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Characteristics of Midfacial FractureIn Oral and Maxillofacial Surgery Department at Hasan Sadikin General Hospital

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Abstract

Objective: Maxillofacial trauma is a physical trauma of hard and soft tissues of the face. Midfacial fractures cause functional failure, facial asymmetry, and decreased quality of life. The incidence of fractures was high because of the anatomical configuration of prominent bones. The aim was to determine the characteristics of midfacial fractures at the Oral and maxillofacial surgery department RSHS Bandung from January – December 2019

Materials and Methods: This is a quantitative descriptive retrospective study with samples of all midfacial fractures from the total population of oromaxillofacial trauma at the Oral and maxillofacial surgery department RSHS Bandung from January - December 2019.

Results: 166 patients with maxillofacial trauma, there were 78 patients with midfacial involvement with the most fracture locations in the zygoma 64.103%, the most complex fractures were Le Fort-2 fractures 11.54 %, the majority of trauma isolated in the midfacial 53% and 47% accompanied by trauma from another region, the most accompanied by trauma to the mandible bone by 34.62%.

Conclusion: Zygoma fracture was the most common fracture due to the anatomical configuration of the prominent midfacial bone

Keywords: Trauma, fracture, midfacial

Introduction

Maxillofacial trauma is a physical trauma that can affect the hard and soft tissues of the face. Traffic accidents cause maxillofacial trauma with the highest percentage of disability and death in adults under 50 years and with the most significant prevalence, usually affecting the age limit of 21-30 years.[1,2]

The severity of maxillofacial trauma is highly dependent on the mechanism of injury, the maxillofacial anatomical deformity involved, and the function of organ systems related to maxillofacial structures. An initial assessment of the severity of maxillofacial trauma is necessary to define and predict a treatment plan. This study aims to determine the characteristics of midfacial trauma at the Hasan Sadikin Hospital in Bandung from January 2019 – December 2019.

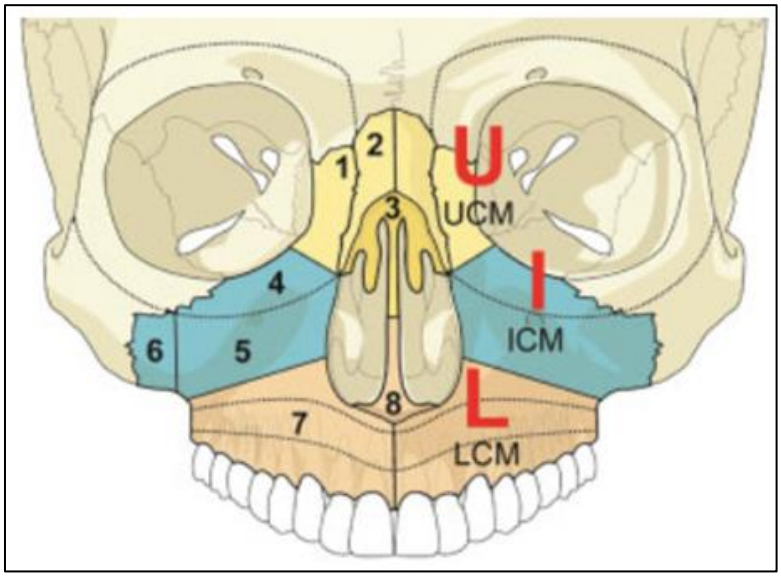


Figure 1: Fractures of the middle third of the face can be classified

Figure 1: Central midface subdivisions. UCM, upper central midface:1, frontonasal maxillary process /medial orbital rim; 2, nasal bone; 3,upper nasal septum/ethmoidal perpendicular plate;ICM,intermediatecentral midface: 4, medial part of the inferior orbital rim (i.e.,infraorbital margin of the maxilla—the entire orbital rim is marked as a band-like outer ring around the orbital opening); 5, anterior antralwall and parapiriform buttress; 6, area of zygomatico-maxillary crest (ZMC) —ICM part; LCM, lower central midface: 7, maxillary alveolar process with two reference lines indicating potential degrees of atrophy in edentulism; 8, lower nasal septum/vomer. The division line between UCM and ICM coincides with the demarcation between themedial and the inferior orbital ri m in the inferomedial quadran

Nasal-Orbital-Ethmoid Fracture (NOE)

According to Markowitz and Manson, NOE fractures can be classified into 3 types:[3,4]

1. Type I: MCT (Medial Canthal Tendon) attaches to a large central fragment.
2. Type II: MCT attaches to fragments large enough to allow osteosynthesis.
3. Type III: MCT attached to the center of the fragment is too small to allow for osteosynthesis or has been completely detached.

