

ORIGINAL ARTICLE

Frequency and Etiology of Zygomatic Complex Fractures in Oral and Maxillofacial Trauma Patients in Tertiary Care Hospital Karachi

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ABSTRACT

Aim: To determine the frequency and etiology of zygomatic complex fractures in oral and maxillofacial trauma patients.

Methods: This cross sectional study was conducted at Oral and Maxillofacial department on 116 patients presenting with oral and maxillofacial trauma. Frequency and etiology of zygomatic complex fractures in these patients were determined. Frequencies and percentages were used for categorical data while mean and SD was calculated for numerical data. Chi Square test for applied for association between categorical data.

Results: Mean age of the patients was 31.52±8.19. The frequency of zygomaticomaxillary complex fractures in our study was 64 (29.3%). Most common etiology was traffic accident 16 (47.1%) followed by fall from height 11 (32.4%).

Conclusion: Traffic accident was the leading etiological factor of zygomaticomaxillary complex fractures. Age groups of 20 to 30 years is the most vulnerable age group for zygomaticomaxillary complex fractures.

Keywords: Etiology, Zygomaticomaxillary Complex Fractures, Oral and Maxillofacial trauma

INTRODUCTION

Maxillofacial injuries are among the most commonly known to general and hospital practices alike, which often tend to be overlooked during initial evaluation¹. The zygomatic bone is a critical component of the face for both aesthetic and functional considerations, with various etiologies and therapeutic approaches in advanced and emerging economies². Despite the reality that injuries to the face, head, and neck are still quite frequent, the etiology of maxillofacial injuries has gained very little emphasis in the overall trauma field³. The economical, sociocultural, and environmental variables contribute the etiology⁴.

Zygomaticomaxillary complex fracture are the second most prevalent type of facial fractures, followed nasal structure, and fractures. It contributes to the development of the orbital cavity, the maxillary sinus, the temporal fossa, and the zygomatic arch in addition to playing a crucial protective role for the eye⁵.

Worldwide, there are disparities in the occurrence and etiology of maxillofacial fractures, as well as within a single nation, there might be variances based on local socioeconomic, cultural, and environmental factors^{6, 7}. Traffic accidents were the predominant etiological factor for maxillofacial injuries in previous investigations⁸. A wide range of symptoms and indicators are present in the zygomatic complex fracture, including pain, sensory deficit, deformity or displacement, trismus, ecchymosis, a flattened arch or malar prominence, periorbital edema, displacement of the palpebral fissure, conjunctival bleeding, diplopia, chemosis, and enophthalmos⁹.

The fracture as well as its displacement are detected accurately by radiological assessment techniques such computerized tomography scan with reconstruction, occipitomeatal view, and sub-mentovertebral view. Depending on the level of displacement of the zygomatic bone, various intervention strategies have been devised for zygomaticomaxillary complex fractures. These extend from conventional conservative therapy to open reduction and multiple point of exposure and fixation¹⁰⁻¹².

One of the supporting structures that governs facial shape and contour is the zygomatic bone. Appropriate evaluation and treatment of such injuries are critical in this regard to their aesthetic and functional implications. In order to assist the individuals living in the area, taking the necessary precautions and thereby drastically lowering the likelihood of zygomatico-maxillary complex fractures and the complications related to the fracture, this study was an attempt to determine the most common causes of these fractures in the area.

MATERIAL AND METHODS

This cross sectional study was conducted at Oral and Maxillofacial department from January 2022 to July 2022 after taking ethical clearance from the ethical board of the hospital. Patients were recruited for the study using non probability consecutive sampling. Patients of either gender presenting with oral and maxillofacial trauma coming from the outpatient department were included. Patients presenting with gunshot injuries and bomb blast injuries were excluded. All the patients were subjected for detailed oral clinical examination and radiographic assessment. All the data including etiological factors, side of fracture, gender and age was recorded on a pre designed pro-forma.

The sample size was calculated using openepi web based sample size calculator, taking previous frequency of interpersonal violence 12.3%, 6% margin of error and 95% confidence interval, the calculated sample size was 116.

