Research

Clinical characteristics of maxillofacial fracture patients in Dr. M. Djamil General Hospital Padang

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ABSTRACT

Background: Maxillofacial fracture consists of several types of fractures depending on their location. Traffic accidents are the most common cause of these cases. The choice of management given in maxillofacial fractures is divided into immediate and planned delayed management, depending on the condition of the injured tissue. **Purpose:** To describe the clinical characteristics of maxillofacial fracture in the Department of Otorhinolaryngology Faculty of Medicine Universitas Andalas/Dr. M. Djamil General Hospital Padang, in 2020 to 2022. **Method:** A descriptive study with retrospective approach. The study was conducted by collecting data from the medical record section by using a total sampling technique (59 patients) from 2020 to 2022. **Result:** The highest cause was traffic accidents (49.2%), the most common findings were nasal bone fracture (44.1%), with operative management (82.4%). **Conclusion:** Maxillofacial fractures were most commonly experienced by the young age group and caused by traffic accidents, therefore driving safety and driver compliance should be more emphasized.

Keywords: maxillofacial fracture, ORIF (Open Reduction Internal Fixation), septorhinoplasty, septoplasty, rhinoplasty

ABSTRAK

Latar belakang: *Fraktur maksilofasial terdiri dari beberapa jenis fraktur tergantung lokasinya. Kecelakaan lalu lintas menjadi penyebab tersering dari kasus ini. Pemilihan tatalaksana yang diberikan pada fraktur maksilofasial dibagi menjadi tatalaksana segera dan tatalaksana lanjutan terencana, tergantung dari kondisi jaringan yang terluka.* ***Tujuan:*** *Untuk mengetahui karakteristik klinis pasien fraktur maksilofasial di Departemen THT-BKL FK Unand/RSUP Dr. M. Djamil Padang, dari 2020 sampai 2022.* ***Metode:*** *Penelitian ini bersifat deskriptif dengan pendekatan retrospektif. Penelitian dilakukan dengan pengambilan data di bagian rekam medik dengan teknik* total sampling *dan didapatkan sampel sebanyak 59 pasien pada tahun 2020 sampai 2022.* ***Hasil:*** *kelompok usia paling sering adalah 16-30 tahun (54.2%), dengan jenis kelamin terbanyak adalah laki-laki (76.3%), penyebab tersering adalah kecelakaan lalu lintas (4.2%), jenis fraktur tersering adalah fraktur tulang hidung (44.1%), dan tatalaksana paling sering adalah tatalaksana operatif (82.4%)* ***Kesimpulan:*** *Fraktur maksilofasial paling sering dialami oleh kelompok usia remaja dan disebabkan kecelakaan lalu lintas, oleh karena itu keselamatan dan kepatuhan berkendara perlu lebih diperhatikan dan ditingkatkan.*

Kata kunci: *fraktur maksilofasial,* ORIF (Open Reduction Internal Fixation)*, septorinoplasti, septoplasti, rinoplasti*

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INTRODUCTION

Maxillofacial fractures consist of several types of fractures depending on the location, which are nasal bone fracture, zygomatic bone and zygomatic arch fracture, maxillary bone fracture, orbital bone fracture, and mandibular bone fracture.[1] Maxillofacial fractures are most commonly caused by traffic accidents. Based on data from the *Regional Statistic Board* in West Sumatra, there were 2.554 cases of traffic accidents in 2020, 2.973 cases in 2021, and 2.956 cases in 2022. This condition indicated that traffic accidents with the possibility of maxillofacial fractures remained high.[2] The study conducted at the Regional General Hospital of West Nusa Tenggara Province also found that 91.43% of craniofacial trauma patients were caused by traffic accidents.[3]

Kanala et al.[4] found that the ratio of men and women in the incidence of maxillofacial fractures was 8:1, the average age of patients was 32 years old, the most common cause was traffic accidents 70% of cases, 19% of cases due to falls, 9% due to attacks from unknown people, and 2% of other causes. However, during the Covid-19 pandemic there had been changes in the etiology and number of patient visits for maxillofacial fractures. The study conducted by Salzano et al.[5] found that the most common cause of maxillofacial fractures during the Covid-19 pandemic was due to falls (50.7%), and there was a decrease in the number of patients visits from 235 patients in 2019 to only 73 patients in 2020 (69.1%).

The most common facial trauma is a nasal bone fracture which often results in an impact on the structure or function of the nose.[6] Zigomaticomaxillary fractures are the second most common facial trauma due to their prominent location and shape, while orbital fractures are the third most common facial trauma and usually associated with blunt trauma to the eye.[7,8] Pati et al.[9] found that the incidence of Naso-Orbito Et hmoid (NOE) fractures was 4.36%.