Zygomatic Complex Fracture

The zygomatic bones are closely related to the maxillary, frontal, and temporal bones, and they are usually involved when a zygomatic fracture occurs, this type of fracture is called a zygomaticomaxillary complex fracture. 5 Classification of complex zygomatic fractures according to Rowe and Killey: [5,6]

Type I: There is no significant displacement.
Type II: Fracture of the zygomatic arch.
Type III: Rotation about a vertical axis.
Type IV: Rotation about the longitudinal axis.
Type V: En bloc complex displacement.
Type VI: Displacement of the orbitoantral partition.
Type VII: Displacement of a segment of the orbital rim.
Type VIII: Comminuted complex fracture

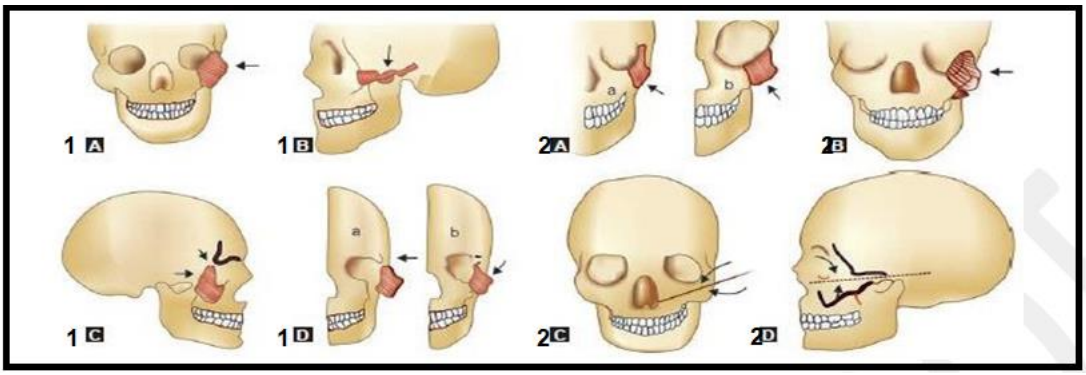


Figure 2: Rowe and Killey's classification of zygomatic complex fractures. (1A) Type I, (1B) Type II, (1C) Type III, (1D) Type IV (a) Exit from zygomatic prominence (b) Enters zygomatic prominence, (2A) Type V (a) Above infraorbital margin (b) Out of zygomaticofrontal suture, (2B) Complex fracture, (2C,2D) Direction of force.[3]

Maxillary Fracture

Renee Le Fort developed a classification into three types of fractures:[7]

