

Characteristics of Middle Third Facial Fractures in the Emergency Departement of Hasan Sadikin Hospital Bandung

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Abstract: **Background:** Maxillofacial trauma is a physical condition that can occur in the hard and soft tissues of the face. The causes of maxillofacial trauma are varied, including traffic accidents, physical violence, falls, sports and gun trauma. An initial assessment of the severity of maxillofacial trauma is needed to determine and predict the next treatment plan. **Objective:** This study aims to determine the analysis of the characteristics, the tendency of trauma to the middle third of the face in the Emergency Installation of the Hasan Sadikin Teaching Hospital, Bandung Period January 2020 - January 2021. **Methods:** This study is a descriptive retrospective study using data from the medical records of patients with oral surgery in the Emergency Home Installation. Hasan Sadikin Hospital Bandung who experienced trauma in the middle third of the face in January 2020 - January 2021. **Results:** The data obtained were 31 samples. The majority of cases occurred in patients aged between 13-24 years (54.84%). The gender that often experienced fractures in one third of the face was male (90.32%). All cases were the result of direct trauma. The location of the midface fracture occurred mostly in the zygoma bone, as many as 21 patients (67.74%). It was found that 17 patients did not wear a helmet. **Conclusion:** Traffic accidents, especially by motorized vehicle drivers, often occur due to lack of attention from motorized vehicle drivers such as not wearing a helmet, driving a vehicle at high speed, causing fractures in the middle third of the face.

Keywords: Maxillofacial trauma, traffic accidents, Facial Fractures

1. Introduction

Maxillofacial fractures are fractures that can occur in the upper third, middle third and lower third of the face. The maxillofacial region is divided into three parts: the upper third consists of the frontal bone; the middle third consists of the maxilla, zygoma, lacrimal, nasal, palate; The lower third consists of the mandible.^{1,2}

Fractures in the middle third of the face can be caused by various causes including traumatic fractures. Direct trauma occurs on the patient's body parts directly. Indirect trauma occurs in patients who fall with the hands supported and the upper and lower arms straight. Stress fractures are fractures due to events that occur repeatedly and occur chronically in the bone, causing the bones to become weak and prone to fracture. Pathological fracture is a trauma that occurs due to a pathological process that causes the bone to become brittle and weak.²

Diagnosis in trauma patients, related to the mechanism of injury, symptoms, signs and special examination. In general, maxillofacial fractures are recognized clinically based on symptoms of pain, malocclusion and diplopia, malocclusion, deformity, sublingual hematoma, subconjunctival hemorrhage, epistaxis and abnormal mobility.^{3,4}

The location and pattern of maxillofacial fractures can be seen with plain radiographs at right angles and computed tomography scans (CT-scans), usually coronal or three-dimensional.⁵⁻⁷

The basic principle of fracture management is to enforce the airway first, then control the bleeding and then perform reduction, fixation and immobilization, to restore shape, function and occlusion with minimum morbidity. The objectives of these principles are satisfaction of facial restoration, functional satisfaction of patient's occlusion, satisfaction of jaw movement distance after treatment, no second surgery for facial contouring or malocclusion.^{4,8}

The Facial Injury Severity Scale (FISS) grading system was introduced by Bagheri in 2006. The assessment with this system is performed on each fracture and soft tissue laceration area of the face which is then summed to obtain the final score for the severity of facial trauma. The FISS score was used to evaluate the severity of facial trauma in patients. The use of this measurement scale is simple and easy, namely by adding up the fracture components found in the results of supporting examinations such as plain radiographs of the head, panoramic and head CT scans. The results of the assessment of the severity of trauma to the face are obtained in the form of a score. The more severe the trauma to the face, the higher the FISS score/scale.^{5-7,9}

2. Methods

This study was a descriptive retrospective study using medical records of patients with oral surgery at the emergency department of Hasan Sadikin Hospital Bandung who experienced trauma to the middle third face in January 2020 - January 2021. Diagnosis of fracture of the middle

third of the facetaken from the history, clinical examination and investigations.

The inclusion criteria in this study were the medical records of oral surgery patients at Hasan Sadikin Hospital, Bandung, who had fractures in the middle third of the face in January 2020 - January 2021 whose diagnosis could be established through anamnesis and supporting examinations. Exclusion criteria included medical records of fracture patients without the middle third of the face and medical records of fractured patients in the middle third of the face which were not equipped with Plain/Panoramaic/Waters/CT-Scan of the head.

