OCCURRENCE AND CHARACTERISTICS OF MAXILLOFACIAL INJURIES – A STUDY

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ABSTRACT

This descriptive study was undertaken to evaluate and analyze the pattern of maxillofacial fractures in 340 patients reported to the Department of Oral and Maxillofacial Surgery, Khyber College of Dentistry, Peshawar from Oct 2005 to May 2007. These patients were examined both clinically and radiologically for maxillofacial fractures. Data regarding the age, gender, cause of fracture and site of fracture were evaluated and reviewed. The age range was 2-28 years (mean 25±16.4years) with high frequency occurring in 21-30 years age group. The male to female ratio was 3:1. The leading cause of maxillofacial fracture was road traffic accident [RTA (n=154; 45.2%)], followed by accidental fall (n= 101; 29.7%) and firearm injury [FAI (n=49; 14.4%)]. It was noted that road traffic accident and fall caused most of the parasymphyseal (n= 90) and condylar fractures (n=65) in mandible, while firearm injury and assault caused more body (n=18) and angle (n=20) fractures. Maxillary bone fractures (55.5%) were common followed by zygomatic bone (38.8%). This study can guide us to formulate strategies and policies to prevent maxillofacial fractures.

Key words: *Maxillofacial fractures, mandibular fractures, etiology, road traffic accidents.*

INTRODUCTION

Maxillofacial injuries involve soft and hard tissues injuries of face extending from frontal bone superiorly to mandible inferiorly.[1] Maxillofacial region is the most exposed part of body and, therefore, vulnerable to trauma.[2] Maxillofacial fractures may occur alone or in combination with other bones fractures. Fracture pattern depends on the mechanism of mechanism of injury, magnitude and direction of impact force and anatomy of site.[2]Maxillofacial trauma presented as skeletal, dental and soft tissues injuries to face.[3]

The common causes of maxillofacial fractures, across the world, are road traffic accidents (RTA), falls, assaults, firearm injury, sports and industrial accidents.[4] These etiological factors depend on the geographic condition, socioeconomic status, cultural characteristics and era.[5] Road traffic accident is the leading cause of maxillofacial fractures in developing countries,[6] while interpersonal violence is the leading cause in western world.[7] The most common causative factor in adults is the road traffic accident and fall in the younger population.[8] Epidemiological studies have revealed age and sex as important factors that influence the occurrence of maxillofacial trauma.[9] The highest incidence is observed in the age group 21-30 years, while the lowest in the age group above 60 years and below 5 years.[5] Recent data indicates 3:1 male: female ratio worldwide.[10]

During the past few decades major developments have been made in the management of maxillofacial fractures. Recent trends in the management of maxillofacial fractures are open reduction and internal fixa-

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tion with bone plates and screws. Bioresorbable plates and screws have been introduced that has revolutionized the maxillofacial surgery. This study was conducted to evaluate various epidemiological features of maxillofacial fractures. In addition, this study will provide the evidences for recommendation of possible preventive measures to be taken to reduce the incidence of maxillofacial fractures.

METHODOLOGY

This descriptive study had been carried out on 340 consecutive patients of any sex and age group presenting with the features of maxillofacial fractures at Oral and Maxillofacial Unit, Khyber College of Dentistry, Peshawar from Oct 2005 to May 2007. Isolated nasal bone fracture and naso-ethomoid bone fractures were excluded from the study.

With the consent of the patients, a detailed history was taken and thorough clinical examination was carried out. Bony fractures were confirmed with relevant radiographs. Based on history, clinical examination and imaging studies the definitive diagnosis of facial fractures was established. The data concerning the study was obtained on preformed proforma and evaluated and analyzed by applying descriptive statistics.

RESULTS

The age of patients at the time of injury ranged from 2-82 years, with a mean age 25.85 ±16.45 years. Most common age group involved was 3rd decade (n= 99; 29.11%) followed by 1st decade (n= 81, 23.82%). (Table 1). Regarding gender distribution, male (n= 254; 75%) pre-dominated the female (n= 86; 25%) with male to female ratio 3:1 (Fig 1).

TABLE 1: AGE DISTRIBUTION OF MAXILLOFACIAL FRACTURES

Age groups (years)	No of patients	%age
1-10	81	23.82
11-20	70	20.58
21-30	99	29.11
31-40	36	10.58
41-50	30	8.82
51-60	18	5.29
Over 60 years	6	1.75
Total	340	100

TABLE 2: DISTRIBUTION OF MAXILLOFACIAL FRACTURES ACCORDING TO ETIOLOGY

Etiology	No of patients	%age
RTA	154	45.29
Fall	101	29.70
FAI	49	14.41
Assault	14	4.11
Sport	8	2.35
Industrial	3	0.88
Other causes	11	3.23
Total	340	100.0

The most common cause of maxillofacial fractures was RTA (n= 154; 45.29%) followed by fall (n= 101; 29.70%), while the least involved cause was industrial accidents (n= 3; 0.88%), (Table 2).