Data was analyzed using IBM SPSS 20. Mean and SD deviation for calculated for age. Frequencies and percentages were used for categorical variables. For assessing association between categorical variables, Chi Square test was applied keeping $P < 0.05$ as statistically significant.

RESULTS

This study was conducted on 116 patients presenting with maxillofacial trauma. The mean age of the patients was 31.52±8.19. Majority of the patients in our study were in the age group of 20 to 30 years, which accounted for 52.59% of the patients. In the age group of 31 to 40 years there were 29.31% patients whereas in the age group of 41 to 50 years there were 18.10% patients.

According to the gender distribution we observed predominance of male gender as they accounted for 67.24% of the patients whereas there were 32.76% females. The frequency of zygomatic complex fracture was 34 (29.3%). The frequency of zygomaticomaxillary complex fractures in our study was 64 (29.3%). According to the etiology of the zygomatic complex fracture the most common etiology was traffic accidents which was 16 (47.1%) followed by fall from height 11 (32.4%). The rest of the etiological pattern can be seen in table 1. Regarding the side of fracture majority of the patients had right side involved 62.1%, 29.3% patients had left side involved and 8.6% had bilateral fracture. We observed that the age group of 20 to 30 years were the most vulnerable age for zygomatic complex fracture as majority of the patients having zygomatic fractures were in the age

group of 20 to 30 years (Table 2) ($P < 0.05$). Gender wise association with zygomatic fracture revealed that male gender was the most effected as compared to female gender (Table 3) ($P < 0.05$)

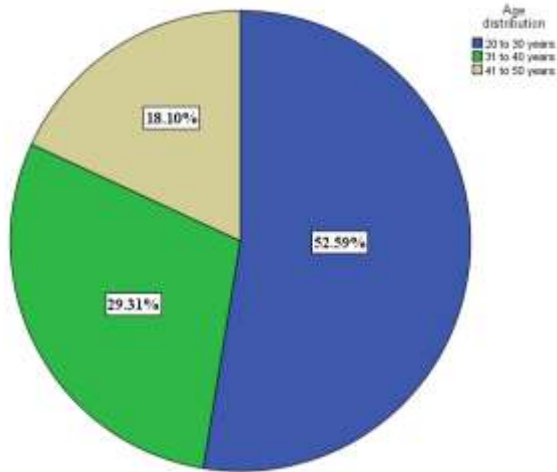


Figure 1: Age distribution

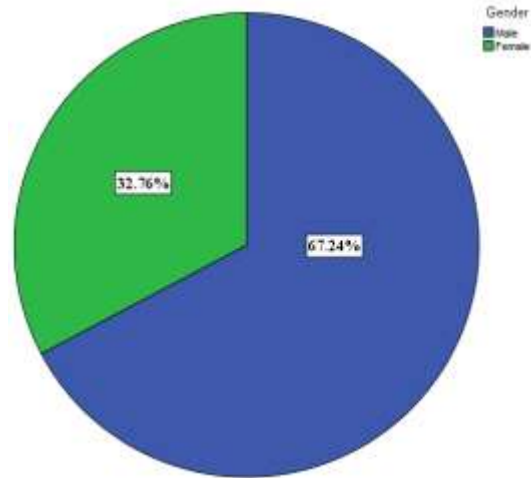


Figure 2: Gender distribution

Table 1: Etiology of zygomatic complex fracture

		Etiology					Total
		Traffic accident	Fall from height	Interpersonal assault	Sport injury	Other	
Zygomatic complex fracture	Yes	16 47.1%	11 32.4%	3 8.8%	3 8.8%	1 2.9%	34 100.0%
	No	34 41.5%	27 32.9%	8 9.8%	9 11.0%	4 4.9%	82 100.0%
Total		50 43.1%	38 32.8%	11 9.5%	12 10.3%	5 4.3%	116 100.0%

