

The Characteristics of Mandibular Fracture In Rsup Dr. Hasan Sadikin General Hospital Bandung, Indonesia

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Abstract

Introduction Mandibular fracture poses a fatal complication because the mandible plays an essential role in occlusion and aesthetics. The mandible is one of the bones most affected by facial fractures commonly resulting from trauma to the face and may be associated with severe morbidity and serious consequences

Methods The records of 282 patients referred to RSUP Dr. Hasan Sadikin General Hospital Bandung, Indonesia between January 2017 and January 2021 were analysed retrospectively. Data including age, sex, etiology of mandibular fracture, type of mandibular fracture, and treatment. Incompleted data from the medical record were excluded.

Results Men aged 17-30 years were the most common victims of mandibular fracture. Road traffic accidents (RTAs) were responsible in 84% of cases. The most common anatomic site for mandibular fracture was parasymphysis region 28.7 with simple fractures 79%, and 82% of the total fractures were treated with open reduction

Conclusion The characteristics of mandibular fracture patients describe trauma patterns in the community. This finding is similar with some readily available literature with RTAs was the most common etiology and parasymphysis was the most common fracture site. Reasons for this high frequency may include the large number of poorly maintained, overloaded vehicles on unsuitable roads, violation of traffic regulations particularly by inexperienced young drivers.

Keywords: Fractures, Mandibular, Parasymphysis, Reduction

Introduction

Mandible is the area of face with major incidence of fracture.¹ Its prominence and position in the skeletal face predispose to frequent traumas.¹ The mandibular bone is an important component of the facial bone, which has a unique role in digestive system, speech, and facial esthetics.² Mandible is a strong bone but has several areas of

weakness that are prone to fracture.³ Body of the mandible is composed principally of dense cortical bone with a small substantial spongiosa through which blood vessels, lymphatic vessels and nerves pass.³ Trauma is the fourth leading cause of death in the world.⁴ More than 90% of deaths due to injury occur in developing

countries.⁵ A report by WHO annually shows Every year around 1.25 million people died due to road traffic accidents (RTAs) with mandibular fracture being the second highest maxillofacial case in the emergency department.⁴ Mandibular fracture incidences are reported to be 15.5% up to 59% of maxillofacial trauma worldwide.⁶ Land Transportation Statistics 2019 showed that West Java has the third highest mortality rate due to road accidents with 3,335 cases annually.⁷ Cases of mandibular fractures at the RSUP Dr. Hasan Sadikin General Hospital on January 2017 were 346 patients cases of mandibular fracture.⁸

Mandible fractures can involve only one site or can often involve multiple anatomic sites simultaneously.⁹ There is reported variability in the pattern of fractures of mandible resulting from different causes of injury, such as road traffic accidents (RTAs), assaults, and falls. Furthermore, there is an increase in the proportion of adolescent and young adults sustaining this injuries.¹ Mandible fractures may lead to deformities be them by displacement or non-restored bone losses, with dental occlusion affection or temporomandibular joint disorder¹. If not identified or inappropriately treated, these lesions may lead to severe squeals, both cosmetic and functional.¹

Diagnosis of mandibular fractures can be done by using panoramic radiographs, posteroanterior Caldwell radiographs, lateral Oblique radiographs, occlusal mandibular radiographs, periapical radiographs, Reverse Towne's radiographs, and computed tomography (CT).² The main concern in the management of mandibular fractures is to properly regain function and esthetics.¹⁰ The mandibular fractures are associated with different preoperative, intraoperative and postoperative complications. Some of the factors influencing the occurrence of complications are the patient's age, the type and the site of the fracture, the general health and dentition, inadequate stabilization, treatment cost, and low postoperative compliance to the surgical advice.¹¹

