



Original Article

Frequency of Zygomatic Complex Fracture in Patients Presenting to Ayub Teaching Hospital

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ABSTRACT

Zygomatic complex fractures are a prevalent type of facial injury. It often results from road traffic accidents (RTA). It poses significant clinical challenges. **Objective:** To find out the frequency of zygomatic complex fractures among patients introduced at the Ayub Teaching Hospital. **Methods:** This cross-sectional study was carried out in the Department of Oral and Maxillofacial Surgery at Ayub Teaching Hospital, Abbottabad, Pakistan after approval from IRB (Institutional Review Board) of the Ayub Teaching Hospital Abbottabad, (IRB-F5/Dent/AMC&ATH) from September 1, 2019, to March 1, 2020. A total of 146 patients, including both genders and revealing oral and maxillofacial injury, were essential parts of the research. Before performing meticulous intra and extra-oral clinical examinations and computed tomography (CT) scans in the Department of Radiology to diagnose zygomatic complex fractures. **Results:** Out of the total number of 146 patients, 33.6% had ZMC fractures. The study involved patients aged 18-60 years. This is consistent with an average age of 31.993 ± 8.00 years and a mean weight of 74.664 ± 9.26 kg. Male patients represented 74.7% of cases and female comprised 25.3%. The primary causes of fractures were road traffic accidents, falls, and sports injuries. **Conclusions:** The research concluded that zygomatic complex fractures occurred due to road traffic accidents (RTA), which are more common in this region. Thus, the examination highlights the basic requirement for procedures to alleviate street mishaps to abridge such terrible facial injuries.

INTRODUCTION

The prominence and structural significance of the zygomatic bone are well known, which is connected with the temporal, sphenoid, frontal, and maxillary bones to form the lateral and anterior regions of the face. It also protects the contents of the orbit. Notably, fractures influencing the zygomatic complex stand among the most predominant injuries in facial injury, especially pervasive in grown-up adults [1]. Pattern and severity of fracture associated with causative factor, magnitude of factor, duration of impact, and other etiological factors [2, 3]. These fractures have many different causes, including

sports-related incidents, assaults, falls, and road accidents [4]. In any case, the epidemiology of maxillofacial fractures shows topographical and sociodemographic variability, affected by social, financial, and surrounding factors [5]. Fractures of the alveolar process are frequently observed in 2-8% of all craniofacial injuries. It was also seen that the severity of damage increased with soft tissues and teeth [6]. Frequently fractures occur due to motor vehicle accidents, playground accidents, falls, and sports injuries [7]. Moreover, direct or indirect pressure on a tooth may lead to overlying the soft

tissues which further cause the dentoalveolar injury [8]. Approximately, 1-8% of pediatric fractures occurred due to midfacial fractures, which are less common among children and may affect the mandible bone [9]. The low proportion may be due to the mandible and cranium bone providing protection, which act like absorbent and absorb most traumatic impacts due to the flexibility of osseous suture lines and the elasticity nature of midfacial bones [10]. The number of children with fractures of midfacial bones is increasing with the passage of time, which might be due to the usage of suitable imaging modalities [11]. Clinical signs of zygomatic complex fracture include diplopia, enophthalmos, subconjunctival ecchymosis, capture of extraocular muscles, malar eminence depression, facial extending, malocclusion, and infraorbital nerve-related neurosensory instabilities [12, 13]. Clinical examination is the primary method of diagnosis, which is typically supported by computed tomography (CT) scans [14]. Early and exact diagnosis stays crucial for ideal treatment, highlighting the significance of exact injury evaluation and timely treatment providences [15]. Surgical management is the primary choice of treatment for displaced zygomatic complex fractures, apart from cases in which surgery is contraindicated due to the medical health of the patient or denied by the patient because of aesthetic concerns [16]. The surgical treatment of fractured zygomatic complexes is the subject of extensive research in the existing literature [17]. Research like the ones carried out by Khan *et al.*, showing a 27% recurrence of zygomatic complex fractures [18], and Tripathi *et al.*, detailing a recurrence of 41.48% [19], further highlight the frequency of these injuries. A larger part of the mid-third of facial fractures include the zygomatic complex, however, the rate varies across different population. The exact treatment and management of zygomatic complex fractures turn on a careful pattern of fractures within one specific group of people. As a feature of this undertaking, this study means to find out the recurrence of zygomatic complex fractures among patients owned up to the ER [20]. The final results of this research are expected to contribute vital proof in regards to this subject among our population, possibly molding more designated and compelling ways to manage these fractures.

