ASSOCIATION OF PATTERN OF MAXILLOFACIAL INJURIES WITH MECHANISM OF TRAUMA

Sana Mushtaq[1], Tariq Ahmad[1], Ammara[2], Atta Rehman[1], Bashir Rehman[1], Muslim Khan[1]

[1]Department of Oral & Maxillofacial Surgery, Khyber College of Dentistry, Peshawar

[2]Ex-Resident, Department of Oral & Maxillofacial Surgery, Khyber College of Dentistry, Peshawar

ABSTRACT

Objectives: *The objective of the study was to determine the association of pattern of different maxillofacial injuries and fracture with the mechanism of trauma.*

Methods and materials: *This study was conducted in department of oral and maxillofacial surgery from June 2020 till December 2020. Fifty one patients were included in this study after taking an informed consent. The data collection was completed on a performa including the variables of age, gender, mechanism of trauma, pattern of injury and site of trauma. Data was analysed with SPSS version 19. Percentage and frequencies were calculated for descriptive variables. Pearson Chi-square test was applied to determine the statistical relationship between the variables. The probability value of less than 0.05 was considered statistically significant.*

Results: *In this study 51 patients, 42 male (82.4%) and 9 female (17.6%) were included. Mean age of the patients was 23.5 years. The mechanism of trauma was road traffic accidents (RTA) in 37 patients (72.5%), 7 (13.7%) had fall, assault in 5 (9.8%) patients and fire arm injuries in 2 (3.9%) patients. The pattern of injuries was compound fractures in 41(80.4%) patients, simple fracture in 8 (15.7%) patients and comminuted fractures in 2 (3.9%) patients. RTA was associated with the ZMC fracture and parasymphyseal fracture of mandible.*

Conclusion: *The pattern of maxillofacial trauma differs in association with mechanism of injury. The incidence of trauma is more among front seat passengers and drivers than back seat passengers. Thus more safety measures are required for front seat passengers and drivers.*

Key words: *Maxillofacial Injuries, Road Traffic Accident, Trauma, Fractures*

INTRODUCTION

Maxillofacial region is vulnerable for sustaining injuries due to its exposed and prominent anatomical position. Trauma to the maxillofacial region is one of the main causes of visit to the accident and emergency department. The increase in the population and industrialization are the environmental causes for the more frequent injuries. The mode of transportation and hectic life style is also associated with increased prevalence of maxillofacial trauma. The oral and maxillofacial region is the conspicuous and intricate region and bears utmost anatomical and functional significance. The patients suffering from maxillofacial injuries can suffer from significant morbidity and disfigurement.[1]

The facial injuries occur either in isolation or in association with other injuries in the extremities and trunk. These injuries lead to a serious disease burden on community and authorities, having financial, social and functional implications.[2]

The fractures of the maxillofacial region are caused mostly by the road traffic accidents, fall and physical assaults and sports injuries. These causes are different in different communities and pattern of life. The pattern of fracture of the bones of maxillofacial region may be having an association with magnitude of trauma and direction of impact. Similarly the individual variable like age and gender

Correspondence:
Tariq Ahmad
Assistant Professor, Department of Oral & Maxillofacial Surgery, Khyber College of Dentistry, Peshawar
Cell: +923005935010
Email: drtriqahmad@yahoo.com

may also be correlated with the pattern of injuries.[3] The pattern of fracture has also changed over time due to the implementation of policies for road safety. The cause of trauma and impact of severity of injury can have an association with the pattern of injury ad type of fracture. Certain pattern of fracture is related to particular mechanism of injury.[4]

The common aetiology of trauma to the oral and maxillofacial region road traffic accidents, falls, physical assaults, gunshot injuries, sports injuries, and industrial injuries. The road traffic accident is the major cause of trauma to the maxillofacial region in the developing countries while the sports injuries and violence are the main causes of these injuries in the developed countries. The younger adults mostly sustained injuries due to road accidents while the children sustained these injuries due to fall.[5]

Considering the close proximity to the vital centres and airway, the maxillofacial region requires special attention in the assessment and proper diagnosis of the fracture. Traumatic brain injuries have been significantly correlated with the trauma to maxillofacial region, particularly in the mid face region. There fore thorough examination and evaluation of the head and neck region is necessary. The early and timely diagnosis of the pattern of fracture and associated concomitant injuries is necessary for proper planning and management of the patient.[6]

The mechanism of trauma to the maxillofacial region can be either due to low energy impacts like fall on ground or assault and high energy impacts like road traffic accidents or industrial injuries. The high energy impacts can lead to more severe injuries and multiple fractured bones. Therefore the exact mechanism of the trauma is important to anticipate the particular pattern of injury and its management accordingly.[7]

There fore, a more acute understanding of injury patterns can be obtained with comparative analyses which are mechanism specific. This is fundamental for the development of optimal treatment regimens, and management decisions. It will provide evidence to the relevant professionals and policy makers for developing suitable injury prevention strategies, health services and resource allocation to make evidence-based screening protocols. This study will provide insight into the mechanism of facial fractures and its association with facial injuries, diagnosis and management protocols accordingly, hence improving the quality of patient care.