Three hundred and eighty seven mandibular fractures occurred in 340 patients at different sites. Parasymphysis (28.4%) was the leading site followed by condyle (19.37%) and angle (17.05%), (Table 3). Regarding site distribution of mandibular fractures and its

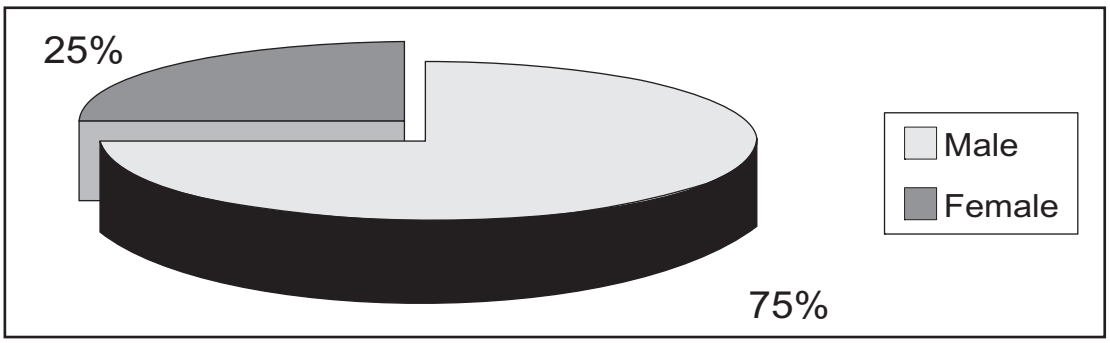

Fig 1: Gender Distribution of Maxillofacial Fractures (n = 340)

TABLE 3: DISTRIBUTION OF SITE OF MANDIBULAR FRACTURES AND THEIR RELATIONSHIP TO ETIOLOGY

S. no	Site	RTA	Falls	Sport	Industrial	Assault	FAI	Others	Total
1.	Symphysis	12	19	0	0	0	4	2	37 (9.5%)
2.	Parasymphysis	47	43	1	0	7	8	4	110 (28.4%)
3.	Body	29	8	3	1	3	15	2	61 (15.7%)
4.	Angle	28	14	2	1	8	12	1	66 (17.0%)
5.	Ramus	1	0	0	1	0	7	0	9 (2.3%)
6.	Coronoid	2	1	0	0	0	0	0	3 (0.7%)
7.	Condyle	34	31	2	0	3	3	2	75 (19.3%)
8.	D.A	8	13	0	0	2	2	2	26 (6.71%)
Total		**161**	**129**	**8**	**3**	**22**	**51**	**13**	**387 (100%)**

(D.A. Dentoalveolar)

TABLE 4: DISTRIBUTION OF OTHER FACIAL BONE FRACTURES AND THEIR RELATIONSHIP TO ETIOLOGY

S. no	Etiology	Maxillary bone			Zygomatic bone	Zygomatic arch
		LeFort I	LeFort II	LeFort III		
1.	RTA	7	10	9	22	2
2	Falls	9	4	0	4	0
3.	FAI	9	0	0	4	0
4.	Assault	1	0	0	3	2
5.	Sport	0	0	0	0	0
6.	Industrial	0	0	0	0	0
7.	Others	1	0	0	2	1
Total			**50**		**35**	**5**

relationship to etiology it is noted that RTA and fall caused most of the parasymphyseal and body fractures, while firearm injury (FAI) and assault caused more body and angle fractures respectively, (Table 3).

Distribution of other facial bone fractures and its relationship to etiology.

Road traffic accidents was the leading cause accounting for 55.55% (n= 50) followed by falls from height 18.8% (n=17), (Table 4). Maxillary bone fracture (55.5%) dominated other bones, followed by zygomatic bone (38.8%), (Table 4).