Maxillofacial fractures may result in a variety of abnormalities, such as airway obstruction, or heavy bleeding resulting in shock which leads to death, decreased function and facial deformities, and might be worsening morbidity rates.[1,10] Specific management for maxillofacial fractures could be immediate and delayed, with the choice of management depending on the condition of the injured tissue.[1]

There was a limited data on West Sumatra-related maxillofacial fractures and their clinical therapies, and no specific research conducted yet in the Ear, Nose, Throat (ENT) Department of Dr. M. Djamil General Hospital, Padang. We aimed to obtain the clinical characteristics of patients with maxillofacial fractures and the management of the cases.

METHOD

A descriptive study with retrospective approach by collecting data through the medical records of patients with maxillofacial fractures in the ENT Department of Dr. M. Djamil General Hospital Padang in 2020-2022. This research was conducted from August to September 2023. The population in this study were all maxillofacial fractures cases at the ENT Department of Dr. M. Djamil General Hospital Padang from January

1st, 2020 until December 31st, 2022 (59 patients). The study samples were obtained by using a total sampling method that met the inclusion criteria. The inclusion criteria were maxillofacial fracture patients in the Facial Plastic and Reconstruction Division of the ENT Department of Dr. M. Djamil General Hospital Padang for the period January 2020 – December 2022. The exclusion criteria were unobservable patients, or incomplete data.

The data collected were basic demographic data on medical records (age, gender, etiology, type of fracture, and patient management). We used univariate and the data were presented in frequency distribution tables.

Our study had been approved by a research permit from Dr. M. Djamil General Hospital, Padang (DP.03.01.XVI.1.3.2/1440/ VIII/2023). We also gained ethical approval from the ethical board committee review from Dr. M. Djamil General Hospital, Padang (LB.02.02/5.7/376/2023).

RESULT

The number of patients recorded with maxillofacial fracture in the Facial Plastic and Reconstruction Division of The ENT Department of Dr. M Djamil General Hospital Padang were 64 patients during the study period. However, after data collection at the Medical Record Installation, there was 5 incomplete data records. The final number of samples in this study was 59 patients.

Based on their age, patients were grouped into five categories. The most common age range was 16-30 years old (32 patients), followed by the age group of 31-45 years and 46-60 years, with 9 patients respectively. (Table 1)

We found most patients with maxillofacial fractures were male; out of 59 patients, 45 of them were male and only 14 patients were female. (Table 2). The etiology was grouped into traffic accidents, non-traffic accidents and unknown trauma mechanisms. The results showed most common cause was traffic accidents (29 cases) with 24 of them riding motorcycles. There were 17 cases with non-traffic accident causes, and 13 cases with unknown causes or mechanisms of trauma. (Table 3). The most common type was nasal bone fracture (26 cases), followed by multiple facial fractures (16 cases). The least common fracture types were NOE fracture and mandibular fracture with 1 in each case. (Table 4). The most common treatment given to patients was operative treatment (49 times) with ORIF procedures being the most common procedure performed (23 procedures) followed by Septorhinoplasty (18 procedures). (Table 5)

Table 1. Frequency distribution of maxillofacial fractures patients by age

Age	N	(%)
0-15 years	7	11.9
16-30 years	32	54.2
31-45 years	9	15.3
46-60 years	9	15.3
> 60 years	2	3.4

Table 2. Frequency distribution of maxillofacial fractures patients by gender

Gender	N	(%)
Male	45	76.3
Female	14	23.7

Table 3. Frequency distribution of maxillofacial fractures patients by etiology

Etiology	N	(%)
Traffic Accidents	29	49.2
Car	2	3.4
Motorcycle	24	40.7
Unclear mechanism	3	5.1
Non traffic accidents	17	28.8
Falls	10	16.9
Sharp trauma	1	1.7
Blunt trauma	3	5.1
Sport injuries	3	5.1
Unknown mechanism	13	22

Table 4. Frequency distribution of maxillofacial fractures patients by fracture type

Fracture Type	N	(%)
Nasal bone fracture	26	44.1
Le Fort fracture/Maxillary fracture and ZMC fracture	12	20.4
Blow out fracture	3	5.1
NOE fracture	1	1.7
Mandibular fracture	1	1.7
Multiple face fracture	16	27.1

Table 5. Frequency distribution of maxillofacial fractures patients by management

Management	N	(%)
Operative	49	82.4
ORIF	23	39.0
Septoplasty	1	1.7
Rhinoplasty	1	1.7
Septorhinoplasty	18	30.5
Combined	6	10.2
Non-operative (conservative)	10	16.9

