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ORIGINAL ARTICLE

Frequency of Paresthesia with Zygomaticomaxillary Complex Fracture

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ABSTRACT

Background: Paresthesia is defined as alteration in local sensibility, accompanied with numbness, tingling, or unpleasant sensation caused by nerve injury
Aim: To determine the frequency of paresthesia with zygomaticomaxillary complex (ZMC) fractures.
Methodology: Descriptive case series was carried out at Department of Dentistry, Ayub Teaching Hospital, Abbottabad from 20th December 2021 to 20th June 2022. One hundred and sixty-four patients of both genders with ZMC fracture confirmed clinically and radiographically were included. The zygomatic region was clinically examined for presence of zygomatic complex fracture and associated paresthesia.
Results: The age range was from 20 to 80 years with mean age of 37.061±9.93 years and mean duration of injury was 8.457±2.4 6days. Male patients were 90.9% and females were 9.1%. Paresthesia was observed in 18.3% patients. The study involved patients aged 20-80 years, with a mean age of 37.061 years and a mean duration of 8.457 days. Males were 90.9%, with 46.3% left side injuries, and 18.3% experienced paresthesia.
Practical implication: The study highlights the importance of assessing fractures and identifying nerve compression to mitigate sensory complications, emphasizing the need for early-stage treatment.
Conclusion: The compression of infraorbital nerve leading to paresthesia was more common in displaced fractures of zygomaticomaxillary complex fractures.
Key words: Zygomaticomaxillary, Complex fractures, Paresthesia, Frequency

INTRODUCTION

Maxillofacial injuries are one of the most common encountered health problems worldwide. These injuries present as a serious clinical problem due to complexity and sensitivity of this anatomical region. Road traffic accidents are the main cause of facial injuries followed by assault, sports, occupational hazards and fall. Mid face represents middle portion of face including maxilla, nasal cavity, zygomatic bone, ethmoid bone and sphenoid bone. Therefore, these fractures are considered most important in treating and re-establishing aesthetics and function according to the fracture pattern and associated adjacent structures[1].

The floor of the orbit its lateral portion, malar eminence as well zygomatic arch is formed by the zygomatic bone which plays an important role in the formation, function and the aesthetic of facial appearance. It functions in articulating the frontal, maxillary, and temporal as well as sphenoid bone resulting in the formation of the tetrapod. Within the various forms of fractures, the zygomaticomaxillary complex fractures are prioritized as one of the most common facial fractures after nasal-bone fractures due to its eminence and contour. These fractures cause functional and cosmetic disturbances because of its association with mandibular coronoid process and orbit. The orbital skeleton is majorly affected in these facial injuries. There are various signs and symptoms related with it including facial and periorbital swelling, sub-conjunctival haemorrhage, ecchymosis, cheek flattening, infraorbital nerve sensations disturbances, enophthalmos, occlusion disturbances, vision doubling, limitation in opening of the mouth[1,2].

Among the various patterns of the ZMC including simple to complex and non-displaced to grossly displaced, there is a significant impact of the cause of injury and the force applied[2].

Zygoma is termed as the buttress, lateral portion of the middle 3rd region of the facial skeleton which contributes to the strength and stability. The zygoma fractures caused the breakage/disruption of the 4 facial sites including the zygomatic-maxillary buttress as well as the inferior orbital rim, lateral orbital rim and also the zygomatic arch[3]. Paraesthesia which is defined as local sensibility as well as numbness and unpleasant tingling is caused by nerve injury as is commonly observed in 70.67% of these patients with involvements of the infraorbital nerve[4].

There are other studies which report the ZMC fractures as in 18-83%. It is reported as sensory modifications including hypoesthesia, dysesthesia/paraesthesia or and anaesthesia of mid-face with involvement of the upper lip, nose, lower-eyelid, cheek as well as of the intraorally; anterior region of gingival and that of the teeth.[5] The present study also reported compression of the infra-orbital nerve which was followed by paraesthesia in patents with the displaced fractures of zygomaticomaxillary bone complex[6]. Photo-biomodulation is an emerging concept in this relevance which is considered as an effective method for the treatment ofparesthesia[7].

The study on zygomaticomaxillary complex (ZMC) fractures highlights demographic characteristics, injury duration, and sensory complications. The study emphasizes early intervention and treatment, with nearly half of injuries occurring on the left side. Paresthesia is common, highlighting the need for thorough sensory assessments and potential surgical intervention.

MATERIALS AND METHODS

This descriptive case series was carried out in the Department of Dentistry, Ayub Teaching Hospital, Abbottabad from 20th December 2021 to 20th June 2022 and After permission from IRB 164 patients were enrolled. All patients of both genders, aged between 20-80 years with ZMC fractures confirmed clinically and radiographically were included. All patients with history of paresthesia prior to fracture and isolated maxillary fractures and LefortIII fractures were excluded. The informed consent was taken from all the patients care takers. The zygomatic region was clinically examined for presence of zygomatic complex fracture and associated paraesthesia was noted. The data was entered and analyzed through SPSS-22.