3. Research Ethics

This research was conducted after being approved by the Health Research Ethics Committee of Hasan Sadikin Central General Hospital Bandung. This study uses research subjects medical record data and oral surgery watchkeeping reports, therefore there may be problems in the form of incomplete data. This problem can be overcome by collecting data professionally and according to standard operating procedures. All research information and data will be collected completely.

4. Results

The data obtained were 31 samples. From the results of the study it was found that there were 0 patients aged 0-12 years or 0.00%, the age group of 13-24 years were 17 people or 54.84%, the age group of 25-36 years were 8 people or 25.81%, the age group 37-48 as many as 3 people or 9.68%, and the age group over 48 years as many as 3 people or 9.68%. The majority occurred in patients aged between 13-24 years. The gender that often experienced fractures in one third of the face was male as many as 28 patients or 90.32% with the remaining 3 patients or 9.68% female. (Table 1 and 2)

Table 1: Characteristics by Age

Characteristics	Frequency (n=31)	Proportion (%)
Age		
0-12 years old	0	0,00%
13-24 years old	17	54,84%
25-36 years old	8	25,81%
37-48 years old	3	9,68%
>48 years old	3	9,68%

Table 1: Characteristics by Gender

Characteristics	Frequency (n=31)	Proportion (%)
Gender		
Male	28	90,32%
Female	3	9,68%

In this study, there were 5 patients or 16.13% not working, 12 patients or 38.71% as students, 2 patients or 6.45% as housewives, 8 patients or 25.81% as private employees, 2 patients or 6.45% work as self-employed and 2 patients or 6.45% are retirees (Table 3).

All patients had a direct traumatic cause (Table 4). There are 13 patients (41.94%) had trauma located in the nasal

bone, 20 (64.52%) located in the orbital bone, 18 (58.06%) located in the maxillary bone, 21 (67.74%) located in the zygoma bone, 4 (12.90%) located in the palate, and 7 (22.58%) located in the maxillary alveolus.

Table 2: Characteristics by Occupation

Characteristics	Frequency (n=31)	Proportion (%)
Occupation		
Not yet working	5	16,13%
Student	12	38,71%
Housewife	2	6,45%
Private sector employee	8	25,81%
Government employees	0	0,00%
Self-employed	2	6,45%
Retired	2	6,45%
Others	0	0,00%

Table 4: Characteristics Based on Cause

Characteristics	Frequency (n=31)	Proportion (%)
Cause		
Traumatic		
Direct	31	100,00%

Table 5: Characteristics Based on Location

Characteristics	Frequency (n=31)	Proportion (%)
Location		
Nasal	13	41,94%
Orbita	20	64,52%
Maxilla	18	58,06%
Zygoma	21	67,74%
Palate	4	12,90%
Maxillary Alveoli	7	22,58%
Total	83	

Patients who was wearing a helmet were 14 patients (45.16%) while the remaining 17 patients (54.84%) did not wear a helmet (Table 6). 1 patient or 3.23% had a serial trauma investigation modality, 1 patient had a panoramic x-ray, 4 patients or 12.90% had water x-ray, 20 patients or 64.52% had a plain head scan, and 16 patients or 51.61% had a CT scan of the head (Table 7). Based on severity, 2 patients or 6.45% had mild severity, 23 patients or 74.19% had moderate severity, and the remaining 6 patients or 19.35% had severe severity. Patients with fractures of the middle third of the face underwent therapy as many as 24 patients or 77.42% underwent surgery in the Emergency Room, 4 patients or 12.90% underwent observation, 21 patients or 67.74% underwent closed reduction, and no patient underwent open reduction (Table 8 and 9).

Table 6: Characteristics Based on History of Helmet Use

Characteristics	Frequency (n=31)	Proportion (%)
History of Helmet Use		
Yes		
Half Face	14	45,16%
Full Face	0	0,00%
No	17	54,84%
Total	31	

Table 7: Characteristics Based on Imaging

Characteristics	Frequency (n=31)	Proportion (%)
Imaging		
Serial Trauma	1	3,23%
Panoramic	1	3,23%
Waters	4	12,90%
Plain Scan of the Head	20	64,52%
CT Scan Head	16	51,61%
Total	42	

Table 8: Characteristics Based on Severity

Characteristics	Frequency (n=31)	Proportion (%)
Severity		
Mild	2	6,45%
Moderate	23	74,19%
Severe	6	19,35%

Table 9: Characteristics Based on Treatment

Characteristics	Frequency (n=31)	Proportion (%)
Treatment		
Emergency Installation	24	77,42%
Observation	4	12,90%
Closed Reduction	21	67,74%
Open Reduction	0	0,00%

5. Discussion

This study on the characteristics of patients with trauma to the middle third of the face at the Surgical Emergency Installation at Hasan Sadikin General Hospital from January 2020 to January 2021 used a descriptive method that was conducted based on data collection from patient medical records. The results of this study identified the characteristics of trauma patients in the middle third of the face based on age, gender, occupation, cause, location, history of helmet use, investigations, severity, and therapy. From the results of the study, it was found that the number of samples of trauma in the middle third of the face at the Emergency Installation of Hasan Sadikin General Hospital from January to February 2022 were 31 samples.