MATERIALS AND METHODS

This descriptive cross sectional study was conducted in department of oral and maxillofacial surgery from June 2020 till december 2020. Fifty one (51) maxillofacial trauma patients who presented to the department were included in this study after taking an informed consent. The data collection was completed on a performa including the variables of age, gender, mechanism of trauma, pattern of injury and site of trauma. Data was analysed with SPSS version 19. Percentage and frequencies were calculated for descriptive variables. Pearson Chi-square test was applied to determine the statistical relationship between the variables. The probability value of less than 0.05 ($P < 0.05$) was considered statistically significant.

RESULT

In this study we had 51 patients, 42 male (82.4%) and 9 female (17.6%) patients. Thus male to female ratio is 4.67:1. Mean age of the patients was 23.5 years. The mechanism of trauma was road traffic accidents (RTA) in 37 patients (72.5%), 7 (13.7%) had fall, assault in 5 (9.8%) patients and fire arm injuries in 2 (3.9%) patients. The pattern of injuries was compound fractures in 41(80.4%) patients, simple fracture in 8 (15.7%) patients and comminuted fractures in 2 (3.9%) patients.

The fracture site was assessed and it was found that ZMC fracture was most common among the patients i.e in 17 (33.3%) patients. Followed by fracture mandible parasymphysis region in 13 (25.5%) and mandibular angle fractures in 11 (21.6%) patients. Twenty seven (27), (52.9%) patients had 2 fracture sites combination while 7 (13.7%) patients had 3 fracture site in combination.

In RTA cases it was noted that 20 (39.2%) patients were riding bike, while 12 (21.6%) were in car and 5 (9.8%) were pedestrians. It was found that 20 (39.2%) patients were on the front seat of the vehicle and 12(23.5%) were sitting on the back seat of the vehicle

Mechanism of trauma was statistically analysed with pattern of injury. Similarly mechanism of trauma also showed significant relationship with fracture site i.e p value of 0.002. In patients with RTA the

fracture site showed a significant relationship with passenger seat in vehicle its p value is 0.004. But there was no significant relationship between fracture site and RTA patients i.e 0.077 p value.

DISCUSSION

The pattern of maxillofacial injuries varies according to geographic location, socioeconomic status and culture. In this study the male to female ratio of the population studies was 4.67:1 it is similar to the studies done in the rest of the world but the ratio is higher in developing countries i.e 5.1:1 than in developed countires i.e 3.7:1 according to a study[1,4]. As men are mostly involved in such activities like driving on highways, sports, working out in harsh environment to earn for their families so they have higher risk to get involved in incidents of trauma. Also our religion and culture puts more responsibility

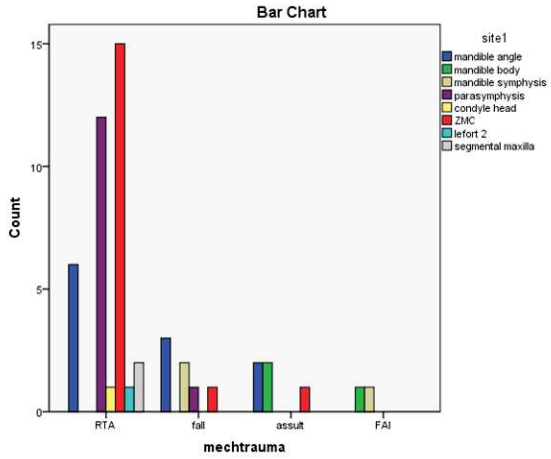

Fig 1: Frequency of Oral diseases in 50 diabetic patients.

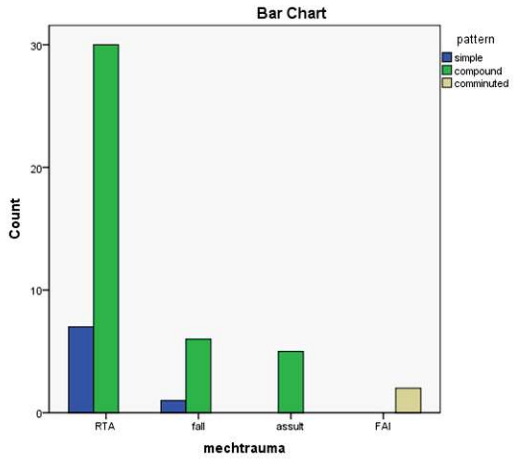

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Table-2: Mechanism of trauma and pattern of Injury

Mechanism of trauma	pattern			Total
	simple	compound	commi-nuted	
RTA	7	30	0	37
fall	1	6	0	7
assault	0	5	0	5
FAI	0	0	2	2
Total	8	41	2	51