This study aimed to find the frequency of zygomatic complex fractures among patients introduced at the Ayub Teaching Hospital.

METHODS

A cross-sectional study was conducted from September 1, 2019, to March 1, 2020, in the Department of Maxillofacial Surgery at Ayub Teaching Hospital, Abbottabad, Pakistan after approval from IRB (Institutional Review Board) of the

Ayub Teaching Hospital Abbottabad, (IRB-F5/Dent/AMC&ATH). The Sample comprised 146 patients. Certainty level of 95%, an expected extent of zygomatic complex fractures in patients with maxillofacial injury of 41.48%, and an absolute accuracy of 8%. For participant selection, non-probability consecutive sampling was used [20]. Individuals between the ages of 18 and 60, regardless of gender, who presented to the emergency department with a history of oral and maxillofacial trauma were included in the inclusion criteria. Fractures caused by gunshot wounds and people who refused informed consent were added to the exclusion criteria. After obtaining written approval and endorsement from the ethical council. After obtaining their informed consent, eligible patients who presented with oral and maxillofacial trauma at the Maxillofacial Surgery Emergency Department, Ayub Teaching Hospital, Abbottabad, were enrolled. Patient qualities like age, orientation, weight (estimated on a weighing scale), and the reason for injury were recorded using a standardized data collection form. Comprehensive intra- and extra-oral clinical examinations and detailed histories were obtained. Patients went through CT checks and the identification of zygomatic complex fractures adhered to the researcher's standardized definition. Data analysis was performed utilizing IBM-SPSS- rendition version 22.0. Quantitative variables like age and weight were shown as Mean \pm SD, whereas categorical variables like gender, trauma cause, and the incidence of zygomatic complex fractures were shown as frequency and percentage. Separation was completed in view old enough, orientation, weight, and justification behind injury to evaluate their effect on zygomatic complex break event. Post-definition chi-square tests were applied, and measurable importance was set at $p \leq 0.05$.

RESULTS

The participants in the study ranged in age from 18 to 60, with a mean age of 31.99 ± 8.00 years and a weight of 74.66 ± 9.26 kilograms. Approximately 75% of the patients were male and approximately 25% were female (Figure 1).

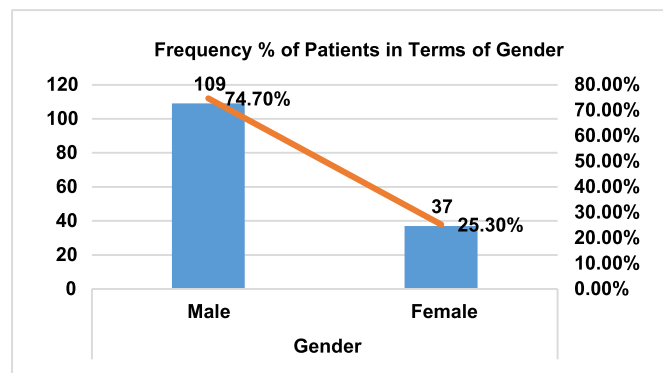


Figure 1: Frequency and Percentage of Patients in Terms of Gender at Ayub Teaching Hospital

The patients had various reasons for injury among which 75% were the cases of road traffic accidents, 31% were violent assaults, 33% had fall history and 7% were related to sports injuries(Figure 2).

