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Etiology and Incidence of Zygomatic Fractures: A 10 Year Retrospective Study.

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ABSTRACT

The study was performed to analyze the etiology and incidence of zygomatic fractures using the medical database of the University clinic for maxillofacial surgery in Skopje, for a period of 10 years and included 284 treated patients. All medical records of patients were reviewed by number of patients per year from 2003 to 2013, sex distribution, age groups, patient's symptoms, clinical signs and radiological findings, etiology and types of fractures with performed treatment. Management protocol and long-term follow up is the best way to recognize and select various surgical approaches or conservative treatment for these types of fractures. The increased incidence of zygomatic bone fractures following violence reveals the necessity of formulating preventive measures and further education.

Keywords: medical records; incidence; etiology; zygomatic fractures; facial bones.

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INTRODUCTION

Various studies on the incidence, etiology and treatment of zygomatic fractures in different countries have been previously reported. Zygomatic trauma results with significant esthetic and psychological complications, where these two factors are dominant issue in the contemporary life. There is a change of increasing influence of this type of trauma in the facial area [1, 2] and the main causes worldwide are assaults and traffic accidents. The zygomatic fractures are one of the most frequent injuries of the facial skeleton that can significantly alter the structure, function and appearance of the midface. Fractures of the zygomatic bone in literature are also referred to as: fractures of zygomatico-maxillary complex, zygomatico-orbital fractures, tripod or tetrapod fractures [3-5].

Etiological factors have changed over the past 3-4 decades and among them the most common etiological factors are traffic accidents, interpersonal violence, accidental falls, alcoholism and sports injuries [6-8]. Epidemiological studies have shown that the main cause in developed countries is interpersonal violence, while in countries that are still in a transitional economic situation, maxillofacial injuries are more often caused by road traffic accidents [2].

The dominance of the male population in these fractures is continuous finding in most studies [8-11]. However, the prevalence and location of zygomatic complex fractures and fractures in the area of facial skeleton, generally varies from country to country depending on study population.

This epidemiological study was done to analyze the etiology and incidence of zygomatic bone fractures using the retrospective database from patients treated at the University clinic for maxillofacial surgery - Skopje. The results of this study are compared with several epidemiological studies about zygomatic fractures, including studies that analyzed zygoma within maxillofacial trauma.

MATERIAL AND METHODS

A retrospective study was performed to assess zygomatic bone fractures in 284 patients treated at the University clinic for maxillofacial surgery in Skopje.

Data were retrospectively recorded including number of patients per year from 2003 to 2013, sex distribution, age groups, patient's symptoms, clinical signs and radiological findings, as well as etiology and types of fractures with performed treatment.

Patients were divided into nine age groups, starting with ranking from 01-10 years old, 11-20 years old, 21-30 years old, 31-40 years old, 41-50 years old, 51-60 years old, 61-70 years old, 71-80 years old and over 80 years patients.

Etiological factors of zygomatic bone fractures were divided into five groups: traffic accident, interpersonal violence, sport injury, accidental fall and attack from domestic animals.

Zygomatic bone fractures were classified into four main groups: monopod, dipod and tripod fractures [12]. The last one was named multiple fractures, which is associated with other neighboring maxillofacial fractured bones. Depending on the type of zygomatic fracture and the extent of damage, four types of treatment were applied: conservative, closed reduction, open reduction with internal fixation and combination of modalities.

The use of surgical treatment is usually application of eyebrow, lower eyelid, maxillary vestibular incision, Gillies temporal approach and percutaneous technique and a hook. The conservative treatment includes antibiotic and antiedematous medication, soft diets with standby monitoring of the stability of non-dislocated fracture line.

RESULTS

In total 284 patients 248 (87%) were males and 36 (13%) females [Fig. 1]. There was a male predominance, with a male: female ratio of 6.88:1.

