A PROSPECTIVE CLINICO-PATHOLOGICAL STUDY OF FACIAL FRACTURES IN SAIDU SHARIF SWAT

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Abstract

Objective: *To analyze the maxillofacial fractures clinico-pathologically which presented over a 1 1/2-year period at the out-patient department and were then referred to the Oral and Maxillofacial surgery department of Saidu group of teaching hospitals and Saidu Medical College, Swat.*

Materials & Methods: *This prospective study was conducted in Oral and Maxillofacial surgery Department of Saidu group of teaching hospitals and Saidu Medical College, Swat, from January 2017- June 2018. A total of 106 maxillofacial fractured cases were included in the study. Informed consent was obtained from the patients. The data collected included age, sex, aetiology, date of trauma, associated maxillofacial trauma, anatomic site of fracture, and treatment. Data were analysed using SPSS version 17. The analysis involved descriptive statistics and the Pearson's chi-square.*

Results: *There were 106 maxillofacial fractures out of 228 patients. Males sustained more fractures than females. The 21-40 year age groups sustained maximum fractures. Road Traffic accidents were the major causes of trauma, followed by violence and falls. The mandible was found to be the most frequently fractured bone. A surgical approach was performed in most cases. The most frequently fractured sites in the mandible were the parasymphysis and the body.*

Conclusion: *In our study there is no significant association between age and facial fractures, but there is significant association between etiology and types of mandibular fractures. The p value of cross tabulation between etiology and type of mandibular fractures is .04, whereas the p value of cross tabulation between mode of treatment and types of fracture is also highly significant .000.*

Key Words: *Maxillofacial fractures, Parasymphysis, Zygomatico-maxillary complex*

Introduction

Trauma to the maxillofacial region results in a large number of fractures to the maxillofacial bones.(1) The term Maxillofacial region encompasses a wide range of structures including soft and hard tissues of the face from frontal bone above to the mandible below.(2) The nasal bone is the most frequent site of fracture followed by the mandible due to its prominent position on the face and also due to its large size. The causes of fractures vary from one population to another and that is why assessment of these fractures helps us in understanding the patterns of these fractures and how they vary between different regions. Fractures of mandible and other facial bones result from different causes of injury, such as road traffic accidents (RTAs), assault and falls and there is a general overall increase in the proportion of adolescent and young adults sustaining these injuries.(3) The etiology and incidence of mandibular fractures vary with the different geographic regions, socioeconomic status, cultures, traffic rules, and study eras. If treatment is not carried out on time various complications such as malocclusion, difficulty in chewing, chronic pain, and temporomandibular joint syndromes, and facial deformity can result.(4) Trauma to the maxillofacial region resulting in fractures of the facial bones ,the mandible , maxilla and the zygomaticofacial complex is very common. Chances of fracture of mandible are more common due to its unique mobility, shape, and chin position in the face. On the other hand, the zygoma plays a very important part maintaining the shape of the face because of its basic anatomy. When there is fracture of this important bone it causes aesthetic defects and can interfere with functions of the eyes and mandible at the same time.

The purpose of our study was to clinico-pathologically evaluate the incidence, etiology, and pattern of fractures of the mandible, maxilla and zygomaticofacial complex in the trauma cases reporting to our institute and hospital. (5,6)

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Materials and Methods

A prospective clinico-pathological study was conducted in the Oral and Maxillofacial Surgery department of Saidu group of teaching hospitals and Saidu Medical College, Swat. The data was collected from January 2017-June 2018. During this time two hundred and twenty eight

patients presented to the department with different complaints.

Out of these, 106 patients presented with different types of fractures. Diagnosis of maxillofacial trauma was on the basis of clinical and radiographic examination, and epidemiological information was obtained from the patients, which included age, gender, etiology of injury, site of injuries and treatment methods. The mechanism of injury was recorded as Road traffic accident, Physical assault, fall, Gunshot injury, & others. Site of fractures was recorded and methods of management were included.