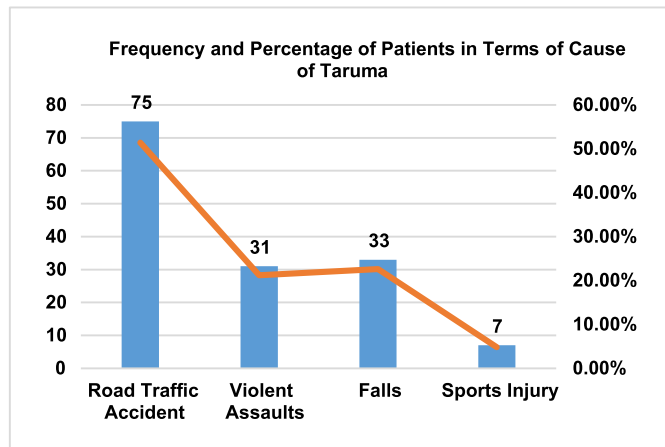


Figure 2: Frequency and Percentage of Patients in Terms of Cause of Trauma at Ayub Teaching Hospital (Total Traumatic Cases=146)

Among the total trauma cases i.e. 146 patients, 33.6% had ZMC fracture and 66.4% were the cases not involving the ZMC fracture(Figure 3).

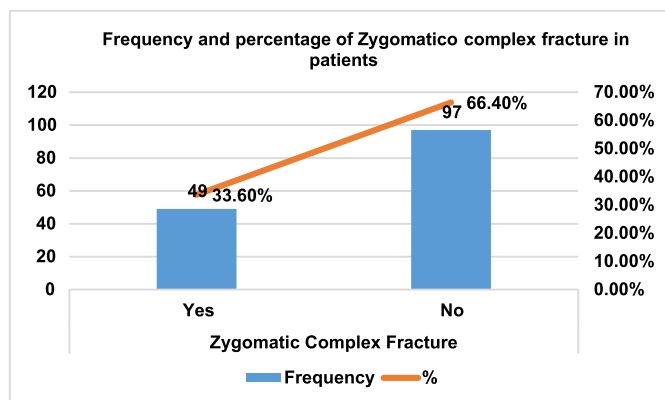


Figure 3: Frequency and Percentage of Zygomatic Complex Fractures in Patients at Ayub Teaching Hospital (49 Out of 146 are ZMC Fractures)

All the data mentioned in the above figures summarized in the table below which show the frequency of patients in terms of gender, cause of trauma, and ZMC fracture (Table 1).

Table 1: Frequency % of Patients in Terms of Gender, Cause of Trauma and Zygomatic Complex Fracture (n=146)

Variables		Frequency %
Gender	Male	109 (74.7%)
	Female	37 (25.3%)
	Total	146 (100%)
Cause of Trauma	Road Traffic Accident	75 (51.4%)
	Violent Assaults	31 (21.2%)
	Falls	33 (22.6%)

Zygomatic Complex Fracture	Sports Injury	7 (4.8%)
	Total	146 (100%)
	Yes	49 (33.6%)
	No	97 (66.4%)

Zygomatic complex fractures were dispersed among various age gatherings, sex, loads, and purposes behind the injury(Table 2).

Table 2: Division of Zygomatic Complex Fracture in Terms of Age, Gender, Weight, and Cause of Trauma

Variables	Zygomatic Complex Fracture		p-value	
	Yes	No		
Age (Years)	18-40	41 (33.1%)	83 (66.9%)	0.763
	41-60	8 (36.4%)	14 (63.6%)	
Gender	Male	39 (35.8%)	70 (64.2%)	0.330
	Female	10 (27%)	27 (73%)	
Weight (kg)	≤80	35 (32.1%)	74 (67.9%)	0.524
	>80	14 (37.8%)	23 (62.2%)	
Cause of Trauma	Road Traffic Accident	33 (44%)	42 (56%)	0.009
	Violent Assaults	3 (9.7%)	28 (90.3%)	
	Falls	11 (33.3%)	22 (67.7%)	
	Sports Injury	2 (28.6%)	5 (71.4%)	

