CHARACTERISTICS AND ETIOLOGY OF ZYGOMATIC COMPLEX FRACTURES

*ZAHUR QAYYUM, BDS, MCPS, FCPS
**ASMATULLAH KHAN, BDS, MCPS, FCPS
***UMER KHITAB, BDS, MSC (UK)

ABSTRACT

This study aims to determine Etiology & Characteristics of Zygomatic complex fracture (ZMC). Forty patients of zygomatic bone fracture were evaluated by history, clinical & radiological examination. The most common cause of ZMC fractures was road traffic accident (RTA) 52.5% (n=21), followed by fall 17.5% (n=7), firearm injury (FAI) 15% (n=6), interpersonal violence (IPV) 7.5% (n=3), occupational trauma and sport injuries 5% (n=2) and 2.5% (n=1) respectively.

The most common characteristic of ZMC fractures recorded in this study was flattening of cheek, 92.5% (n=37) and subconjunctival hemorrhage 92.5% (n=37) respectively, followed by abnormal nerve sensibility 90% (n=36), periorbital ecchymosis 87.5% (n=35), epistaxis 55% (n=18), limited mouth opening 50% (n=20) and diplopia 27.5% (n=11).

The most common characteristic of ZMC fractures was flattening of cheek and subconjunctival hemorrhage, because the zygomatic complex bone is very prominent and easily expose to traumatic forces and subconjunctival hemorrhage can easily occurs even if there is a minor tear of periosteum. The most common cause of ZMC fractures was RTA because of bad road conditions, poor road traffic sense in road users plus seat belt legislation was not enforced in this part of the world.

Key words: Zygomatic complex fractures, Etiology, Characteristics, Malar fractures, flattening of cheek, subconjunctival hemorrhage.

INTRODUCTION

Zygomatic fractures are common facial injuries presenting either the most common facial fractures or the second in frequency. The high incidence of these fractures probably relates to the zygoma’s prominent position within the facial skeleton which frequently exposes it to traumatic forces.

The zygoma is a major buttress of the facial skeleton and is principal structure of the lateral mid face. It is a thick strong bone which is roughly quadrilateral in shape, with an outer convex surface and an inner concave surface. The convexity forms the point of greatest prominence of the cheek; therefore the zygoma plays a major role in facial contour. A characteristic sign and striking feature of zygomatic injury is flattening of the normal prominence and limitation of mouth opening.

The causes of maxillofacial fractures vary from country to country and it shows that some of the variations can be attributed to social culture and environmental factors. There were 15390 estimated cases of facial bone fractures in England and Wales in six years and 50% involved the fracture of the zygomatic bone complex. Zygomatic bone complex fractures are classified by the direction of displacement on water’s view radiograph into six groups.

The methods of treatment of zygomatic bone complex fracture vary from surgeon to surgeon and depend upon circumstances. There are several techniques for the reduction of the fractured zygomatic bone including hook elevation, Gillies temporal approach and upper buccal sulcus technique. The upper buccal sulcus technique originally described by Keen and has been used successfully. The Gillies temporal approach method is used widely in U.K for zygomatic bone fracture.

Since the shape of face is influenced largely by the under lying osseous structure, the zygoma plays an important role in the facial contour. Therefore for both cosmetic and functional reasons it is important that...
ZMC fracture be treated properly to avoid cosmetic and functional deformity.

MATERIALS AND METHODS

This descriptive study was carried out in Oral & Maxillofacial surgery unit of Oral and Dental hospital Khyber College of Dentistry Peshawar from January 2004 to Jan 2005. The patients presenting with facial trauma were evaluated by history, clinical & radiological examination. Those patients having separate zygomatic complex fracture were recorded in the proforma. Patients having maxillary fracture along with ZMC fracture were excluded to avoid mixing of characteristics.

RESULTS

Table 1 shows the etiology of the zygomatic complex fracture. The most common cause of ZMC fractures was road traffic accident (52.5%; n=21), followed by fall (17.5%; n=7), fire arm injuries (15%; n=6), injuries associated with interpersonal violence IPV (7.5%; n=3), occupational trauma (5%; n=2) and sports (2.5%; n=1)

CHARACTERISTIC OF PATIENTS WITH ZMC FRACRTURES

Table 2 shows major characteristic of zygomatic complex fracture recorded in 40 patients such as peri-orbital ecchymosis (poe), flattening of cheek (fc), trismus, abnormal nerve sensitivity (ANS), epistaxis, diplopia (Dip), subconjunctival ecchymosis (SCE), pain and buccal sulcus ecchymosis (Bse).