Data was collected and tabulated by using Microsoft Excel 2007. Informed consent was obtained from the patient and the above mentioned institutions.

Results

The mean age of the patients presenting to our institutions with fractures was 31.7 years where the minimum age was 7 and maximum 71 years. Fractures were more frequently observed in 21-30 & 31-40 year age groups which both had 20.7% fractures . Second most frequent age group for fractures was the 11-20 year age group which had 16.9% of fractures. This is followed by the 41-50 year group which had 11.3% , 1-10 year group with 9.4%,and the 61-70 year and 51-60 year olds had 8.4% and 7.5% of the facial fractures respectively. This is shown below in Table 1. A total of 228 patients (174 males and 74 females) presented to the oral and maxillofacial department of the hospital and medical college. Male: female ratio was 4:1. Shown in Figure 1. The most common cause of trauma was road traffic accidents (RTAs) which accounted for 49.1% of fractures, followed by assault which were responsible for 24.5% Falls were the third most common cause 19.8%%and finally medico-legal cases like gunshot wounds were the least common cause 3.8%. shown in Figure 2. Mandible was the most common bone to fracture with 77.4% of fractures being mandibular. In the mandible the parasymphysis being the most frequently fractured area 30.1%, followed closely by the body 28.9% , and then.is followed by the body of the mandible. The angle was the third most frequently fractured site 11.3% and then the symphysis 9.4%.The second most frequently fractured bone was the zygomatico-maxillary complex, which accounted for 12.3% of maxillofacial fractures. The third was the maxilla alone which constituted 8.9% of the fractures.

Table 1: Age groups of maxillofacial fractures

Age	Frequency	%age
0-10	14	13.3
11-20	18	30.5
21-30	22	51.4
31-40	22	72.4
41-50	12	83.8
51-60	8	91.4
61-71	9	100.0
Total	105	
Missing	1	
Total	106	

