

PATTERN OF MAXILLARY FRACTURES IN PATIENTS PRESENTED TO TERTIARY CARE HOSPITAL-A STUDY

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ABSTRACT

The objective of this study was to evaluate pattern of maxillary fractures in patients presented to a tertiary care hospital. Data of 136 patients who sustained maxillary bone fractures presented to the Department of Oral and Maxillofacial Surgery, Mardan Medical Complex Mardan from January 2015 to September 2018 was recorded. History, clinical and radiographic examinations were performed for diagnosis. Data regarding the age, gender, etiology, and associated facial fractures were evaluated and analyzed. Out of 136 patients having maxillary fractures, 116 patients had also associated other maxillofacial fractures. A male to female ratio of 4.03:1 was recorded. Patients in their third decade of life were mostly affected (39.70%). Road traffic accident (RTA) was the most common etiology accounting for 41.9 %. The most common type of fracture was Le fort I (42.64%) and regarding associated fractures unilateral zygomatic bone fractures were most commonly (27.90%) involved. Public awareness is required regarding the significance of the facial injuries.

Key words: Maxillary fractures, associated fractures, etiology, road traffic accident, Le fort fracture.

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INTRODUCTION

Maxillofacial injuries are commonly reported to Oral and Maxillofacial Surgery Department across the world. Facial region is highly prone to traumatic incidences owing to exposed and unprotected nature of this region.¹ These fractures are often associated with severe morbidity, functional deficit, facial deformity and huge financial cost.² Maxilla is the bridge between the cranial base above and the dental occlusal plane below. It is composed of bony components of the hard palate and alveolar process.³

The causes of maxillary fractures vary widely among the world and depend upon on social, cultural, and environmental factors of particular region. Studies have reported assault as the leading cause followed by Road Traffic Accidents (RTA) in developed countries, but in developing and undeveloped world, the leading cause is RTAs followed by fall.^{4,5} These injuries may be superficial lacerations of soft tissues or involve single or multiple bones of face.⁶

Rene Le Fort performed experiments on 35 cadavers and devised the three fracture lines, called as Le Fort's lines.⁷ Severity and fracture pattern depends on the amount and direction of impact force, mechanism of injury, and anatomy of site.⁸ This fracture classifica-

tion was observed in injuries resulted from low-energy; however recently, Le Fort fractures are mainly resulted from RTAs or high-energy impacts.⁹

These fractures most commonly occurs in age group 21-30 years, while the incidence is lowest in age group above 60 years.^{8, 10, 11} Recently the male: female ratio is 4:1 around the world.^{8, 11}

Diagnosis of maxillary fractures depends upon history, clinical and radiographic examination and confirmed by computed tomography. Three-dimensional imaging is the ideal tool for providing informations regarding classification, fragmentations and any displacement.^{8, 12} Treatment of maxillary fracture varies from closed to open reduction and internal fixation at three or four sites depending upon type of fractures. Maxillary bone fracture carries a risk of functional and aesthetic impairment and therefore warrants timely management to prevent late or non-operative sequels.^{12, 13}

The objective of the present study is to evaluate the occurrence of maxillary bone fractures over 3 years period in our area with special attention to age, gender, etiological factors, site, and any associated injury. Timely diagnosis and treatment will prevent the complications associated with these fractures. This study will also help us in the collection of the data in our part of the world and will also be helpful to establish preventive measures in future.

METHODOLOGY

This descriptive study included 136 patients of both gender and all age groups, from January 2015 to September 2018, presented with maxillary bone fracture to Department of Oral and Maxillofacial Surgery, Mardan Medical Complex (MMC) Mardan. Exclusion criteria included patients with incomplete record, non treated old fractures and patients who refused. Ethical approval was taken from the hospital ethical review committee. Complete history and clinical examination of every patient was performed. Routine investigations, CT scan with 3-D reconstruction were performed for every patient. The diagnosis, so established, was based on history, clinical and radiographic examination in all cases. Preformed proforma was used to obtain study data. Frequencies, percentages were computed for variables, like gender, causes of injury, types of fracture and type of associated facial fractures and presented in form of tables and graph. Similarly, mean \pm standard deviation and age range was computed for age with frequencies and percentages for age groups and presented in tables.

RESULTS

Mean age was 32 ± 14.97 years, with an age range of 05-80 years. Age group 21-30 years were most com-

monly affected (39.70%) followed by age group 31-40 years (17.64%) (Table1).

The ratio of male and female was 4.03:1, (Fig 1).

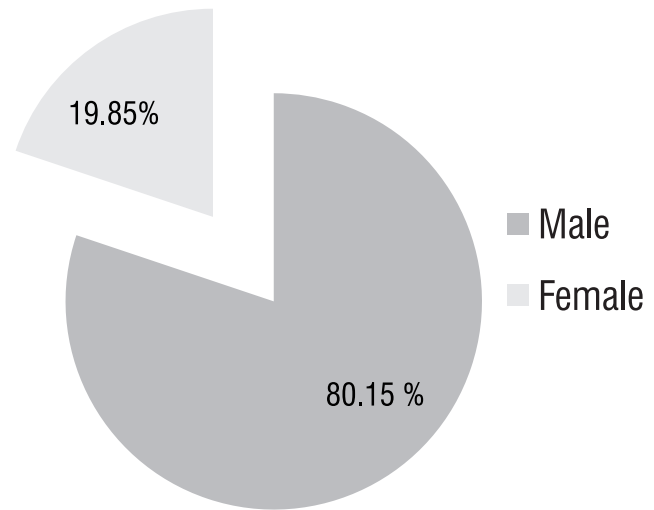


Fig 1: Gender Distribution of Maxillary Fractures

TABLE 1: AGE DISTRIBUTION OF PATIENTS WITH MAXILLARY FRACTURES

Age Groups (Years)	No of Patients	Percentage
0-10	2	1.47%
11-20	22	16.17%
21-31	54	39.70%
31-40	24	17.64%
41-50	20	14.70%
51-60	10	7.35%
61-70	2	1.47%
71 and above	2	1.47%
Total	136	100