Ultimate goal of treatment is to re-establish the preinjury dental occlusion (bite), mandibular anatomy and jaw function of the patient.¹² Reduction techniques in mandibular fracture treatment may be classified as open or closed depending on the presence or absence of direct visual access to the fracture site.¹³ RSUP Dr. Hasan Sadikin General Hospital, the highest and biggest referral hospital in west java, receives many mandibular fracture cases. This research objective is to understand the characteristic of mandibular fractures in RSUP Dr. Hasan Sadikin General Hospital from 2017 to 2021 as a base for the future preventive effort to decrease mandibular fracture cases. Various epidemiological studies on the incidence, etiology, and pattern of mandibular fractures have shown varying results concerning the condition of the population in an area. Therefore it is necessary to study the characteristics of mandibular fracture cases at RSUP Dr. Hasan Sadikin General Hospital, Bandung, Indonesia. This study was conducted to determine the characteristics of mandibular fracture cases in the Oral and Maxillofacial Surgery Department of RSUP Dr. Hasan Sadikin General Hospital. Epidemiological studies regarding the characteristics of mandibular fractures are expected to become a reference for preventive measures of the public health system in the city of Bandung.

Methods

Appropriate ethical clearance was obtained from the ethical committee of Padjadjaran University number 1047/UN6.KEP/EC/2021. The present study is a retrospective study that included all cases of mandibular fractures that were clinically and radiographically diagnosed in RSUP Dr. Hasan Sadikin General Hospital. The sample was selected from medical records of mandibular fractures patients treated in RSUP Dr. Hasan Sadikin General Hospital from 2017 to 2021. Epidemiological & Clinical information were extracted from the case records form which included gender, age, etiology of injury, area of

injuries and treatment methods. The mechanism of injury was recorded as road traffic accident, physical assault, fall, sports injury, blow by heavy objects, and others. Demographic data was

recorded and methods of management were included. Data was collected and tabulated by using Microsoft Excel 2007. Data were presented in number and percentage.

Table 1: The demographic

No	Name of Variabel	Distribution
1	Age Intervals (Years)	<ul style="list-style-type: none"> • 0-16 Year • 17-30 Year • 31-45 Year • > 45 Year
2	Gender	<ul style="list-style-type: none"> • Male • Female
3	Etiology	<ul style="list-style-type: none"> • Traffic Accident • Violence • Pathological Condition • Fall • Work Accident • Sports Accident
4	Type Of Mandibular Fracture	<ul style="list-style-type: none"> • Condyles • Coronoideus • Corpus • Ramus • Angulus • Parasymphisis • Symphysis
5	Treatment	<ul style="list-style-type: none"> • Open Reduction • Closed Reduction
6	Type Of Fracture	<ul style="list-style-type: none"> • Simple Fracture • Compound Fracture • Comminuted Fracture
7	Patient Route To The Hospital	<ul style="list-style-type: none"> • Outpatient • Inpatient • Emergency Department
8	Duration Of Stays	<ul style="list-style-type: none"> • Days

Results

Based on the results, cases of mandibular fractures that occurred at the RSUP Dr. Hasan Sadikin General Hospital during the period from 2017 to 2021 include 240 patients with a total of 282 cases of mandibular fracture. The analysis shows that males tend to have a fractured mandible more than women; age 17 to 30 is the most common age of accidents, and road accidents are the leading cause of mandibular fractures (Figure 1). The distribution of data based on gender shows that there were 200 male patients (83.4%) and 40 female patients (16,6%) (Figure 2).