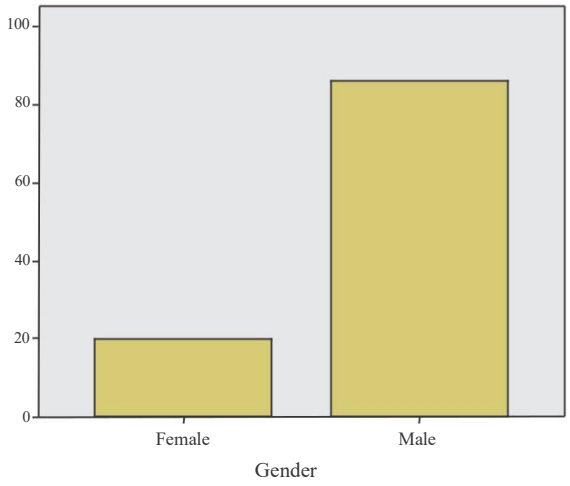

Figure 1: Gender affected by fractures

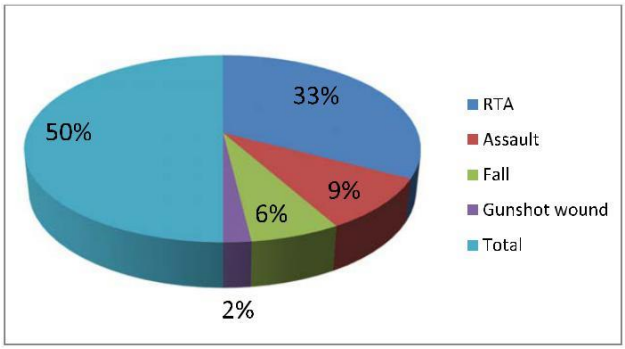

Figure 2: Etiology of fractures

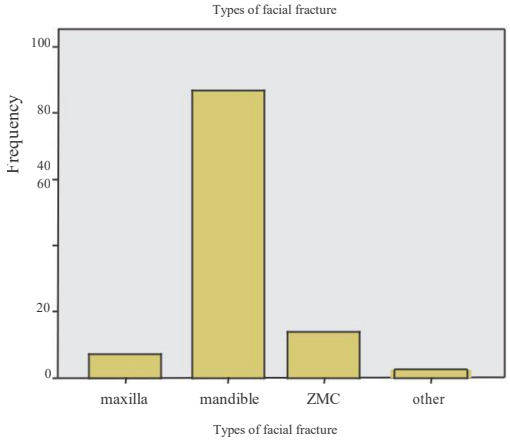

Figure 3: Different types of facial fractures.

Table 2: Location of mandibular fractures.

Types of mandibular fractures	(n)	%
Body	24	22.6
Symphysis	10	9.4
parasymphysis	25	23.6
Angle	12	11.3
Ramus	1	.9
Condyle	4	3.8
body and angle	3	2.8
parasymphysis and angle	4	3.8
Total	83	78.3

Table 3: Types of Maxillary fractures

Types of maxillary fractures	n	%
Leforte 1 & 2	4	3.8
leforte3	1	.9
other	4	3.8
Missing data	1	.9
Total	10	9.4

Table 4: Surgical procedures performed

Procedures performed		Accumulative Percent
*MMF	56	54.9
**ORIF	32	31.4
Splinting	3	2.9
Other	9	8.8
99	2	2.0
Total	102	100.0
Missing data	4	
Total	106	

Types of facial fracture * Mode of Treatment Cross tabulation Count

		Mode of Treatment					
		MMF	ORIF	Splinting	other	99	
Types of facial fracture	maxilla	0	4	2	1	1	8
	mandible	51	20	1	7	0	79
	ZMC	4	8	0	0	1	13
	other	1	0	0	1	0	2
Total		45	32	3	9	2	102

Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.081[a]	15	.000
Likelihood Ratio	37.475	15	.001
Linear-by-Linear Association	.096	1	.757
N of Valid Cases	102		

a. 19 cells (79.2%) have expected count less than 5. The minimum expected count is .04.

*MMF: Maxillo mandibular fixation
**ORIF: Open Reduction and Internal Fixation

Table 5: Types of facial fracture * Mode of Treatment Crosstabulation

Etiology of Fractures * Types of Mandibular Fractures Crosstabulation Count								
	Types of Mandibular Fracures							
	body	symphysis	parasymphysis	angle	condyle	body and angle	parasymphysis and angle	Total
Etiology of RTA	11	5	27	7	1	2	3	56
Fractures Assault	3	1	4	3	1	0	1	13
Fall	4	3	3	0	0	0	0	10
Gunshot wound	0	1	0	0	1	1	0	3
Total	18	10	34	10	3	3	4	82

Table 6: Cross tabulation between Etiology and type of fracture

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.714[a]	18	.040
Likelihood Ratio	24.285	18	.146
Linear-by-Linear Association	.034	1	.854
N of Valid Cases	82		

a. 23 cells (82.1%) have expected count less than 5. The minimum expected count is 11

b. Table 6: Chi square test of etiology with types of mandibular fractures.

Discussion

In our current study the most frequent age groups where fractures occurred were the 21-30 years and 31-40 years age group that is 20.75% each and this may be due to their increased daily activities like outdoor activities, driving or taking public transport to work. In a study in the southern region of Saudi Arabia the age group 16–35 years was the most frequent age group involved in RTA's and hence maxillofacial fractures (71%),which is very similar to our findings.[7] In a study in brazil, Sao Poalo The mean age of the patients with fractures was 27. 3 years with a minimum age of 3 and maximum of 72 years. This is almost identical to our current study.[8]