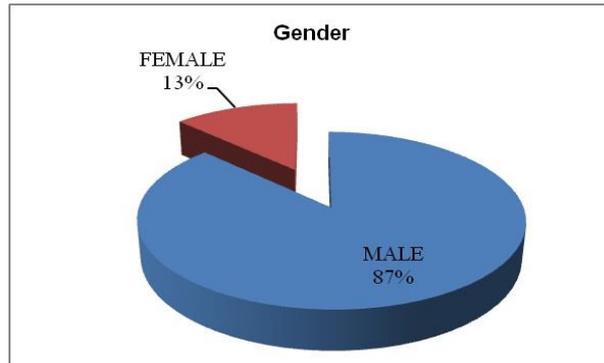


Figure 1: Distribution of patients according to gender

The ages of the patients were ranged from 01 year and above 90 years old and mean age was 36.86 years. The highest incidence was in the age group of 21–30 years followed by fourth and fifth decade of life [Fig. 2].

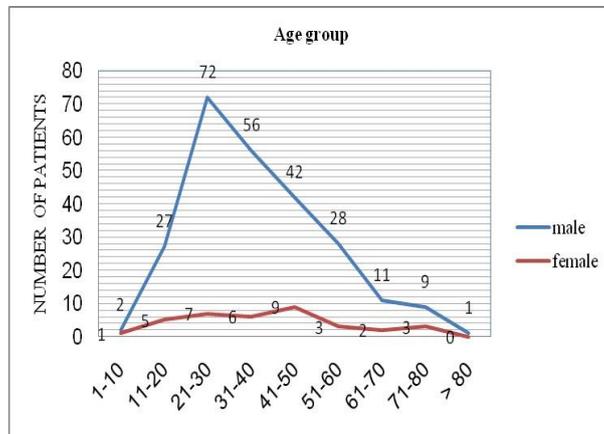


Figure 2: Distribution of patients according to age group and number of patients

Major etiology of injuries were interpersonal violence (41%) followed by road traffic accidents (31%) and accidental falls (21%) [Fig. 3]. Regarding the etiological factor and age group distribution, there has been reported that interpersonal violence is more prevalent in the age group between 21 and 30 years (27.82%), while accidental falls are most common in the age group between 41-50 years (17.96%). Among the most common radiographic examinations used for diagnosis of zygomatic fractures were: Water’s view (52%) and Computed tomography (13%).

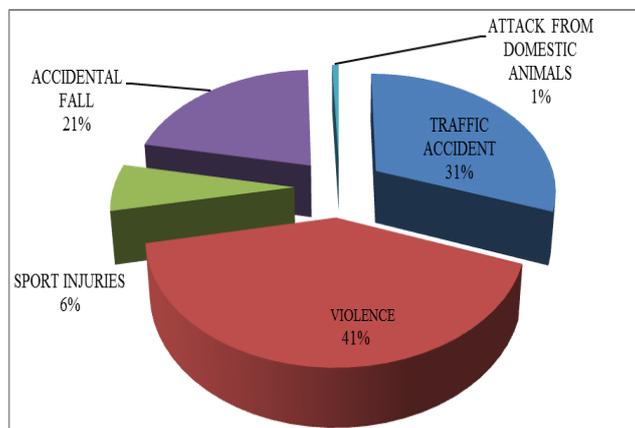


Figure 3: Pattern of zygomatic bone fractures

Anatomic site-wise distribution of zygomatic bone fractures in the study population shows that most common fractured anatomical region was in the zygomatico-frontal suture (41%) and orbital rim (29%) [Fig. 4]. Depending on the type of associated maxillofacial fractures including the zygoma, most of which was nasal bones (4.58%), mandible (4.22%) and maxillary bone (3.88%) fractures of the face.