DISCUSSION

Epidemiological surveys across the world about the maxillofacial injuries are varied and depend upon the socioeconomic status, geographic condition and cultural characteristics. The predominant age group in this study was 3rd decade which correlates with the previous studies.[1, 2, 11, 12 13]. However, these findings are in contrast to some studies, where the dominant age groups having a high incidence were 0–10 years, and 11–20 years respectively.[14, 15] Low incidences of fractures of 1.75% was noted in this study above 60 years. Similar results had been reported in previous studies done in Pakistan.[2, 5, 15], while contrast results had been observed in western societies.[16] The possible explanation for the higher frequency of fractures in 3rd decade may be attributed to the fact that people in this period of life are more active regarding sports, fights, violent activities, industry and high speed transportation. The low frequencies of very young and old age groups are due to the low activities of these age groups.

The male to female ratio (3:1) showed that maxillofacial fractures were predominantly common in the male population in this part of the world. This finding

is consistence with the results of previous studies conducted all over the world.[2, 4, 5, 17] The relatively high number of male to female is due to the fact that male are engaged more in outdoor activities while the female are confined to indoor activities.

In the present study RTA was the leading cause of maxillofacial fractures followed by accidental falls. Previous epidemiological studies reported similar findings about the cause of maxillofacial injuries in developing countries.[11, 15, 18] However, in western countries assault and interpersonal violence is the major cause of fractures. This changing trend in the etiology of fractures in western world may be attributed to the implementation of compulsory seat belts legislation[15] and to the abuse of alcohol and use of illicit drugs in these societies.[19, 20, 21] The high number of maxillofacial fractures attributed to RTA in our country is due to lack of seat belt law obligation, over speeding, overloading, underage driving and poor conditions of roads and vehicles.[1, 2, 5] Accidental fall was the second most common cause of fractures in the present study. Similar findings had been reported in previous studies done in Pakistan[5], United Arab Emirates[21] and Greece[18] but were different from some other studies.[19, 22] It was noted that most of the victims of fall were children and belonged to 1st decade of life. Children often fell from beds, stairs, buildings and from parents' hands due to negligence and inadequate safety features in the building designs. Fairly high numbers of FAI, recorded in this study were due to the tribal fighting and due to possession of arms with every adult which is a part of their cultural life.

The most common site of mandibular fracture in the present study was the parasymphysis followed by the angle. The correlation between the cause and the anatomic site of the mandibular fracture had been discussed in the literature.[20, 23, 24, 25] Adi. M and coworkers (1990)[20] have given an audit of distribution of site of mandibular fracture and its relationship to etiology. In their study they demonstrated that RTA causes more parasymphyseal fractures followed by body falls have more condylar fractures while assaults have higher frequency of parasymphyseal and angle fractures. In another study, Copcu E and colleagues[23] demonstrated that assault victims had higher frequency of angle fractures, sports related injuries had subcondylar and angle fractures, falls victims had subcondylar and parasymphyseal fractures, gunshot injuries had body and angle fractures while RTA had body and parasymphysis fractures. All these studies are consistent with the results of present study.

Any trauma to facial region can cause fracture of other facial bones, which may occur in isolation or in association with mandibular fractures. In the present study it was observed that maxillary bone fracture (55.5%) dominated other bones. The results of the present study coincides well with the study of Ahmad H.E.A and associates (2004)[21] where maxillary fractures dominated other facial bones fractures. Adi M and colleagues (1990)[20] have reported that the most common bone of the facial skeleton fractured in association with mandible is the zygomatic bone. The higher ratio of zygomatic complex fractures in their study may be attributed to the fact that most of the fractures in the developed countries are caused by the assaults and interpersonal violence and due to the prominence of zygomatic bone in the facial skeleton, it is a favored site of receiving intentional and unintentional violence. In the present study maxillary fractures were more frequent. The reason for the higher percentage of these fractures may be due to the fact that most of the injuries are caused by RTA and falls in this country, where the maxillary bone are more prone to fracture than other bones.

CONCLUSION AND RECOMMENDATIONS

The results of present study reveal that majority of the patients were young male adults. The most common etiological factor was RTA followed by falls, while the most commonly fractured site was the parasymphysis. Again RTA and falls caused more maxillary bone fractures, while assault caused more zygomatic bone fractures. This study confirmed the view that risk factors for maxillofacial injuries vary from country to country and RTA and falls are still the major causes for maxillofacial injuries in Pakistan.

In the light of this study the following recommendations are given:

To reduce the incidence of RTA, the laws regarding the precautions like seat belts, speed limits and traffic rules must be observed strictly. An awareness campaign to educate the public especially the drivers about the importance of restraints and protective measures in motor vehicles should be started. Improvement in

education and socioeconomic setup aimed to reduce the incidence of fractures secondary to assaults. Education of parents about the consequences of fall in children will reduce the incidence of injury in pediatric population. Control over the proliferation of deadly weapons at state level to reduce the incidence of FAI in society.

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