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Characteristics of Maxillofacial Fracture and Head Injury due to Motor Vehicle Accidents in Hasan Sadikin Hospital, Bandung, Indonesia

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Abstract: ***Introduction:*** ***According to the previous research about the most caused of traumatic brain injury after maxillofacial fracture with head injury was due to motor vehicle accidents. Aim of this research was to analyze the characteristics of maxillofacial fracture and head injury in emergency unit of Hasan Sadikin Hospital, Bandung, Indonesia.*** ***Methods:*** ***This cross sectional descriptive data research was done on patient in emergency unit of Hasan Sadikin Hospital Bandung on periode between September 2017 – February 2018 with the inclusion criteria was any maxillofacial fracture and head injury due to motor vehicle accidents. Primary and secondary survey was done based on chronology of trauma and identified the location of head fracture and wound in a face. Form data was filled by researcher asaccording to the inctructions. Data was analyzed by cross sectional method for observed. Assessment system of maxillofacial trauma severity level was done by using Facial Injury Severity Scale (FISS) and Maxillofacial Injury Severity Score (MFISS). Assessment system of head injury severity level was done by using Glasgow Coma Scale.*** ***Results:*** ***Data about characteristics of maxillofacial fracture with head injury due to motor vehicle accidents in 100 patients showed 16 cases of maxillofacial upper third fracture, 73 middle third fracture cases and 53 of lower third fracture cases. According to the GCS data calculation, 76 % in mild category, 22 % in moderate and 2 % in severe category. One typed and three type intracranial lesion was the most founded lesion (each 19%), two type lesions was 9% and no lesion was 70%.*** ***Conclusion:*** ***Maxillofacial middle third fracture, GCS mild category and one intracranial lesion due to motor vehicle accidents was the most characteristics trauma of maxillafacial and head injury. This research showed the most caused of maxillofacial trauma and head injury in patient at Hasan Sadikin Bandung, West Java Province was motorcycle vehicle accident.***

Keywords: Maxillofacial trauma, head injury, Hasan Sadikin hospital

1. Introduction

Vehicle crashes incidences in the world was tends to increase and global problem in most of developed country. Safety in driving was important to care, but some driver, especially motorcycle driver was often ignore and got an accident. The incidences, demographic distribution of the fractures very depending on the geographical area, sosio-economic trends, road traffic accident, alcohol and drug abuse. Research in Bandung, West Java showed a high incidence of motorcycle vehicle accidents followed by increased of maxillofacial fracture with head injury and *traumatic brain injury* (TBI).[1-5]

Bandung as a capital city of West Java was a province with the most population in Indonesia (45 milions people). Hasan Sadikin Hospital as a patient referral center from West Java. Increased of population was equivalent with increased of motor vehicles, but not followed by safety in driving and become the most problem in West Java, especially in Bandung. Data from Badan Pusat Statistik (BPS) on year 2013 showed the incidence of motorcycle vehicle accidents with serious injury was 28.438 peoples and minor injuries was 110.448 peoples, while according the data from BPS from West Java in Polrestabes Bandung on year 2012, amount of motorcycle vehicle accidents was 1.113 cases, passenger cars was 472 cases, car loads was 58 cases, bus was 21 cases, special vehicles was 7 cases.

Previous research showed from January 2013 to June 2014, 1324 (65.4%) of 2108 head injury cases were caused by motorcycle crashes, and only 55 (2.61%) were caused by other vehicle crashes.[3] Data showed the most accidents was motor vehicle accidents and other research showed the most caused of head injury and maxillofacial trauma was motor vehicle accidents.[1-3,6-8] Maxillofacial trauma was an crash on face and tissue around it included soft and hard tissue, while head injury was a damaged of brain due to mechanical trauma primary (at the moment) or secondary trauma (shortly after the trauma).

Assessment system of maxillofacial trauma severity level was done by using *Facial Injury Severity Scale* (FISS) and *Maxillofacial Injury Severity Score (*MFISS). The system can provide convenience the severity assessment of maxillofacial trauma and treatment planning, and also be as a predictive and prognostic tools to provide information for pStient and their family. Assessment system of head injury severity level was done by using *Glasgow Coma Scale*. The system only assessa severity level of head injury as a guide to determine the therapy and predicted the effect of injury.[8,9]

2. Methods

Research procedure was approved by Health Research Ethics Committe Universitas Padjadjaran Fakultas Kedokteran, Bandung, Indonesia number

824/UNG.C.10/PN/2017. Patient will get information about the research procedure and give the approval by signing informed consent.

This research was cross sectional research with descriptive data from patient in emergency unit of Hasan Sadikin Bandung within periode between September 2017 – February 2018. Inclusion criteria was patient with maxillofacial fracture and head injury due to motorcycle vehicle accident. Primary and secondary survey was done based on the chronology of trauma and identifiying of head fracture location and also wound on face.

Research data was obtained from medical record of the patient included information about data identification from each patient who are eligible, vital signs, GCS score, use of helmet, pathology diagnose from panoramic rontgen, skull AP lateral and *Computed Tomography (CT) scan*. Data collected was distribution based on age, gender also maxillofacial trauma and head injury location and type. Data was analyzed by cross sectional method for observed the relationship between maxillofacial trauam severity based on FISS (*Facial injury severity score*) and MFISS (*Maxillofacial Injury Severity Score*) and also between head injury based on GCS (*Glasgow coma scale*) with amount and type of intracranial lesion according to the radiology assesment (rontgen).