DISCUSSION

Our study found maxillofacial fracture patients were mostly in the age range of 16-30 years. Menon et al.[11] also found similar findings. The high level of mobilization and use of motorcycles compared to cars in the second and third decades makes them became most vulnerable age group susceptible to trauma.[12] The increased risk of trauma in younger age groups is also related to their social life and economic activities.[13] *Regional Statistic Board* in Jakarta in 2016 found that the age range group of 16-30 years largely detected as the traffic accident victims (1634 out of a total of 4156 cases).[14]

Males were predominantly affected by maxillofacial fractures. This might be caused by the influence of high physical activity such as driving, and the vulnerability to be the victim of interpersonal violence.[12] The more aggressive nature of men and activities that increase their risk of trauma such as sports, lack of caution in driving, and more active social life also tend to be rationalizing the reason men suffer more maxillofacial fractures than women.[15]

The most common cause of maxillofacial fractures was traffic accidents mainly motorcycle accidents. Wusiman et al.[16] also found that traffic accidents mainly led to maxillofacial fracture. Fractures of the middle third of the face usually result from various trauma, and can occur as isolated fracture or in combination with other fractures.[17] The increasing incidence of maxillofacial fractures, mortality, and morbidity in young age groups in developing countries is closely related to traffic accidents.[18] This might be caused by several things such as a negligence of driving safety, inadequate road conditions, traffic violations, or not using helmets and seat belts.[18,19]

Out of the 59 patients with maxillofacial fractures, 26 patients had nasal bone fractures, followed by multiple facial fractures in 16 cases. However, Salzano et al.[5] found that the most common type of maxillofacial fracture was mandibular fracture (35.4%) followed by nasal bone fracture (22.5%). Barreto et al.[15] also found that mandibular fractures were the most common type of maxillofacial fracture (24.3%), followed by nasal bone fractures (17.3%). Menon et al.[11] found that 14.94% of maxillofacial fractures were multiple fractures. The findings in our study, there was only 1 case of mandibular fracture. The limited number of mandibular fractures recorded might be influenced by the fact that the ENT Department is not the only department that handles these maxillofacial fracture cases. The incidence of nasal bone fracture was higher than mandibular fractures, orbital fractures, and maxillary fractures in high-energy injury mechanisms caused by motor vehicle accidents, and low-energy injuries such as falls, and violence.[20] This was in accordance with the results of our study which found that the most common mechanism of injury experienced by patients was motor vehicle accidents, followed by falls, with nasal bone fracture as the most common case.

Operative treatment with open reduction and internal fixation (ORIF) was the most frequently performed management. The selection of appropriate measures for patients with maxillofacial fractures is important because of its aesthetic function, and maintaining anatomical function. ORIF has several advantages such as helping bone union quicker with minimal callus formation, preventing poor oral hygiene, maintaining jaw function, and reducing the risk of difficulty speaking in the future.[16,18] ORIF with miniplate and screw is the surgical procedure preference for maxillofacial fracture management, due to better bone fixation and more stable function.[21] The second operative procedure that was mainly performed in this study was septorhinoplasty because most of the fracture types experienced by patients were nasal bone fractures. Mahato et al.[22] found that the prevalence of septorhinoplasty was 2.03%. Septorhinoplasty is a surgical procedure that aims to improve the nose in terms of function (nasal obstruction) and shape (external deformity).[23]

This study concluded that maxillofacial fractures were commonly experienced by the young age group with male gender, and were caused by traffic accidents. Increasing awareness of traffic rules is needed to reduce the incidence of maxillofacial fractures caused by traffic accidents, and the use of safety equipment such as helmets and seatbelts needs to be emphasized.

REFERENCE

1. Soepardi EA, Iskandar N, Bashiruddin J, Restuti RD. Buku Ajar Ilmu Kesehatan Telinga Hidung Tenggorokan Kepala & Leher FK UI. Dalam: Trauma Muka dan Leher. 7th ed. Indonesia: Universitas Indonesia Publishing; 2020. p.179–186.
2. Badan Pusat Statistik (BPS) Provinsi Sumatera Barat. Data Kecelakaan Lalu Lintas yang Terjadi di Sumatera Barat 2020-2022 [Internet]. 2022. Available from :https://sumbar.bps.go.id/indicator/34/536/1/data-kecelakaan-lalu-lintas-yang-terjadi-di-