TABLE 2: DISTRIBUTION OF PATIENTS ACCORDING TO ETIOLOGY

Cause of the Injury	No of Patients	Percentage
Road traffic accident	57	41.9%
Fall	14	10.29%
Assault / IPV	4	2.94%
Fire arm injury	0	0.0%
Sports related injury	0	0.0%
Others	4	2.94
Total	136	100

TABLE 3: DISTRIBUTION OF PATIENTS ACCORDING TO TYPE OF FRACTURE

Type of Fracture	No of Patients	Percentage
Lefort I	58	42.64%
Lefort II	38	27.90%
Lefort III	04	2.94%
Lefort I & II	32	23.50%
Lefort II & III	02	1.47%
Lefort I, II & III	02	1.47%
Total	136	100

TABLE 4: DISTRIBUTION OF PATIENTS ACCORDING TO TYPE OF ASSOCIATED FACIAL FRACTURE

Associated Facial Fracture	No. Of Patients	Percentage
Dentoalveolar	02	1.72 %
Mandible		
Symphysis	06	5.17%
Parasymphysis	06	5.17%
Body	04	3.44%
Angle	02	1.72 %
Ramus	02	1.72 %
Condyle	12	10.3%
Coronoid	02	1.72 %
Unilateral Zygomatic Bone	38	32.7%
Bilateral Zygomatic Bone	14	12.06%
NOE Complex	10	8.62%
Isolated Nasal Bone	06	5.17%
Frontal Bone	02	1.72 %
Isolated Orbital Rim	02	1.72 %
Mid Palatal Split	08	6.89%
Total	116	100

Road Traffic Accidents (41.9 %) was the common cause of injury followed by fall (10.29%) and assault (2.94%) (Table 2).

LeFort I (42.64%) was the common fracture, followed by LeFort II (27.90%), combination of LeFort I and II (23.50%) and LeFort III (2.94%), (Table 3).

Regarding associated facial fractures unilateral zygomatic fracture was most common (32.7%) followed by mandibular fractures (27.90%) and bilateral zygomatic bones fractures (12.06%), (Table 4).

DISCUSSION

This study was conducted for the evaluation of maxillary fractures pattern (LeFort) in patients presented to tertiary care hospital. Studies in developing countries, over the past three decades, have shown that RTA is the most common etiological factor of maxillary fractures, while in developed countries interpersonal violence is the prevailing reason.^{14, 15, 16, 17} Results of our study shows the leading cause of injury was RTA (41.9 %) followed by falls (10.29%) and assaults (2.94%). Similar results were seen in the studies conducted in other areas of Pakistan.^{1, 2, 6, 8} The possible cause for the increased incidence of RTA could be the use of two wheelers, crowded or poorly maintained roads and violations of traffic rules. Trauma due to fall could be in children while playing or young men falling from heights while working. In developed countries, IPV is the common etiological factor for facial fractures.¹⁸ The use of seat belts have significantly reduced the RTA related facial fractures in recent past.^{19, 20}

In this study the most commonly affected age group was 21-30 years. This figure is consistent with other studies done in Pakistan.^{1, 2, 8, 21, 22} Studies done across the world also shows similar results regarding age distribution.^{23, 24} People in this age group are commonly actively involved in day to day activities and therefore are prone to trauma.

The high ratio of male over female (4.03:1) shows that maxillary bone fractures were more common in the male than female in our country.^{2, 8, 21, 22} However; studies from other countries had also reported similar results.^{23, 24} The predominance of male population, in this study, may be due to increased involvement of male in daily activities,²⁵ and cultural differences as women in our society remain indoor.

Trauma to face may cause other facial fracture. Per patient there are 0.85 associated facial fractures. The most common associated facial bone involved is unilateral zygomatic, followed by mandibular fractures. Oliveira-Campos GH²⁴ and co-workers also reported similar results of zygomatic bone fractures associated with LeFort fractures. As maxillary bone is closely related to the zygomatic bone at the zygomaticomaxillary suture lines that's why, zygomatic bone fractures may be associated with maxillary bone fractures to pose a life-threatening condition as well as gross facial deformity.²⁶ Fractures of other facial bone complicates the management of LeFort fractures in these patients.^{12, 23, 26}

CONCLUSION AND RECOMMENDATIONS

This study revealed that maxillary fractures were more prevalent in male and in young age group. RTA was the most common etiology of these fractures and the most common type was Le fort I followed by Le fort II. Unilateral zygomatic bone fracture was the most commonly involved associated bone.

Recommendations for the reduction in incidence of maxillary bone fractures are:

1. Implementation of traffic laws/rules to ensure the use of seat belts, control over speeding, overloading in private and public transport.
2. Sensitization and education of the public regarding the use of protective measures in high speed transportation through print, social and electronic media should be started.
3. Parent education regarding sequels of trauma to children due to fall will help to reduce the complications in these patients.

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| 2 Sertaj Khan: | Article Discussion and cross referencing. |
| 3 Saifullah: | Data Analysis and Interpretation. |
| 4 Mohammad Tariq Khan: | Data interpretation and plagiarism analysis. |
| 5 Khadija Syed: | Data collection. |
| 6 Syed Asad Shah: | Data collection. |
| 7 Ruqayyah Younis: | Literature Review & write the first draft of article. |
| 8 Muhammad Sohail: | Data collection. |
| 9 Umar Khitab: | Supervised the entire research process. |