The results were recorded as given below:

Periorbital ecchymosis was recorded in 87.5% (n=35), flattening of cheek present in 92.5% (n=37), trismus recorded in 50% of cases (n=20), abnormal nerve sensitivity recorded in 90% of cases (n=36), epistaxis recorded in 55% of cases (n=22), Diplopia recorded in 27.5% cases (n=11), subconjunctival ecchymosis recorded in 92.5% of cases (n=37), pain in 37.5% (n=15) and buccal sulcus ecchymosis recorded in 45% of cases (n=18). The term +ve and -ve used in charts stand for presence or absence of that fracture.

DISCUSSION

The etiology of facial fractures have changed over the last four decades and they continue to do so\(^8,9\). The contemporary causes of the fracture of the facial bones are interpersonal violence, sports injuries, falls and road traffic accidents in descending order. More recently this changing pattern of maxillofacial trauma have been reviewed by Van Beak and Markx\(^10\) who have compared their own longitudinal studies from the Netherlands with similar data from Hamburg and Great Britain. The developed countries all show a striking reduction in the broad category of road traffic accidents and the increasing influence of interpersonal violence\(^9\). This was not the case in our study. Road traffic accident was by far the most common cause of zygomatic fractures (52.5%) interpersonal violence accounted for only (7.5%) of total 40 cases. This result was totally opposite to the result of Tadj and Kimble from Australia\(^8\) and Israr\(^2\) from Sheffield U.K. This also show that the etiology of maxillofacial trauma depend on social, cultural and geographic setup. The result of our study is comparable with those reported by Van Hooft\(^11\), Adekey Zichariadesades et al\(^13\), Tanaka et al\(^14\), Anwar et al\(^15\), Gusztv\(^16\) which shows the road traffic accidents were the most common cause of facial fractures.
The high number of maxillofacial injuries due to road traffic accidents in our country is due to the lack of road sense among the road users, over speeding, under age drivers, slow moving vehicles on roads like tractor trolley etc, bad condition of vehicles, over loading and bad condition of roads. Large numbers of people were belong to low socio-economic group in this region of country and they use public transport vehicles operated by illiterate road sense drivers which leads to accidents, that is the one reason for high number of RTA cases.

The developed countries strictly follow the road traffic regulations, well trained public transport drivers and well arrange seating capacities of public transport plus the strict seat belt legislation is also strictly followed which leads to reduction in road traffic accidents.

The inter personal violence is a common cause in most developed countries. It is due to the consumption of alcohol in these societies which lead to increase in the cases of interpersonal violence, but as we lived in a Muslim society where alcohol is prohibited socially and culturally, the incidence of interpersonal violence is negligible which reflects in our study 7.5% (n=3). The same result was reported by Gusztav16 from U.A.E. and Anwar et al15; from Jordan both Muslim countries. Alcohol intake is usually a contributing factor to both assaults17 and RTA18 in non-Muslim countries. Fairly high frequency of firearm injuries 15% (n=6) in this study is due to tribal quarrel and mode of life in north west frontier province of Pakistan where most of the people possess arms. The results of our study resemble the similar result of previous study by Qiam19.

Fall was the second most common cause in this study which is comparable to the previous studies of Brook and Wood20, and Cook and Row,21 but it is slightly low then the study of Israr2 and Qiam19.

Sports related fractures are becoming increasingly common due to a growing interest in the sports activities throughout the world (8.8%) reported by Nabuyuki22 and Israr2. Our study does not show the same result. We noted 2.5 % of sport related injuries which is lower than the result of Nabuyuki22 and Israr2. The reason for this low result is lack of facilities of sports available in this region of world. In England occupation related facial injuries have decreased reflecting a decline in traditional industries and perhaps best safety measure20. We noted 5% of occupational injuries which shows lack of safety measures during work in this part of the world.

Matsunaga et al23 find that periorbital ecchymosis is present in 64 % of ZMC fracture cases while it is 90% in our study.

