

The Prevalence of Maxillary Fractures at Hasan Sadikin Hospital Bandung between 2015 And 2020

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Abstract

Introduction: Maxillofacial trauma includes injuries to the lower, middle, or upper thirds of the face and oral cavity. As these fractures have the potential to cause morbidity and even mortality, they require careful examination and management based on their severity. This study aimed to provide information regarding the number and types of maxillary fracture cases at Hasan Sadikin General Hospital, Bandung.

Methods: The design of this study was a descriptive study. Patients diagnosed with unilateral maxillary fractures, palatal fractures, Le Fort I fractures, Le Fort II fractures, and Le Fort III fractures admitted to Hasan Sadikin Hospital, Bandung, from January 2015 - December 2020, were included. Patients with incomplete medical records were excluded from this study.

Results: This study found 157 maxillary fracture patients out of 1221 maxillofacial trauma patients treated at the Oral and Maxillofacial Surgery Department of Hasan Sadikin General Hospital between January 2015 and December 2020. Male patients had a more significant number of cases (87.26%). The ages 11 to 20 years had the highest incidence of maxillary fractures (29.29%). Maxillary fractures accompanied by palatal fractures were the most prevalent, followed by Le Fort II fractures and unilateral maxillary fractures (28.66%, 21.01%, and 11.46%, respectively). About 42.67% of patients who experienced maxillary trauma also sustained mild head injuries. The most frequent mechanism of injury was motor vehicle accidents (95.54%).

Conclusion: This study reported the prevalence of maxillary fractures at Dr. Hasan Sadikin Bandung between 2015 and 2020 based on fracture types, sex, age groups, head injuries, and mechanism of injury. Future study is required to measure the force, direction, impact mechanism, use of helmets, and types of helmets to prevent maxillofacial trauma.

Keyword: Maxillary fracture, le fort I, le fort II, palatal fracture

Introduction

Maxillofacial trauma includes injuries to the soft tissues of the face and mouth and injuries to the lower, middle, or upper thirds of the face and oral cavity (1,2). Fractures of the middle third of the face frequently occur in the maxillary region. As these fractures have the potential to cause

morbidity and even mortality, they require careful examination and management based on their severity. Abnormalities caused by trauma in the midfacial region tend to be more noticeable and affect the overall esthetics of the lower face. The

fractures of the maxilla are classified according to the Le Fort classification system (1,3–6).

Le Fort fractures are a pattern of complicated facial injuries resulting from blunt trauma to the face. Le Fort I, also known as Guerin's fractures, Le Fort II, also known as a pyramidal fracture, and Le Fort III (craniofacial dysjunction) are the three different types of maxillofacial fractures. The injuries are most frequently related to motor vehicle accidents, fights, sports injuries, and falls. Other risk factors include substance abuse and excessive alcohol use (3–5,7,8).

Le Fort fractures can occur in tandem with other oromaxillofacial fractures, including a fracture of the palate (6,9–11). In a research conducted by Park, 13.2% of Le Fort fractures exhibited palate fractures. According to another study by Chen CH *et al.*, palate fractures were present in 46.4% of Le Fort fractures cases (12).

Bandung Hasan Sadikin Hospital is the West Java's referral center, with a relatively high referral rate for maxillofacial trauma cases. Numerous prior studies on maxillofacial trauma at Hasan Sadikin Hospital did not evaluate the prevalence of maxillary fractures in terms of age, gender, kind of fracture, cause, or therapy. Therefore, this study was conducted to provide information regarding the number and types of maxillary fracture cases at dr. Hasan Sadikin Bandung.

Methods

This was a descriptive study of maxillofacial trauma patients diagnosed with unilateral maxillary fractures, palatal fractures, Le Fort I fractures, Le Fort II fractures, and Le Fort III fractures admitted to Hasan Sadikin Hospital, Bandung during January 2015 - December 2020. Patients with unilateral maxillary fractures, Le Fort I, II, and III fractures, and palatal fractures were included in this study. Patients with incomplete medical records were excluded from this study.

Unilateral maxillary fracture in this study was defined as a fracture that occurs solely on a single side of the maxilla bone and is clinically and radiographically apparent. Le Fort fractures were midface fractures that were visible both clinically and radiographically. Palatal fractures were clinically and radiographically visible palate-involved fractures. The authors collected the data from patients' medical records at Hasan Sadikin Hospital Bandung. The data was then analyzed in Microsoft Excel.

Results

This study found 157 patients with a diagnosis of fracture of the maxilla, Le Fort, or palate treated at the Oral and Maxillofacial Surgery Department at Hasan Sadikin Hospital, Bandung, between January 2015 and December 2020. Males patients had more cases (137 patients, 87.26%) than females (20 patients, 12.73%).

Table 1: Patient Characteristics based on sex

Patient Characteristics	f(n)	Percentage (%)
Sex		
Males	137	87,26%
Females	20	12,73%

Table 2: Patient Characteristics based on age groups

Patient Characteristics	f(n)	Percentage (%)
Age		
0-10 tahun	2	1,27%
11-20	46	29,29%
21-30	44	28,02%
31-40	33	21,01%
41-50	17	10,82%

51-60	7	4,45%
61-70	8	5,09%

Patients were divided into groups based on age from 0 to 10 years old, 11 to 20 years old, 21 to 30 years old, 31 to 40 years old, 41 to 50 years old, 51 to 60 years old, and 61 to 70 years old (Table 2). There were two respondents in the 0-10 year-old age range (1.27%), 46 respondents in the 11-20 year-old range (29.29%), 44 respondents in the 21-30 year-old range (28.02%), 33 respondents in the 31-40 year-old range (21.01%), 17 respondents in the 41-50 year-old range (10.82%), 7 respondents in the 51-60 year-old range (4.45%), and eight respondents in the 61-70 year-old range (5.09%).