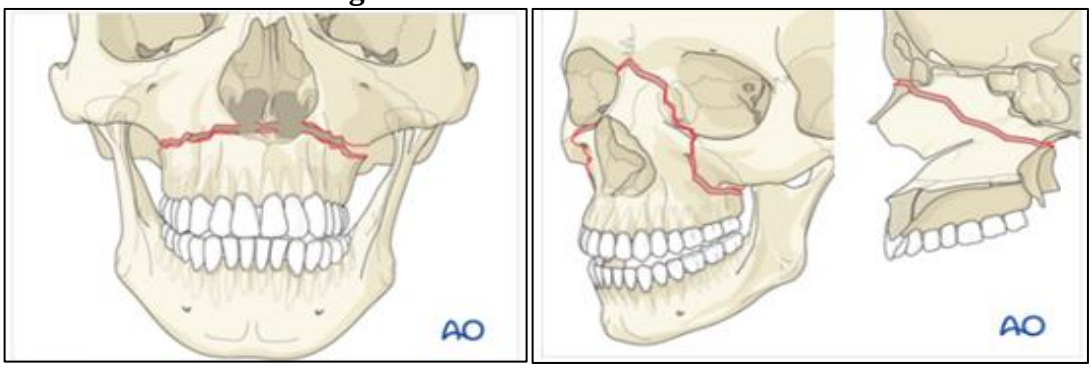
Le Fort I

Le Fort I/Guerin fracture occurs due to horizontal forces on the maxilla, fractures the maxilla through the maxillary sinus and along the floor of the nose, separating the maxilla from the pterygoid plates and nasal and zygomatic structures.[7]

Le Fort II

The force in a superior direction results in a Le Fort II fracture/pyramidal fracture, separating the maxillary and nasal complexes from the orbital and zygomatic structures.[7]

Figure 3: Lefort fracture classification.



3a. Lefort 1 **3b. Lefort II**

Nasal Fracture

The nasal bones are small and thin and are the most common site of fracture of the facial bones. [8] Simple classification system based on clinical findings consists of Lateral deviation fracture, Posterior depressed fracture, Upper lateral cartilage disarticulation, Anterior nasal spine fracture, Nasal septum involvement.

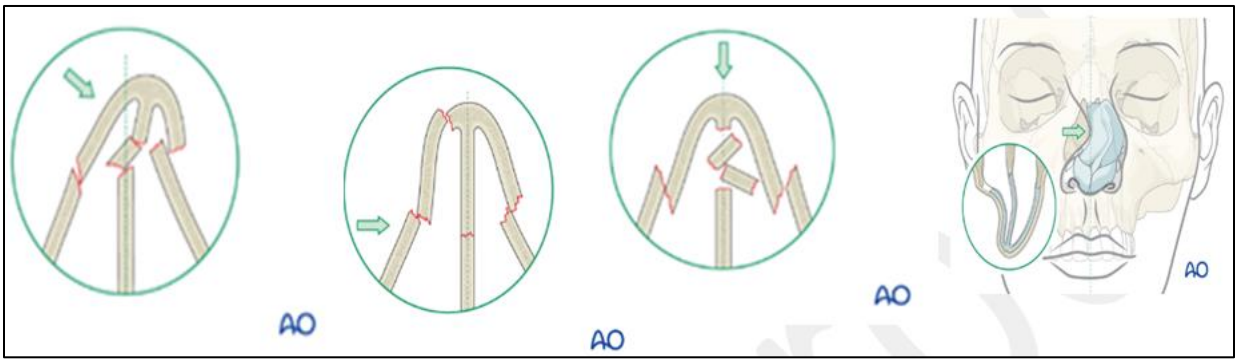


Figure 4: Nasal Fracture Classification. 4a, b. Lateral deviation, 4c. Posterior depression. 4d. Upper lateral cartilage disarticulation[8]

Materials and Research Methods

The target population in this descriptive study was oral surgery patients at Hasan Sadikin Hospital in Bandung who experienced oromaxillofacial trauma in January - December 2019. The diagnosis of maxillofacial fractures was taken from anamnesis, physical examination, and imaging. The data needed in this study were obtained from patient medical records.

This research is a quantitative descriptive retrospective study with research variables consisting of age, gender, location of trauma, history of using helmet, clinical examination, trauma from another region, supporting examinations, and severity, which was carried out after being approved by the Health Research Ethics Committee at Hasan sadikin General Hospital Bandung, with research sequences in the form of collecting patient data, submitting requests for borrowing patient medical records that have been recorded to the medical record field, identifying diagnoses of midfacial trauma patients according to medical record data, recapitulating data that has been collected in Microsoft Excel format, processing, analyzing and discuss research results.

Results

From 166 cases of maxillofacial fracture, there were 78 people based on the total population of oral surgery patients at Hasan Sadikin Hospital, Bandung, who had fractures with midfacial involvement. The majority gender was male, with a percentage of 85.897% of the total 78 patients studied and only 14.10% female patients. The highest age range is in the age range of 13-24 years, with a percentage of 51.28%, and the rest are in the age range of 25-36 years to more than 48 years.