Flattening of cheek appear to be the striking feature of zygomatic injury. It is reported in 70 % to 86% of cases by Larsen and Thomson24 Ellis et al24 Balle et al25. It is more prominent in those cases in which distraction of the FZ suture and medial rotation or combination have occurred. Our study shows similar result for flattening of cheek, which is 92%, more or less similar with the results of previous study of Larsen and Thomson24 Ellis et al25 Balle et al26.

Limitation of mouth opening known as trismus frequently accompanies zygomatic injuries. The reason often cited for post fracture trismus is impingement of the translating coronoid process of the mandible on the displaced zygomatic fragment. Whether this contact actually occurs in the majority of cases is doubtful, since the amount of displacement necessary for producing actual mechanical interference is great. A more likely explanation is muscle spasm secondary to impingement by the displaced fragments, especially on the temporal muscle. The trismus usually accompanies zygomatic injuries and present in 33% to 45% of cases.25,27 Our study shows 50% of cases of ZMC fractures accompanies with limited mouth opening (trismus) which is slightly higher than the results of previous studies.

Disruption of the infraorbital nerve causes anesthesia of the lower eyelid, upper lip, and lateral aspect of the nose. Abnormal nerve sensibility of infraorbital nerve present in approximately 50% to 90% of ZMC injuries24,25. Our study shows abnormal nerve sensibility in 90% cases which is similar to previous studies.

The result of our study shows 55% cases of ZMC fractures have positive sign of epistaxis, which is more or less similar with the result of former studies.

Diplopia is the name given to the symptom of blurred vision. Two varieties of diplopia exist and it is important to distinguish between them. Monocular diplopia or blurring of the vision through one eye with the other closed, requires the immediate attention of an ophthalmologist since it usually indicates a detached lens, hyphema, or other traumatic injury to the globe. Binocular diplopia in which the blurring of vision occurs only when the patient looks through both eyes simultaneously. It is common and occurs in approximately 10% to 40% of ZMC injuries24,25.

The result of our study correlates the result of other studies. There is 27.5% diplopia in our cases which is similar to the results of previous studies.

Subconjunctival hemorrhage is a frequent finding in zygomatic fractures. It may accompany even a hairline crack through the orbital rim if the periosteum has been torn. Its absence does not exclude an orbital rim fracture because if no disruption of the periosteum has occurred, bleeding can accumulate in a subperiosteal location and may not be visible under the conjunctiva. When present subconjunctival ecchymosis usually has
no posterior limit and will be bright red owing to the ability of oxygen to diffuse through the conjunctiva.

The result of previous studies shows subconjunctival hemorrhage is present in 50% 70% cases of ZMC injuries.

This was not the case in our study. Subconjunctival ecchymosis was by far the most common finding of ZMC fractures 92.5% which was 22.5% more than previously reported.

Severe pain is normally not a feature of zygomatic fractures unless the fracture segment is mobile. Palpation of the fracture site also elicits a painful response. 37.5% of cases in our study shows pain during the initial report.

An important sign of zygomatic or maxillary fracture was ecchymosis in buccal sulcus. Our study reveals 45% of cases of ZMC fractures show buccal sulcus ecchymosis.

CONCLUSION

The result of this study shows that RTA is the most common cause of ZMC fractures in this part of the country. The reason for this is that there is lack of road sense in road users, poor condition of the vehicles; increase traffic load and poor conditions of roads. There is dire need to improve road conditions, strict enforcement of traffic rules including seatbelt legislation and run campaign to aware road user about the road safety which will decreased the incidence of facial fractures (including ZMC fractures) in developed countries.

Regarding to the characteristic of ZMC fractures, flattening of the cheek and subconjunctival hemorrhage is most common finding of this study. As the zygoma occupies the most prominent position in the facial skeleton so it is easily exposed to traumatic forces which lead to depression of face and a minor periosteal tear leads to subconjunctival hemorrhage. Both these signs are common findings.

This study will help the dentists that when they examine patient of facial trauma clinically and if they see depress cheek and subconjunctival hemorrhage they should advise occliptomental radiograph and refer to a specialist for proper management.

This group of patients with ZMC fractures represents the Peshawar region of country such patients are also treated in other hospitals of Pakistan. We recommend that this study provides the opportunity to compare the results with similar units in the country.

REFERENCES