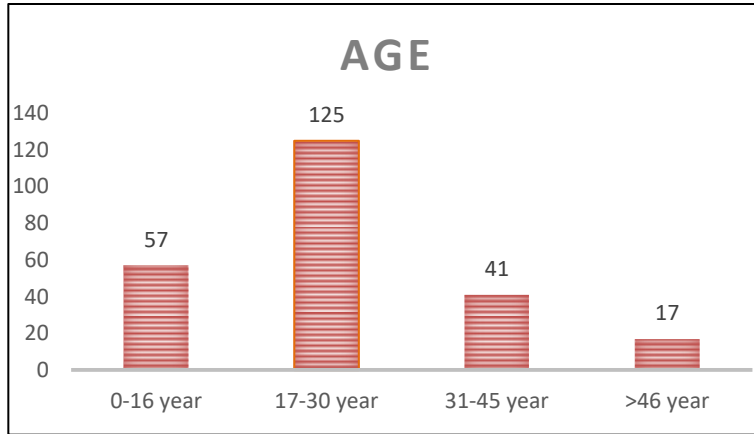


Figure 1: Age Comparison on Mandibular Fracture

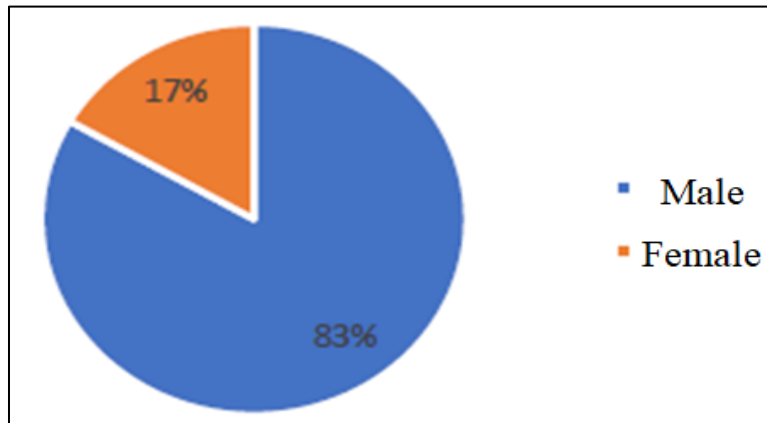


Figure 2: Gender Analysis of Mandibular Fracture

The etiology of mandibular fracture at RSUP Dr. Hasan Sadikin General Hospital, principal causes of fracture in this study were RTA (Road Traffic Accidents) representing 84%, followed by fall 8% (Figure 3). The Type of mandibular fracture was parasymphysis fractures in 94 cases (28.7%) followed by symphysis fractures (20.8%), corpus (17.8%), condyles (14.9%), angulus (12.9%), ramus (3.1%), and coronoid (1.8%) (Figure 4)

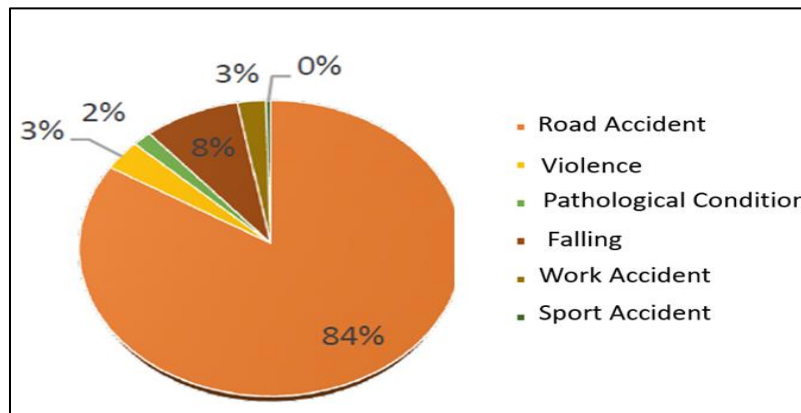


Figure 3: Distribution of Mandibular Fracture and its causes.