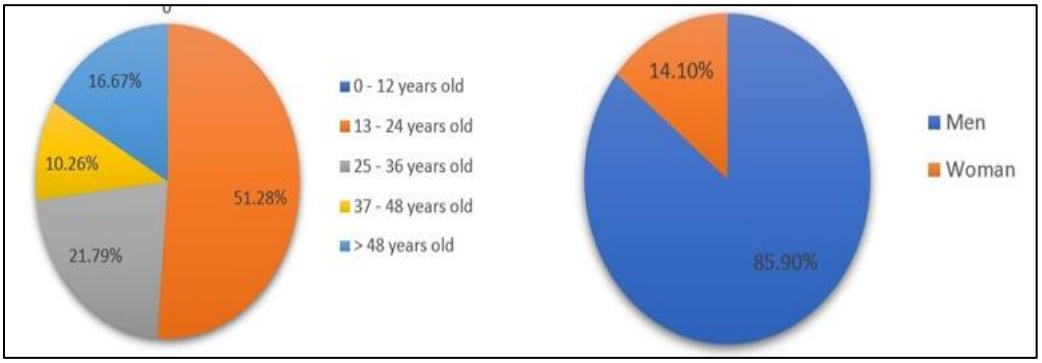


Diagram 1, 2: Characteristics Based on Age and Gender

The most fracture location was the zygoma bone with a percentage of 64.103%, second to the orbital bone at 46.15%, then the maxillary alveolar bone 30.77%, the maxillary bone 28.21%, the nasal bone 20.51% and the palate bone 19.23%. The most complex fractures were Le fort 2 fractures 11.54%, le fort 1 8.97%, and NOE fractures 6.41%.

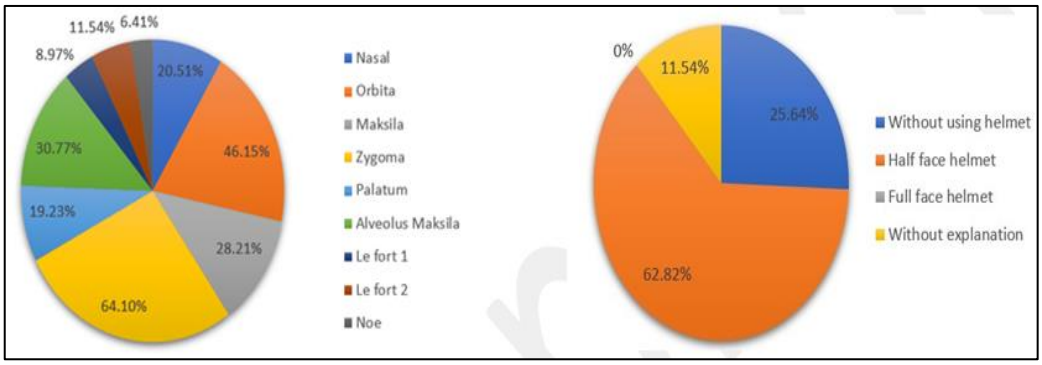


Diagram 3, 4: Characteristics based on Location and History of using Helmet

Most of the patients used half-face helmet 62.82%, 25.64% did not use a helmet, and 11.54% did not know whether they wore a helmet. The presence of trauma on other location than midfacial experienced by most patients was midfacial trauma (34.62%), followed by trauma to the cranium o=(29.49%), extremities (15.38%), frontal trauma (14.01%), thorax (6.41%), abdomen (2.56%) and the pelvis (1.28%).