The most common fracture types were maxillary fractures accompanied by palatal fractures for 28.66%, followed by unilateral maxillary

fractures with Le Fort II fractures at 21.01%, and finally, Le Fort I fractures accounted for 11.46%. Additionally, 8.28% of the palate fractures were associated with Le Fort II fractures, 7.64% of the Le Fort I fractures were related to palatal fractures, and 1.27% of the Le Fort III fractures were associated with maxillary fractures.

Medical records revealed that 42.67% of patients who experienced maxillary trauma also sustained mild head injuries, 16.56% sustained serious head injuries, and 2.54% sustained severe head injuries (severe head injury). Also, based on the patient's medical histories, vehicle collisions accounted for 95.54% of cases, whereas falls accounted only for 4.45%.

Table 3: Patient Characteristics based on maxillofacial fractures types

Patient Characteristics	f(n)	Percentage (%)
Maxillofacial fractures		
Unilateral maxilla	33	21,01%
Maxilla + Palate	45	28,66%
Le fort I	18	11,46%
Le fort I + Palate	12	7,64%
Le fort II	33	21,01%
Le fort II + Palate	13	8,28%
Le fort III + Maxilla	2	1,27%

Table 4: Patient Characteristics based on head injury severity

Patient Characteristics	f(n)	Percentage (%)
Head injury		
Mild Head Injury	67	42,67%
Moderate Head Injury	26	16,56%
Severe Head Injury	4	2,54%

Table 5: Patient Characteristics based on injury mechanism

Patient Characteristics	f(n)	Percentage (%)
Mechanism		
Motor vehicle accident	150	95,54%
Fall	7	4,45%

Discussion

Accidents involving motor vehicles remained the leading cause of maxillofacial trauma and head

injuries in Indonesia. From 2010 to 2011, Dr. Soetomo Surabaya reported 102 patients with maxillofacial injuries due to traffic accidents 2010 to 2011, with a 79.1% occurrence rate; in 2012, this number increased to 113 patients, with 81.9%. In contrast, Andi Makkasau Hospital in Pare-Pare observed 90 cases of maxillofacial trauma related to traffic accidents in July and August 2013. This represented a rate of 74%. Hasan Sadikin Hospital is one of the main hospitals in the West Java Province that treat maxillofacial trauma.

This study was conducted by reviewing the medical records of oral surgery patients who experienced fractures of the maxillary bone at the ER Hasan Sadikin Hospital Bandung between January 2015 and December 2020 to describe the fracture characteristics that occurred in the maxillary region based on gender, age, type of maxillary fracture, the severity of the head injury, and mechanism of trauma. The research commission has approved this research of the Faculty of Medicine, Padjadjaran University.

Results indicated that 157 individuals (12.85%) out of 1,221 maxillofacial trauma patients had maxillary bone fractures (unilateral maxilla, Le Fort, palate). Male patients represented most of the patients, about seven times the number of female patients. Based on the causal mechanism, it can be determined that the mechanism of trauma to the maxillary region is mainly caused by traffic accidents, affecting 150 patients, and falls, affecting seven patients. This is consistent with research conducted in Brazil by Oliveira Campos *et al.* and in the United States by Lee *et al.* (13,14).

The majority of these fractures occurred in the age groups 11-20 years (46 patients), 21-30 years (44 patients), and 31-40 years (33 patients), with the lowest cases in the age group 0-10 years old (2 patients) and 51 to 60 (7 patients). This was plausible as the productive age groups typically had a higher activity level, and the outdoor activities were limited in the 0-10 and 51-60 age groups.

The leading cause of the high number of motor vehicle accidents is difficult to pinpoint. However, it can be attributed to various previously described factors, such as poor road conditions not suitable for the rise in the number of vehicles, driving safety levels, driving speeds that exceed safe limits, or helmet usage errors. Inadequate driving safety, carelessness or neglect of drivers while driving due to consuming alcohol or toxic drugs, poor driving habits, and socioeconomic conditions of drivers are also other vital factors of motor vehicle accidents. All of these causes necessitate substantial government funding for improving and reducing motor vehicle accidents.

Conclusion

From the research and data analysis conducted, it can be concluded that there were 157 maxillary fracture patients out of a total of 1221 maxillofacial trauma patients treated at the Oral and Maxillofacial Surgery Department of Hasan Sadikin General Hospital between January 2015 and December 2020. Male patients had greater incidences. The age group of 11 to 20 years had the highest incidence of maxillary fractures. Maxillary fractures accompanied by palatal fractures are the most prevalent, followed by Le Fort II fractures and unilateral maxillary fractures. As demonstrated in this study by the presence of mild head injuries in a number of cases, maxillary fractures can also be accompanied by head trauma. A traffic collision causes the greatest number of fractures. Additional research is required on the mechanism of maxillary fractures resulting from traffic accidents to measure the force, direction, impact mechanism, use of helmets, and types of helmets (half and full face).

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