DISCUSSION

The prevalence, demographics, etiology, and treatment of zygomatic bone fractures, particularly facial fractures, are the primary topics of discussion in this article. It features that zygomatic bone fractures, comprising the most well-known among facial fractures, overwhelmingly influence people within a particular age group and gender, primarily happening because of different mishaps like industrial mishaps, sports injuries, and road traffic accidents. Zygomatic bone fractures, framing the anterolateral projection of the center face, address a huge part of facial fractures. This thesis article dives into the socioeconomics, causative factors, and helpful treatment modalities concerning these fractures. Studies show a majority event of zygomaticomaxillary complex (ZMC) fractures among people aged 18 to 41, affecting a greater population of male gender (74.7%)[21]. This gender incline lines up with worldwide patterns seen in comparable studies, credited to higher male contribution in exercises inclined to injury, for example, road traffic accidents, falls, and sports injuries. This study mirrors discoveries in different areas, highlighting the effect on young adults participating in ventures [22, 23]. Etiologies for zygomaticomaxillary complex cracks show territorial inconsistencies. While created nations witness a decrease in road traffic accidents, this review, directed in Abbottabad, recognized road traffic accidents as the primary causative factor (44%) [23]. Contrasting sociocultural settings, for example, lack of safety measures, essential education about road sense in common people, and low financial conditions, contribute essentially to this pattern in the neighborhood people. In

contrast, alcohol abuse and social dissatisfaction lead to assault-related injuries in other regions [24]. This study aligns with the findings of Shah *et al.*, who reported a similar male predominance in facial fractures. He found a predominance of zygomatic complex fractures in males (74.7%). This gender predominance indicates the involvement of male in activities prone to injuries [2]. These injuries include road traffic accidents and sports. Additionally, our studies were supported by the work of Liu *et al.* [1]. He reported comparable age and gender distributions in their study on facial fractures. These fractures were caused by falls. It also supports our demographic findings. Our study showed that RTA (44%) was the leading cause of ZMC fracture. It is not the common cause of ZMC fracture in developed nations. These results were consistent with the findings of as described by Dikhit and Gaggl [25, 26]. Other causes like sports injuries and violent assaults in developed countries. While assault-related injuries were more prevalent Bruccoli *et al.* found that in regions with significant alcohol abuse and social dissatisfaction, Assault related injuries are the primary cause of ZMC fracture [27]. It contrasts with our findings where road traffic accidents were predominant. There are various causes of ZMC fracture across different regions of the world. This highlights the influence of social, cultural, and geographic factors. In contrast, our findings emphasize the need for better road safety education and measures in Abbottabad. This is to mitigate the high incidence of road traffic accidents. Treatment option varies globally. It includes different approaches ranging from non-fixation to direct reduction and fixation. Our study supports the use of bone plating. This aligns with the findings of Patrick and colleagues [28]. Studies show that better outcomes with mini bone plate fixation compared to wire osteosynthesis. This highlights the importance of adopting optimal treatment strategies to improve patient outcomes [10]. The changing nature of maxillofacial injuries is highlighted by comparisons with studies from various regions. Changed causes going from road traffic accidents to social attacks feature the impact of social, cultural, and geographic variables on the occurrence of zygomaticomaxillary complex fractures [29]. This explains the need for locally educating people on how to prevent such injuries. The treatment modalities of zygomaticomaxillary complex fracture remain a subject of discussion around the world [30]. Using a variety of hardware options, recommendations range from non-fixation to direct reduction and fixation. While different methodologies exist, ideal circumstances favor decrease and fixation with bone plating, as confirmed by studies supporting mini bone plate fixation over wire osteosynthesis. A better understanding of regional influences on fracture demographics and causes is necessary to understand the changing patterns of maxillofacial injuries. This study shows the significance of customized mediations to relieve common causative

factors and highlights the meaning of ideal fracture management modalities.

CONCLUSIONS

The study concluded that the higher occurrence of zygomatic complex fractures in this geographic locality, mainly credited to road traffic accidents. Extraordinarily, the age section of 18-40 years is the most impacted section, confirming this stage as an active phase of life and commitment to adventurous pursuits. These findings emphasize the significance of targeted interventions and preventative measures to reduce the frequency of such injuries, particularly during this active phase of life.

Authors Contribution

Conceptualization: SM, PI

Methodology: TAK, GG

Formal analysis: SM

Writing-review and editing: MR, MAW, PI

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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