Table 2: Association of zygomatic complex fracture with age

		Age distribution			Total	P value
		20 to 30 years	31 to 40 years	41 to 50 years		
Zygomatic complex fracture	Yes	25 73.5%	5 14.7%	4 11.8%	34 100.0%	0.01
	No	36 43.9%	29 35.4%	17 20.7%	82 100.0%	
Total		61 52.6%	34 29.3%	21 18.1%	116 100.0%	

Table 3: Association of zygomatic complex fracture with gender

		Gender		Total	P value
		Male	Female		
Zygomatic complex fracture	Yes	28 82.4%	6 17.6%	34 100.0%	0.02
	No	50 61.0%	32 39.0%	82 100.0%	
Total		78 67.2%	38 32.8%	116 100.0%	

DISCUSSION

Because of its prominence in both aesthetics and function, zygomaticomaxillary complex is a particularly important component of the face, which is especially susceptible to damage in the maxillofacial region. The zygomaticomaxillary complex (zygomaticomaxillary complex) is a particularly important and complicated facial structure since it serves as a vertical and horizontal support system for the face. The zygoma is an important element of the lateral and inferior orbital rim and the orbital floor, as well as a sturdy buttress of the middle third of the face skeleton. Fractures to the maxilla, naso-ethmoidal region, and orbital area are common because of its central location in the face. Different facial deformities can be caused by four different phases of the fracture complex. Paresthesia, trismus, diplopia, and antimongoloid slant are functional impairments that can be

exceedingly bothersome to patients and often necessitate surgical treatment. Complex traumas sometimes result in non-standard fracture patterns, making it challenging to apply established classifications to a subset of zygomaticomaxillary complex fractures. Because of these characteristics, treating fractures is often complicated and requires individualised care for each patient.

The overall frequency of zygomaticomaxillary complex fractures in our study was 64 (29.3%) out of 116 patients presenting for maxillofacial trauma. In our study we observed that males (82.4%) were more effected by zygomaticomaxillary complex fractures as compared to the females. This could simply be explained by the fact that in our society the male gender is more exposed to various work and social hazards like traffic accidents, interpersonal assault, fall from height and sports injuries etc. Females are often less active in social activities which makes them less prone to zygomaticomaxillary complex fractures. Similar findings have been reported by various studies in the support of male dominance in zygomaticomaxillary complex fractures. A study¹³ conducted in India reported 98 patients with zygomaticomaxillary complex fracture were treated, with male making up 72.4% (n=71) and females making up 27.6% (n=27) of the total patients.

Regarding the age groups, we have found that the age group of 20 to 30 years is the most vulnerable group for

zygomaticomaxillary complex fractures, as this age group is mostly active in outdoor activities. In comparison to our findings a study¹⁴ conducted in Pakistan also reported that patients especially the male gender in their twenties are at a higher risk of zygomaticomaxillary complex fractures.

Regarding the etiology of the zygomaticomaxillary complex fractures in our study the most common etiology was traffic accidents which accounted for 47.1% of all etiologies followed by fall from height which was 32.4%. Interpersonal assault and sports injuries had similar proportions of 8.8%. Our findings are in comparison with various studies. A study conducted in India¹³ reported that RTA was the leading cause of zygomaticomaxillary complex fractures. They reported that the incidence of RTA in their study was 57.1% followed by self fall which was 16.3%, interpersonal violence accounted for 12.3% which is similar to our findings. Khan A et al¹⁴ also reported that RTA was the major cause of zygomaticomaxillary complex fractures in their study accounting for 75% of all etiologies including accidental fall 9%, sports injuries 4% and interpersonal assault 12%. Another study¹⁵ conducted in India reported that RTA was the most frequency cause of zygomaticomaxillary complex fractures, they reported the frequency of 76.23% of RTA in their study. The increasing number of traffic accidents leading to zygomaticomaxillary complex fractures in Pakistan is due to the violation of the traffic rules and careless driving by the uneducated and underage drivers. Since Pakistan is a country where majority of the people belong to a low socioeconomic background, they use public transport for daily commute, hence more often they become the victim of careless driving.