provinsi-sumatera-barat.html

3. Chaeruddin MBS, Istikharoh U. Gambaran Epidemiologi Kasus Trauma Kraniofasial di RSUD Provinsi NTB Pada September 2018 - September 2019. J Kedokt. 2020; 9(1):37–42.
4. Kanala S, Gudipalli S, Perumalla P, Jagalanki K, Polamarasetty PV, Guntaka S, et al. Aetiology, prevalence, fracture site and management of maxillofacial trauma. Ann R Coll Surg Engl. 2021; 103(1):18–22.
5. Salzano G, Orabona GDA, Audino G, Vaira LA, Trevisiol L, D'Agostino A, et al. Have There Been any Changes in the Epidemiology and Etiology of Maxillofacial Trauma during the COVID-19 Pandemic? An Italian Multicenter Study. J Craniofac Surg. 2021; 32(4):1445–7.
6. Park YJ, Do GC, Kwon GH, Ryu WS, Lee KS, Kim NG. Quality of life of patients with nasal bone fracture after closed reduction. Arch Craniofacial Surg. 2020; 21(5):283–7.
7. Aman HM, Alenezi A, Ducic Y, Reddy L V. Secondary Reconstruction of the Zygomaticomaxillary Complex. Semin Plast Surg. 2020; 34(4):254–9.
8. Døving M, Lindal FP, Mjøen E, Galteland P. Orbital fractures. Orbitafrakturer. Tidsskr Nor Laegeforen. 2022; 142(6). Doi:10.4045/tidsskr.21.0586
9. Pati D, Mishra N, Kar I, Meher B, Samal D, Rath KC. Nasoorbitoethmoid fractures in a tertiary care hospital of eastern India: A prospective study. Natl J Maxillofac Surg. 2021; 12(1):42–9.
10. Corrales-Reyes IE, Chaple-Gil AM, Morales-Navarro D, Castro-Rodríguez YA, Mejia CR. Maxillofacial fractures surgically treated: a 3-year experience of a Cuban hospital. Cir y Cir English Ed. 2021; 89(6):740–7.
11. Menon S, Sham ME, Kumar V, Archana S, Nath P, Shivakotee S, et al. Maxillofacial Fracture Patterns in Road Traffic Accidents. Ann Maxillofac Surg. 2019; 9(1):345–8.
12. Shivakotee S, Menon S, Sham ME, Kumar V, Archana S. Midface fracture pattern in a tertiary care hospital – A prospective study. Natl J Maxillofac Surg. 2022; 13:238–42.
13. Asiri A, Algoblan D, Asiri E, Albishi S, Al Salamah M. Trends of maxillofacial and mandibular fractures in level I and II trauma patients in a tertiary hospital in Saudi Arabia. Saudi Dent J. 2022; 34(8):772–8.
14. Badan Pusat Statistik (BPS) Provinsi DKI Jakarta. Jumlah Korban Kecelakaan Lalu Lintas Menurut Kelompok Umur di Provinsi DKI Jakarta 2016 [Internet]. Available from: https://jakarta.bps.go.id/indicator/34/589/1/jumlah-korban-kecelakaan-lalu-lintas-menurut-kelompok-umur-di-provinsi-dki-jakarta.html
15. Barreto SBL, Castro GG, Carvalho CN, Ferreira MC. Cases of Maxillofacial Trauma Treated at Hospitals in a Large City in Northeastern Brazil: Cross-Sectional Study. Int J Environ Res Public Health. 2022; 19(24).
16. Wusiman P, Maimaitituerxun B, Guli, Saimaiti A, Moming A. Epidemiology and Pattern of Oral and Maxillofacial Trauma. J Craniofac Surg. 2020; 31(5):517–20.
17. Lestari DY, Hafiz A, Huriyati E. Diagnosis dan Penatalaksanaan Fraktur Le Fort I-II disertai Fraktur Palatoalveolar Sederhana. J Kesehat Andalas. 2018; 7(Supplement 3):78-84.
18. Chandra L, Deepa D, Atri M, Pandey S, Passi D, Goyal J, et al. A retrospective cross-sectional study of maxillofacial trauma in Delhi-NCR Region. Fam Med Prim Care Rev; 2019. p. 1453–9.
19. Khan TU, Rahat S, Khan ZA, Shahid L, Banouri SS, Muhammad N. Etiology and pattern of maxillofacial trauma. PLoS One. 2022; 17(9):1–10.
20. Epstein S, Ettinger RE. Nasal and Naso-orbito-ethmoid Fractures. Semin Plast Surg. 2021; 35(4):263–8.
21. Hafiz A, Lestari DY. Diagnosis dan Penatalaksanaan Fraktur Tulang-Tulang Wajah. Dalam: Fraktur Le Fort. Indonesia: LPPM - Universitas Andalas; 2021. p.49–63.
22. Mahat o NB, Regm i D, Bi sta M. Septorhinoplasty among patients who visited the outpatient department of otolaryngology-head and neck surgery of a tertiary care center: A descriptive cross-sectional study. JNMA J Nepal Med Assoc. 2021; 59(237):432–6.
23. Sasindran V, Harikrishan B, Mathew N. Cosmetic and Functional Outcomes of Septorhinoplasty. Indian J Otolaryngol Head Neck Surg. 2020; 72(2):194–9.