In the present study, male:female ratio was 4.2:1.This is in accordance with a study in Haryana, India where there was a similar male preponderance. A similar ratio of 4:1was found by Salonem EM in 2010 in Finland. This is probably due to the reason that men are more involved in outdoor activities. They are also more prone to violence and aggression as compared to the female population.[9] In a study by Paul.A.Tent et al in Romania the ratio of male to female fractures was 6.9:1. This is much higher than the numbers in our current study. This higher ratio might be due to a much higher consumption of alcohol in this region which increases susceptibility to an increased number of conflicts. Also physical and outdoor work is mostly done by men increasing the possibility of work related accidents.[10]

Road Traffic accidents were the main cause of fractures in our study accounting for 65.4% of the cases. In a study conducted in India 49.9% of the maxillofacial fractures resulted from road traffic accidents , which varies from our study. In another study conducted in Nigeria 71.89% of the fractures was caused by RTA,s which is quite close to the statistics in our study. The higher number of fractures due to accidents in developing countries could be explained by the fact that drivers do not follow the traffic safety rules due to lack of awareness. There are a lot of very old vehicles on roads , where there are no proper safety features for the passengers . Also the road conditions are also very frequently unsuitable for safe driving. Also people usually do not wear seatbelts or helmets while driving.[9] Interpersonal violence is the second most common cause of fractures in our study, this is much higher as compared to the study in Yumnagar ,india where it is only 5.6%. In a study in Madinah by Mahmood samman et al, assault or interpersonal violence was reported in only 2.5%. This is in stark contrast with studies carried out in the west where street fights and assault are the most frequent cause of maxillofacial injuries. In the west a large number of cases of assault are duly attributed to alcohol and drugs, stress, racial problems , cultural issues and domestic fights, all the problems of the developed world.[5]

Mandiblular fractures are the most frequently encountered fractures in our study that is 77.4%. In a study conducted in India by Kaura s. the Mandibular fractures were the most common fractures similar to our study. Ramdas et al. during their review of maxillofacial fractures in India also reported mandible as the bone to be most frequently fractured in the maxillofacial complex. The reason for this increased frequency is probably due to the fact that the mandible has a very prominent position in the face and is not as well supported as the midface.[6]

Since mandibular fractures are the most predominant in our current study they warrant a little more detailed discussion. In the current study the highest number of fractures were in the mandibular parasymphysis 30.1% closely followed by the body 28.9%, the third most frequent site was the angle 11.3% and the fourth the symphysis which was found fractured in

9.4% of the cases.

A study by Elgehani has reported the parasymphysis as being the most frequently affected site of fracture in the mandible. Another study in Eastern Libya also reported the parasymphysis as the most common site of fracture followed by angle.

Few authors reveal the most common site of fracture being parasymphysis followed by body, angle, and condyle of the mandible. Different countries have different etiologies, differences in regional factors and the type of patients for mandibular fractures, which may explain the differences in site of mandibular fractures.[5,7] The reason behind this is that,the canines have very long roots it makes the parasymphysis area more vulnerable to fractures. The explanation for a large number of parasymphyseal, symphysis and body fractures could be that since the major cause in our study of fractures is Road Traffic accidents. The force here is generally applied on the anterior part of the mandible mostly due to head on collision where the mandible suffers a direct blow from anterior to posterior direction, or due to crashes from the right or left hand sides of the vehicle resulting in trauma to the sides or body of the mandible.[11] During the assault, the force is frequently directed to the left side of the face resulting in direct fracture of the mandibular angle .

Surgical procedures performed Regarding treatment modalities, 54.9% of patients were treated by MMF , 30.2% of patients with ORIF, and 2.8% of the patients were treated with stabilization by acrylic splints and wiring. These findings were quite different from a study in India by Kaur et al where 73% of patients were treated by ORIF and MMF in 25.8% of patients, and 0.8% of pediatric patients were treated with stabilization by acrylic splint and circummandibular wiring.[1] In a study by Singh et al. patients were mostly treated by ORIF and conservative management, and circum-mandibular wiring method was less frequently used. According to Singh, et al.for treatment of mandibular fractures ORIF was mostly done. [12]

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