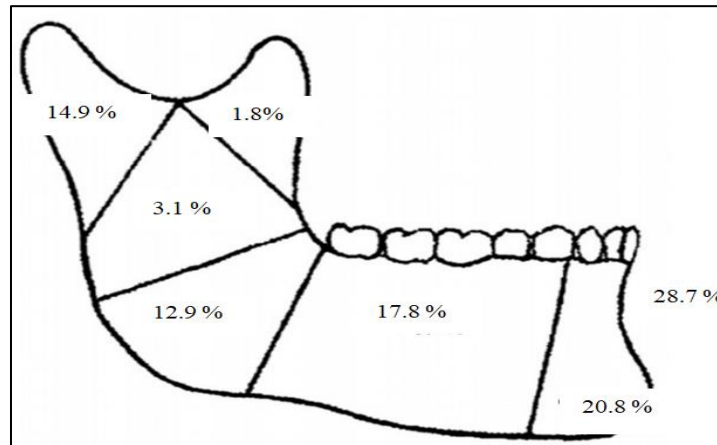


Figure 4: Schematic of Mandibular Fracture Distribution based on anatomical location

Management of mandibular fractures at RSUP Dr. Hasan Sadikin General Hospital was performed with open reduction in 197 patients (82%) and closed reduction in 43 patients (18%) (Figure 5). Type of fracture mandibular fractures simple fracture 190 patients (79.16%), compound fracture 34 patients (14.16%) and comminuted 16 patients (6.66%) (Figure 6).

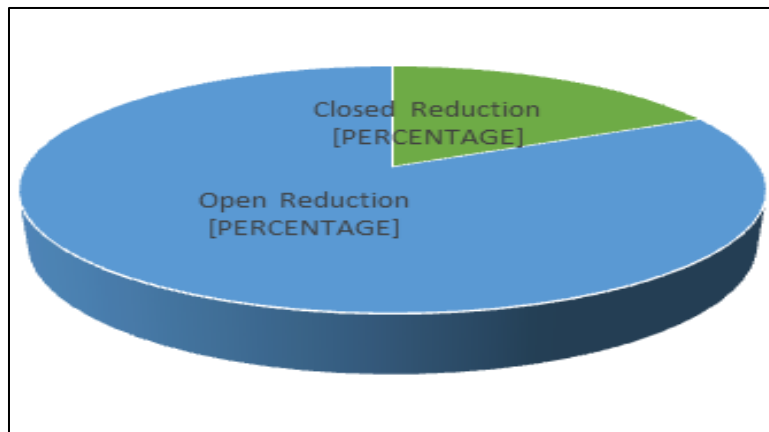


Figure 5: Management of mandibular fractures

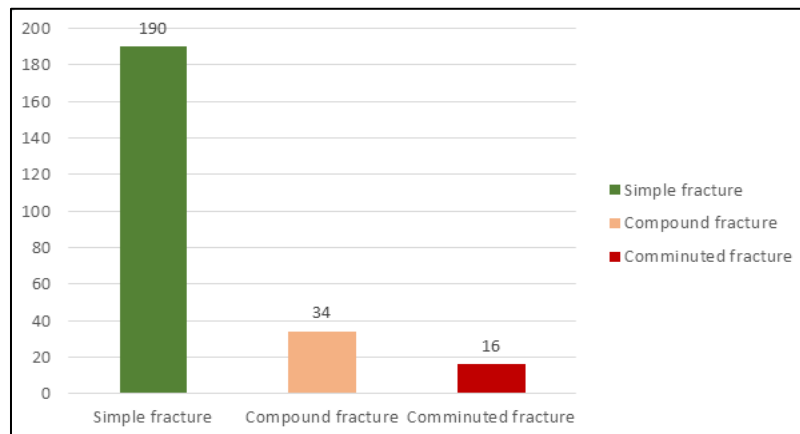


Figure 6: Type of fracture mandibular fractures

Mandibular fracture patients usually come to the hospital through the outpatient route. One hundred thirty-nine patients from 2017 to 2021 came to RSUP Dr. Hasan Sadikin General Hospital and underwent treatment through this route. 81 cases inpatient route and through emergency department 20 cases (Fig.7). The Average duration of stay and length of stay is five days for mandibular fracture.