CONCLUSION

From our study we conclude that the most common etiological factor of zygomaticomaxillary complex fracture was traffic accident. The most common age group at risk was 20 to 30 years, since this age group is the most active phase of a people's life, public awareness and strict implementation of traffic policies are the need of the hour.

REFERENCES

- Ogunbowale A, Costello L, McCormack D, Ekanayake K, Kearns GJ. Maxillofacial fractures in females: a 5-year retrospective review. *Ir J Med Sci.* 2022;191(1):367-74.
- Ciofu ML, Sulea D, Luchian S, Boisteanu O. Aesthetic considerations in the reconstruction of orbito-zygomatic fractures. *Med Surg J.* 2018;122(1):176-83.
- Prajapati VK, Shahi AK, Prakash O, Ekram S. Etiology, Modalities of Zygomaticomaxillary Complex Fracture, open reduction and fixation. *J Clin Exp Dent.* 2021;13(3):e215.
- Ribeiro AL, da Silva Gillet LC, de Vasconcelos HG, de Castro Rodrigues L, Pinheiro JD, de Melo Alves-Junior S. Facial fractures: large epidemiologic survey in northern Brazil reveals some unique characteristics. *J Oral Maxillofac Surg.* 2016;74(12):2480-81.
- Blumer M, Kumalic S, Gander T, Lanzer M, Rostetter C, Rücker M, et al. Retrospective analysis of 471 surgically treated zygomaticomaxillary complex fractures. *J Craniofac Surg.* 2018;46(2):269-73.
- Adeyemo WL, Ladeinde AL, Ogunlewe MO, James O. Trends and characteristics of oral and maxillofacial injuries in Nigeria: a review of the literature. *Head Face Med.* 2005;1(1):1-9.
- Wusiman P, Maimaituerxun B, Saimaiti A, Moming A. Epidemiology and pattern of oral and maxillofacial trauma. *J Craniofac Surg.* 2020;31(5):517-20.
- Neto IC, Franco JM, de Araujo Junior JL, Santana MD, de Abreu LC, Bezerra IM, et al. Factors associated with the complexity of facial trauma. *J Craniofac Surg.* 2018;29(6):e562-6.
- Schneider M, Besmens IS, Luo Y, Giovanoli P, Lindenblatt N. Surgical management of isolated orbital floor and zygomaticomaxillary complex fractures with focus on surgical approaches and complications. *J Plast Surg Hand Surg.* 2020;54(4):200-6.
- Olate S, Lima Jr SM, Sawazaki R, Moreira RW, de Moraes M. Surgical approaches and fixation patterns in zygomatic complex fractures. *J Craniofac Surg.* 2010;21(4):1213-7.
- Higgins A, Hurrell M, Harris R, Findlay G, David M, Batstone M. A study protocol for a randomised controlled trial evaluating the effects of intraoperative computed tomography on the outcomes of zygomatic fractures. *Trials.* 2019;20(1):1-10.
- Pons M, Lutz JC, Chatelain B, Weber E, Barrabe A, Meyer C, et al. Impact of intraoperative cone beam computed tomography in the management of zygomatic fractures. *J Stomatol Oral Maxillofac Surg.* 2021;122(4):349-54.
- Rohit, Vishal, Prajapati VK, Shahi AK, Prakash O, Ekram S. Incidence, etiology and management zygomaticomaxillary complex fracture. *J Clin Exp Dent.* 2021;13(3):e215-20.
- Khan A, Jamal M, Javed A, Asim M, Sardar H. Frequency and etiology of zygomatic complex fractures in oral and maxillofacial trauma patients, a study done at ayub teaching hospital, abbotabad. *PODJ.* 2017;37(4):543-6.
- Yamsani B, Gaddipati R, Vura N, Ramiseti S, Yamsani R. Zygomaticomaxillary complex fractures: a review of 101 cases. *J. Maxillofac. Oral Surg.* 2016 ;15(4):417-24.