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RESULTS

Age range was from 20 to 80 years with mean age of 37.061±9.93 years and mean duration of injury was 8.457±2.46 days (Table 1). Male patients were 90.9% and females were 9.1%. Seventy-six (46.3%) patients have left side, 68 (41.5%) patients have right side and 20 (12.2%) patients have both sides were involved. According to cause of injury, 17(10.4%) were fight, 65(39.6%) patients were fall, 76(46.3%) were road traffic accidents and 6(3.7%) were other causes. Paresthesia was observed in 18.3% patients (Tables 2-5).

When the paresthesia was compared with site, statistically the significant difference was significant (P<0.05) while the injury was compared, the results showed not significant (P>005) difference respectively (Tables 6-7).

Table 1: Descriptive statistics of patients (n=164)

Variable	Mean±SD
Age (years)	37.06±9.93
Duration of injury (days)	8.45±2.46

Table 2: Frequency of genders (n=164)

Gender	No.	%
Male	149	90.9
Female	15	9.1

Table 3: Frequency of site of the patients (n=164)

Site	No.	%
Left	76	46.3
Right	68	41.5
Both	20	12.2

Table 4: Frequency of causes of injuries (n=164)

Cause of injury	No.	%
Fight	17	10.4
Fall	65	39.6
RTA	76	46.3
Others	6	3.7

Table 5: Frequency of paresthesia (n=164)

Paresthesia	No.	%
Yes	30	18.3
No	134	81.7

Table 6: Comparison of paresthesia with site (n=164)

Site	Paresthesia		P value
	Yes	No	
Left	3 (1.8%)	73 (44.5%)	0.000
Right	7 (4.3%)	61 (37.2%)	
Bottom	20 (12.2%)		

Table 7: Comparison of paresthesia with injury (n=164)

Injury	Paresthesia		P value
	Yes	No	
Fight	1 (0.6%)	16 (9.8%)	0.000
Falls	12 (7.3%)	53 (32.3%)	
RTA	17 (10.4%)	59 (35.9%)	
Others	-	6 (3.6%)	

DISCUSSION

Zygomatic bone being a quadrangular-bone is present in the lateral part of the mid facial region. Its complex fractures are the second most commonly reported with a prevalence of 45% all over the globe with various epidemiological causes depending upon geographical as well as cultural and regional differences.[8-12] Road traffic accidents and assault are the main reason of maxillary facial injuries as it was reported in the current study as well that 46.3% cases were due to RTA while 39.6% and 14% as a result of fall and other traumatic incidents. The results were in accordance to the previously reported data[13,14].

The current research also highlighted the fact that there were more males affected than females within 20-50 years with a proportion of 90.9% to 9.1% as a reason of more outdoor activities in men than women[15,16]. Majority of the cases had sub-conjunctival ecchymosis such as in 88.03% due to the orbital rim periosteal tear. Followed by this the second most common symptom was of buccal sulcus ecchymosis having a prevalence of 83.76%. The step deformity was observed in 84.61% of the cases wherein the cheek flattening was observed as in 78.63%, periorbital ecchymosis in 82.91%, and the presence of paresthesiain18.3% cases. Complain of pain was presented in 57.26% of patients89% having epistaxis and 26.9% having trismus while 5.98% having diplopia. The results of the present study were also similarly reported in other researches as well[17,18].

Reduction of zygomatic fractures was done for functional and aesthetic restoration of the face as well as orbit. The choice of procedure was based on the region involved as well as on the extent of injuries. The lateral eyebrow and the infraorbital incision in addition to the intraoral-vestibular incision were commonly applied as surgical-exposure. For the zygomatic arch Gillies temporal applications were opted. In few cases such as 19.55% the incision of the lower eyelid with lateral extension was also employed. The justification of these procedural choices was provision of best possible results with minimal risk of complications and implants palpability. Similar to the present study, opted procedures were the choices elaborated in the Zingg et al[19] and Westermark et al[20] research, wherein they have supported the fact that presence of the compromised infra-orbital nerve function is around 80% cases. Likewise, there is the another research work which detailed that around 7.4% of infraorbital nerve sensory disturbances in their cases[21,22]. The techniques applied has the major cause of discrepancies formation within various researches. This is followed by the protocol applied for the nerve function assessment. Among various methods, “two point discriminations, pressure threshold, pin prick test, sharp and blunt instrumentation and thermography” are common procedures for the assessment of neurosensory deficit. The extent of trauma is recognized as a contributory factor for severity of injury[23,24].

In the present study, infra-orbital nerve hypoalgesia was presented in most of the patients in comparison with the paresthesia and hyperalgesia. Zuniga and Essik[25] also reported similar findings as presented in the current study. The option of the closed reduction was opted in cases where there was minimal displacement and there were no significant functional and aesthetic concerns. Neurosensory alteration following ZMC fracture was not rare in the current study. The patients complained in diverse manner due to the distress faced by the facial malformation and fractures[26].

Furthermore, few participants reacted to the given sensory stimuli through the direct testing of virgin area supplied by the infraorbital nerve as reported by Karas et al[27] study. They also reported that the lower part of the lip and the chin were sensitive to the finest filament in 92% and 83% of the cases respectively.

CONCLUSION

Infraorbital nerve compression leading to paresthesia is very common in zygomaticomaxillary bone complex displacement fractures. The main injury causes are road traffic accidents followed by fall with male as more prevalent in such injuries than females.

Authorship and contribution declaration: Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

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