preferences, patient characteristics, and fracture type, number, and location.[5,7] Two basic treatment methods have been proposed: open and closed reduction.[3,4,7] The management of cases that involve a stable occlusion, a favorable fracture, and a greenstick fracture should consists ofwatchfull waiting, aliquid diet, and limited physical activity. Andersson *et al.*[3] presented that if occlusal discrepancies or other signs of fracture displacement develop, then either closed or open reduction techniques should be implemented early. In this study, only three cases (3%) were recorded as giving advice to patients without any administering treatment.

Despite technological advances in plating systems and the widespread availability of these systems, most mandibular fractures can be successfully treated with closed technics.[1,3] This technique consists of an IMF procedure, which uses arch bars. IMF is simple and conservative. Erol *et al.*[1] demonstrated that in the cases with preferable characteristics, clinical outcomes are quite good. In children, the best option for the treatment of most mandibular fractures is the closed approach. In younger children, mandible fractures can be successfully treated using acrylic splints attached to the mandible by circummandibular wires, avoiding the necessity of IMF.[1,3,20] In the present study, 56% of cases were treated with closed reduction methods, which included IMF with arch bars or acrylic splints attached to the mandible by circummandibular wires.

Open reduction with internal fixation methods is an appropriate option for patients who are intolerant to IMF and exhibit excessive displacement, unfavorable fractures, or multiple fractures.[1,3,7] In recent years, open reduction and internal fixation methods performed with miniplates and screw systems have become quite popular for the treatment of mandible and other facial fractures. An open method entails a number of advantages, such as optimal visualization of fracture segments, stable anatomical reduction, and early return of function for the patient.[4,6] In this study, 41% of patients were treated with open reduction and internal fixation with miniplates and screws. The findings of this study are compatible with the findings of other reports indicating that closed reduction methods are more preferable.[1,9,11] However, other studies reported that the open methods are more preferable.[4,7,10,13] The differences between these results may be due to variability of factors affecting treatment options or the variety of preferences of different clinicians.

CONCLUSIONS

This study indicated that traffic accidents are the most common etiologic factor of mandibular fracture cases in center of the Eastern Anatolia Region of Turkey. Males and young individuals are the most affected by these fractures. The condylar site is the most common anatomical site of mandibular fractures. Both closed and open reduction methods are commonly used for the treatment of mandibular fractures.

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