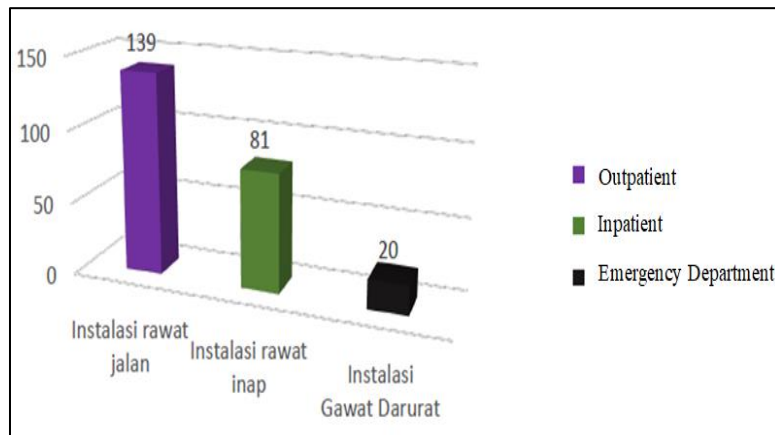


Figure 7: Route of Entry Mandibular fracture patients

Discussion

The incidence of mandibular fracture varies with population density, geographic area, socioeconomic status, and road traffic conditions.^{2,7} This study showed that the incidence of mandibular fractures was higher in male patients than in female patients and result follows the statements of several previous studies.^{3,9,10} The occurrence of mandible fracture among the male gender in our study correlates with other studies. Male predominance may be due to the higher social activity, driving vehicle, alcohol and contact sports. The high frequency occurs in men because men dominate most motorcycle users on the highway compared to women. Role of men, who are more active in community activities compared to women, whose activities are limited.³ This study also showed that the incidence of mandibular fractures in the young adult age range of 17–30 years was 52.08% and the situation is because people in that age range take more activities in daily life, including riding motorbikes carelessly.¹⁹ In this study, the lowest incidence of mandibular fractures occurred in the age range >45 years, which was 7.007%. This is

because the age range is already included in advanced adulthood. Late adulthood is a time when both physical and psychological abilities quickly decline.¹⁷ Mandibular fracture patients due to traffic accidents on motorcyclists are caused by the use of helmets that do not meet standards, inadequate transportation routes or infrastructure, the influence of alcohol while driving, obtaining a driving license without strict tests, and bad traffic etiquette from motorcyclists.^{17,18,19} Besides that, driving speed is another cause of motorcyclists' traffic accidents.¹⁸ The result of this study shows that the most common location for mandibular fracture is the parasymphysis region, with 94 cases (28.74%). This result is in accordance with the statement of Sultana et al., who stated that the prominent position of the mandible in the facial region is prone to trauma, especially in the parasymphysis region.¹² Various pieces of literature also state that the anatomical location of mandibular fractures is influenced by several other factors, such as the mechanism of injury, the direction of trauma, the magnitude of the trauma, and the characteristics of each person's mandible.^{6,9,11} The data of this study stated that the most mandibular

fracture treatment at RSUP Dr. Hasan Sadikin Hospital during the study period was the open reduction, as many as 197 patients (82.03%). Anggayanti et al. (2020) stated that maxillofacial trauma treatment with open reduction could improve the patient's quality of life.¹⁷ Arviana et al. (2015), in their journal, mention that maxillofacial trauma patients with open reduction can be done at RSUP Dr. Hasan Sadikin General Hospital, Bandung.

Conclusion

The characteristics of mandibular fractures in various regions may vary depending on the geographical and socioeconomic conditions of the area, affecting various risk factors and individual conditions. This study analysed statistical data on mandibular fracture characteristics at RSUP Dr. Hasan Sadikin General Hospital, Bandung, during the period 2017 to 2021. We found that mandibular fractures were more common in male patients. Road traffic accidents (RTA) represented the major etiological factor of maxillo-facial injuries, with young adult males as the main victims. The most common type of mandibular fracture is parasymphysis fracture, and the most treatment is open reduction. Simple fracture is the most common type of fracture and most cases of mandibular fracture are found in outpatient settings, and most of the treatment is carried out by oral surgeons.

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