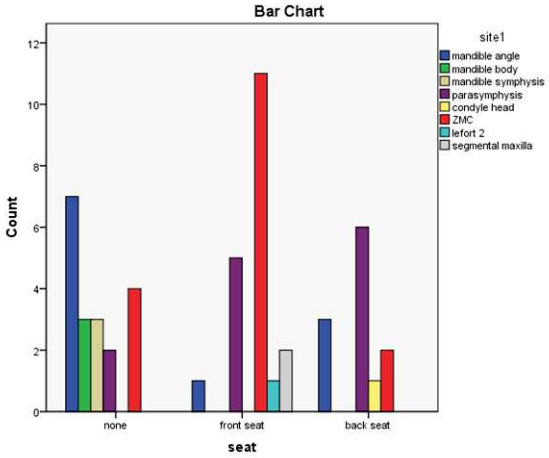

Fig 1: Frequency of Oral diseases in 50 diabetic patients.

Table-1: ???????????

gender	Frequency	Percent
male	42	82.4
female	9	17.6
Total	51	100.0

Table-3: Fracture site and seat of vehicle in RTA

seat	site								Total
	mandible angle	mandible body	mandible symphy-sis	parasym-physis	condyle head	ZMC	lefort 2	segmental maxilla	
none	7	3	3	2	0	4	0	0	19
front seat	1	0	0	5	0	11	1	2	20
back seat	3	0	0	6	1	2	0	0	12
Total	11	3	3	13	1	17	1	2	51

of outdoor activities on men. The mean age of the population in this study was 23.5 years this is consistent with the finding that in 2nd, 3rd and 4th decade of life a person is more socially and physically active thus vulnerable to traumatic incidents.[5]

Road traffic accidents (RTA) was most common mechanism of injury in this study followed by falls, physical assault and fire arm injuries. As in our country traffic rules are not strictly followed for example speed limit is violated, unlicensed drivers and also safety measures are not taken. Also as majority of the population has low socioeconomic status thus the condition of the vehicles and poor road infrastructure has its role in higher incidence of RTA. Not only in our region RTA and associated injuries are a common problem but it is also common in rest of the world even in the countries with more literate population and advanced road infrastructure.[8] Also to reduce the fatal injuries in RTA Vision zero model has been introduced and implemented to ensure road safety in advanced societies so to have zero fatal injuries as the name suggests.[9,10]

The pattern of most of the maxillofacial injuries in this study were compound fractures due to higher percentage of zygomaticomaxillary complex (ZMC) fractures. As ZMC fractures are communicating to the external environment through maxillary sinus and nasal cavity thus they are classified as compound fractures. Low incidence of simple and comminuted fractures can be attributed to less number of cases in which trauma is due to falls , physical assault and fire arm injuries respectively.

The ZMC fracture is the most common in this study as most of RTA incidents were due to motorbike accidents and as the malar eminence is more the prominent part of midface thus it has more chance to get hit with an impact in head on collision. Especially when motorbike rider is not wearing a helmet for protection as that is a common practice in our society according to a local study.[11] However in another study in Saudia Arabia it was found that the most common fracture pattern was mandibular fractures in combination of parasymphyseal condylar process fractures. The high rates of mandibular parasymphysis and condyle involvement could be attributed to a direct impact to the prominent chin that results in a force that transmits posteriorly to reach the condyles, leading to both parasymphyseal and condylar fractures with zygomatic fractures second most common type of fractures.[12] However in an Australian study orbital floor fractures were common along with lefort pattern of fractures.[13] while in Kenya nasal bone fracture was most common.[14] as nasal bone is one of the weak bone on face with prominent position thus most commonly fractured. But in this study isolated nasal bone fracture were not included as in our health care system nasal bone fracture are managed by ENT specialists mostly.

The impact of force is decreased for the passengers in back seat of car then for front seat passenger or driver as this fact can be inferred from the results of this study which shows more incidence of trauma to front seat passengers thus more safety measures are needed for passengers sitting in the front seat also due to structure of cars with windscreen, steering wheel and rear view mirror close to front seat passengers thus the incidence for them is more[5] . Also the incidence of pedestrians who got injuried in RTA is far less due to low energy of impact force.

The pattern of injury in trauma patients with history of physical assault was mandible body or angle fracture in this study. This finding is also noted to another study and it was found that the upward directed force of the assailant and direct impact on mandible body region is the cause of mandible body fracture in physical assault cases.[15]

CONCLUSION

Thus it is concluded that maxillofacial trauma is more common among young males with RTA being the most common cause of maxillofacial trauma followed by falls. Zygomaticomaxillary fractures were most common pattern of fracture associated with RTA, according to this study, followed by mandibular parasymphysis fractures. The pattern of maxillofacial trauma differs in association with mechanism of injury. The incidence of trauma is more among front seat passengers and drivers than back seat passengers. Thus more safety measures are required for front seat passengers and drivers.

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