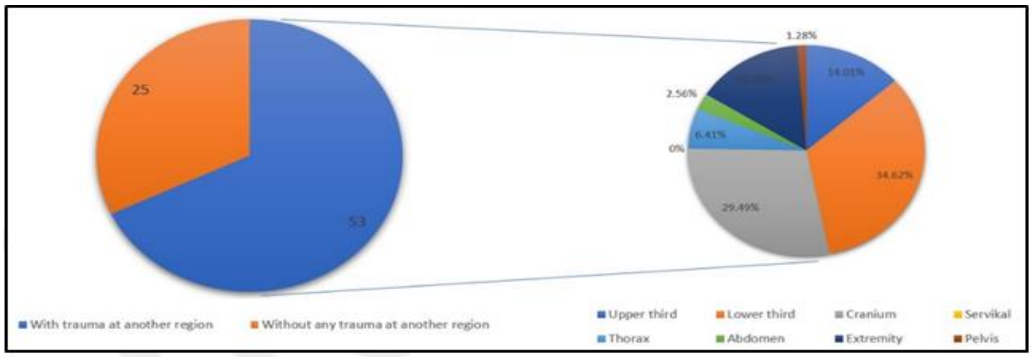


Diagram 5: Characteristics based on Extra Location of Trauma

Radiographic examinations consisted of plain head photos 66.67%, head CT scans 48.72%, serial trauma 7.44%, thorax x rays 34.62%, waters x rays 33.33%, panoramic 19.23%, and cervical x rays 2.56%. The severity level is calculated based on the FISS score. 46.15% is included in the moderate category, 35.89 is in the mild category and 17.94% is in the severe category.

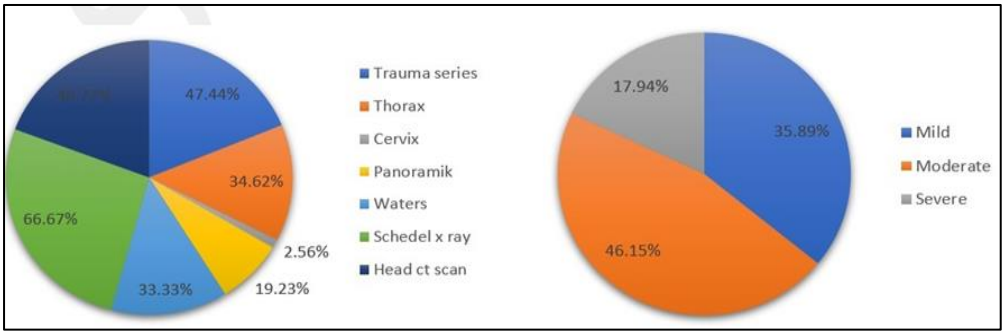


Diagram 6, 7: Characteristics based on radiographic examinations and severity

Discussion

Motor vehicle accidents are still the highest causative factor in Indonesia, causing maxillofacial trauma and head injuries. Based on previous research data, 72 cases of maxillofacial trauma occurred, based on the total population of oral surgery patients in the emergency room of Hasan Sadikin Hospital, Bandung, from January 2018 - June 2018.

The results showed that from 78 data on patients with midfacial trauma. It is known that the majority of male patients experience direct trauma due to traffic accidents. This condition is likely associated with activities outside the home using motorized vehicles, mainly carried out by people of the male gender.

The 13-24 year old age group is the most age group who experienced trauma due to traffic accidents. This result illustrates the high activity of one of the productive age groups accompanied by a lack of caution due to their very young age. Emotional and thinking maturity of the 37-48 year age group can be the reason for the low group experiencing trauma.

The leading cause of the high number of motor accidents is challenging to determine, but several factors can cause it. Unfavorable road conditions are not proportional to the increase in the number of vehicles, the level of safety in driving, driving speed that exceeds the safe limit, and errors in the use of helmets. Motor accidents are also a significant problem due to poor driving safety, carelessness or negligence of drivers due to drinking alcohol or toxic drugs, and bad driving habits. These factors require significant government funds to improve and reduce the number of motorized accidents on the highway.

This study has several limitations, including the researchers did not discuss the limitations of the function of occlusion and mouth opening, the strength and direction of an impact during trauma, and other specific trauma mechanisms. The limitations mentioned above can be used as recommendations for further research.

Conclusion and Suggestion

The results of the research and data analysis show that zygoma fractures are the most common fractures due to the anatomical configuration of the bony prominence in the midfacial area. It is hoped that further research will discuss the limitations of occlusion function and mouth opening, strength, and direction of an impact during trauma.

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