3. Results

Data result about patient characteristic in this research was included gender, age, helmet uses and fracture location. Chaacteristic data was :

Table 1: Patient characterisctics

Characteristics Patient	f (n)	Percentage (%)
Gender		
Male	82	82.0
Female	18	18.0
Age		
≤25 years old	66	66.0
26-35 years old	20	20.0
36-45 years old	7	7.0
46-55 years old	2	2.0
66-65 years old	3	3.0
>65 years old	2	2.0
Helmet		
Use	64	64.0
Not use	36	36.0
Fracture location		
Third upper face	16	10.6
Third middle face	73	48.6
Third lower face	52	34.6
No fracture	9	0.6

Most of patient was male (82%) and female only 18%. Most patient in range age was ≤ 25 years old with percentage was 60%, while the rest was between age 26 to more than 65 years old. In this research only 64% of patient using helmet. Acoording to the location of fracture, the most fracture was 48,6% in third middle face (73 cases), third lower faces was 52 cases (34,6%) and 10,6% was in third upper face (16 cases).

Maxilofacial trauma was calculated based on FISS and MFISS. FISS was assesement method used for evaluating the severeity of facial trauma, while MFISS was assessment method used to evaluate the severity of maxillofacial trauma.

Table 2: Description of maxillofacial trauma

Maxillofacial trauma	x̄/f (n)	Percentage (%)
FISS		
Average	3.28	
Deviation standard	2.96	
MFISS		
Average	15.3	
Deviation standard	12.4	
MFISS Category		
Minor	53	53.0
Moderate	20	20.0
Serious	11	11.0
Severe	16	16.0

According to the table 2, the average of FISS was 3,28 with deviation standard was 2,96, while MFISS avergae was 15,3 with deviation standar was 12,4. MFISS can be categorized as minor, moderat, serius dan *severe*. In this research from 100 patient, 53% was in minor category, 20% in moderate category, 11% was in serious category, and the rest was in severe category.

Data recorded about head injury was measured by using GCS (*Glasgow Coma Scale)*. Head injury can be assess from radiography by using fschedel AP Lateral photo ct scan to evaluate the location of trauma and lesion in brain from pateient with head injury. Head injury analysis with this imaging was done by calculated the amount of lesion.

Table 3. Description of Head Injury

Head injury	*f (n)*	*Percentage (%)*
GCS Score		
Average	13.92	
Deviaton standard	2.34	
GCS Category		
Mild	76	76.0
Moderate	22	22.0
Severe	2	2.0
Amount of intracranial lesion		
No lesion	70	70.0
One lesion	19	19.0
Two lesion	9	9.0
Three lesion	2	2.0

The average of GCS score was 13,92 with deviation standard was 2,34, while in calculated data according to the category, there was 76% in mild category, 22% in moderate category, and 2% in severe category. The most intracranal lesion only one lesion 19%, with two lesion was 9% and three lesion was 19%. In this research, 70% patient has no intracranial lesion.

4. Discussion

Motor vehicle accidents still be the most important etiological factors were causing maxillofacial and head injuries. As for motorcycle accidents, the crucial role of helmets has to be acknowledged. On the other hand, people

also have not given any attention for the importance of using helmet for protect from injury. The effectivity of using helmet also include the choice of helmet type ehich can protect the head from injufry. Legislations making helmet use compulsory for all motorcyclists are crucial to reduce the incidence of facial injuries in this category.

Our research was evaluated all patients presenting with maxillofacial and head trauma at the Hasan Sadikin hospital in Bandung, Provinsi Jawa Barat, Indonesia over a period of September 2017 – February 2018. Hasan Sadikin hospital is one of the main hospitals that treats maxillofacial and head injuries in province of West Java area. Patients who did not enter the inclusion criteria were excluded from the study.

Research result the prevalence of face was 48% in the middle third of face and 34% in the lower third face. This result was according to the previous research by Naveen Shankar et al and Mijiti et al. But, in this research, the prevalence was higher in the middle third of face 48% than the previous study by some researchers for example by Bali et al that was only 31%, Mesgarzadeh et al only 22%, Kostakis et al 47% and Chalya et al 15%. Another research showed a higher prevalence of facial injuries by Erdman 70%. In our total study population, most of the patients were aged less than 25 years old. In this research, GCS score was 76% at mild category, 22% at moderate and 2% at severe category. Faried et al explain about the research which was same at the level of GCS score 74,9% at mild category, 17, 6% at moderate category and 7,6% at severe category.

The reason for high frequency are difficult to postulate but maybe due to the factor mentioned below. Inadequate road safety awareness, unsuitable road condition without expansion of the motorway network, violation of speed limits, and failure to wear helmets. Also like in many development country such as India, Iran, Yunani, Nigeria, Tanzania and in rural area of Xinjiang China, motorvehicle accident occure mainly due to poor road safety, recklessness and negligence of the driver often during using alcohol or other intoxicating agents, behavioural disorders and sosioeconomical insufficiencies of some drivers. In the view of the overall cost of care to the society, emphasis should be placed on prevention of road traffic accidents.

5. Conclusion

1) Maxillofacial middle third fracture, GCS mild category and one intracranial lesion due to motor vehicle accidents was the most characteristics trauma of maxillafacial and head injury.
2) This research showed the most caused of maxillofacial trauma and head injury in patient at Hasan Sadikin Bandung, West Java Province was motorcycle vehicle accident.

6. Acknowledgement

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7. Conflict of Interest

The authors report no conflict of interest

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