Age and sex factors were associated with the incidence of midface fracture. The productive age group, namely adolescents to adults, had relatively higher fractures in the middle third of the face. A study conducted in India revealed that the peak incidence of maxillofacial fractures occurred in the 21–30 year age group, with mean age of 29.6 years.² Many other study supported this finding especially in developing country. This study also find that the percentage of patients based on occupation shows that the largest number is found in students as many as 12 patients, which also mostly in productive age group. This is due to the large number of students who drive motorbikes. The possible explanation for this was that younger persons involved in intense social interaction and higher rate of mobility, drive motor vehicles carelessly making them more susceptible to road transport accident and interpersonal assault. In developing countries, the lack of traffic regulations as well as poor road infrastructure and old vehicles without safety features influence the prevalence of maxillofacial injuries.¹⁰

In this study, the gender that often experienced midface fracture was male incidence rate as high as 28 patients or 90.32%. Only 3 patients or 9.68% were female. This can be

attributed to the fact that men are mostly involved in work outside, routines with high mobilization, motorized driving activities, more sports professions than women.^{1,3}

Cultural and socioeconomic characteristics have significant influence in gender distribution of maxillofacial injuries. In countries where females participate widely in social activities, the male-to-female ratios for the occurrence of maxillofacial trauma were reduced to 2:1. Conversely, in a study conducted in Saudi Arabia, where men usually do outdoor work and few women driveshowed that 78% of men experienced more maxillofacial fractures than women.²

The cause of midface fracture showed that all 31 patients had direct traumatic causes. Many studies especially those conducted in developing countries stated that incidence of accidents in motorized driving is one of the causes of maxillofacial trauma. Falls, sports, occupational accidents, and gunshot wounds comprise a smaller percentage.^{1,3}

Patient with midface fracture most occurred in patients who did not use a helmet when driving a motorcycle, with as many as 17 (54,84%) patients in this study. The advances in automotive safety technology, such as safety belts, have been shown to reduce the incidence of facial fractures and lacerations, whereas non-use of current safety features increases the risk of sustaining facial fractures and panfacial fractures.¹⁰

The percentage of patients based on the location of the trauma showed that the largest number was found in fractures of the zygoma bone as many as 21 patients, fractures of the orbital bone as many as 20 patients and fractures of the maxilla as many as 18 patients. Ascani et al.² reported mandible fractures in 31% and zygomatic bone fractures in 22% with the most common cause of the maxillofacial fractures road traffic accidents. Almost the same percentage of mandible and zygomatic bone fractures were reported in other study with road traffic accidents as the main cause of injuries.³ However, Arslan et al.¹⁰ found that in a midface fracture caused by violence, most of bone fractures found in his study were maxillary bone fractures (30%). Therefore, different aetiology affected different site of the fracture.

In this study, the patients underwent additional investigations, the most supporting examinations in patients with fractures of the middle third of the face were plain radiographs of the head, as many as 20 patients. Facial Injury Severity Score (FISS) is a scoring system that can be used to assess the severity of maxillofacial trauma by adding up the fracture components identified through clinical examination results and supporting examinations in the form of plain head photos, panoramic photos and head CT scans. It has been pointed out that one of the advantages of CT in the evaluation of maxillary fractures is in identifying fractures of the cribriform plate. Some studies have also reported that CT is superior to CM for imaging the frontal process of maxilla, pterygoid plate fractures and comminuted fractures of the maxillary sinus walls.⁹

All injury conditions were included in the Facial Injury Severity Score (FISS) scoring system, based on severity,

indicating that the highest number was in moderate severity as many as 23 patients. Patients who experienced fractures in the middle third of the face were treated in the Emergency Room for the most treatment, namely closed reduction measures as many as 21 patients. In isolated zygomatic fractures, the necessity of reduction and/ or fixation is dependent on the degree of displacement and impairment of function.^{11,12}

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6. Conclusion

Traffic accidents, especially by motorcyclists, often occur due to lack of attention from motorized vehicle drivers such as not wearing a helmet, driving a vehicle at high speed, causing fractures in the middle third of the face.

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