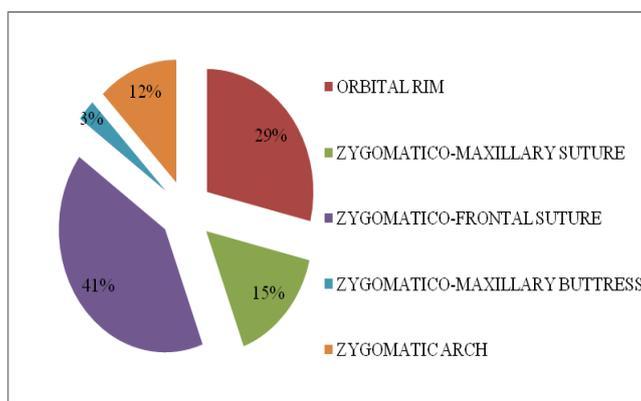


Figure 4: Anatomic site-wise distribution of zygomatic bone

Pain (25%), hematoma (24%), asymmetry (14%), swelling (11%) and trismus (8%) were the commonest forms of clinical signs and symptoms on admission in our study.

The treatment of zygomatic fractures was: closed reduction (56%); open reduction with internal rigid fixation (31%) and conservative (10%). Only five patients (2%) refused to be treated.

DISCUSSION

Zygomatic (malar) bone as most exposed part in the middle face is vulnerable to facial trauma. The etiologies of zygomatic fractures vary from country to country depending on environmental, cultural, and socioeconomic factors [2, 13, 14]. Using the findings from the literature many authors reported that the most common type of fracture in the middle region of the face was zygomatic fractures [2, 10, 13]. Rana et al.[15] demonstrates that the zygoma was the second most frequently fractured facial bone, after mandible, maxillary and nasal bones [9, 14, 16].

There were 87% males in our study with male female ratio of 6.88:1. Results that includes the gender involvement, had shown that the 21-30 year age group scored the highest rate (27.82%) of incidence of zygomatic bone fractures, and male to female ratio are compatible with other literature founds [7, 8, 11]. These results can reflect that males are more active regarding traffic accidents, sports activities and violence.

Zygomatic bone fractures in this study are mainly caused by interpersonal violence (41%). Our results of zygomatic bone fractures are different from several studies, where they explained that the major factors are various types of traffic accidents [7, 13, 18-21].

International studies from Jordan, Singapore and New Zealand indicate that traffic accidents represent the dominant etiological factor, while in the USA, in Sweden and in Finland it is interpersonal violence [2, 16].

The orbital rim and zygomatic process of frontal bone was the most (70%) fractured anatomical site in treated patients, followed by fractures of zygomatico-maxillary suture (15%). These results are in contrast with other studies made on zygoma and maxillofacial trauma including zygomatic fractures where dominant anatomic area is zygomatic process of frontal and maxillary bone (38.8%), zygomatico-maxillary buttress and orbital rim (27.2%), zygomatico-maxillary buttress and zygomatico-frontal process (85.91%), and zygomatico-maxillary suture (14%) [7, 8, 13, 22].

In this epidemiological study, left-sided (44.37%) zygomatic fractures were more common than right sided (37.32%) fractures. This is an almost universal finding in the study of Ungari et al. [11], but opposite with

Punjabi et al. [20]. We have shown that association between involvement of zygoma and others facial bones was (15.49%). In other comparison study there is a difference in the results according to the distribution of associated maxillofacial fractures [7, 10, 23]. Management modalities of zygoma fractures were presented with the most used treatment called closed reduction (56%). In other studies, for zygomatic fractures combined approaches with zygomatico-frontal incision (75%), open reduction and internal fixation with miniplate and screws (91%), open reduction (74%), open reduction and internal fixation (44%), Gillies approach (25.4%) have been used [6, 7, 11-13].

CONCLUSIONS

Based on our study, zygomatic bone fractures, in males and resulting from violence in the third decade of life, were the most significant findings. Majority of the fractures appeared in young patients (21-30) and interpersonal violence (41%) was the leading cause of zygomatic bone fractures.

Management protocol and long-term follow up is the best way how to recognize and select various surgical approaches or conservative treatment for these types of fractures. The increased incidence of zygomatic bone fractures following violence noted in this study reveals the need for formulating preventive measures and further education.

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Ethical approval:

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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