INCIDENCE AND ETIOLOGY OF MIDFACE FRACTURE: A RETROSPECTIVE STUDY

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ABSTRACT

The aim of this study is to collect retrospective data regarding the patients reporting with midfacial fractures over the past one year and analyze the data, the results which can be of further assistance in future clinical and research studies. The hospital records of 109 cases of maxillofacial trauma over the last one year, the data was obtained from the digital records of the college. Male female ratio of 6:1 was noted. 15.8% of cases accounts to dentoalveolar fractures. 41.8% cases of Zygomatico Maxillary Complex(ZMC) fractures, 28.8% of nasal bone fractures, 5.7% of lefort I, 1.2% of lefort II, 0.2% of isolated lefort III, and 4.7% of orbital floor fracture. Road traffic accident was found to be the most common etiology. Pearson Chi square test was done for association between gender and etiology in midface fracture with p value: 0.049 (<0.05); statistically significant and the association between the age and etiology in midface fracture and p value: 0.61(>0.05) hence the correlation is not statistically significant.

Keywords: Trauma, Fracture, Midface, Road traffic accidents, Facial bone


INTRODUCTION

Maxillofacial injuries remain a challenge for oral and maxillofacial surgeons, demanding both skill and a high level of expertise (Perry, 2009). The midfacial fractures (maxilla and zygoma) are a part of all skull fractures and their prevalence differs depending on the country, ranging from 17% in Brazil, to 26% in Austria and up to 60% in Turkey (Chrcanovic et al., 2010). These differences might be due to the socioeconomic, cultural and environmental factors related to changes in the trauma pattern (Qudah and Bataineh, 2002). Trauma is one of the leading causes of death among people under 40 years of age (Gassner et al., 2003). Maxillofacial injuries are one of the most common injuries associated with other injuries and adult males are the most common victims. Road traffic accidents (RTA) are the major cause of maxillofacial injuries in developing countries (Akama et al., 2008). Little is known about the current epidemiology of midface fractures. The main aim of this retrospective study was to evaluate the prevalence and etiology of mid face injury.

MATERIALS AND METHODS

Sample size

This retrospective study was conducted in the university setting. Data chosen for evaluation were patients who reported to a private dental college for the removal of plates fixed in maxillofacial region. The details of the patients were obtained from analysis of 86,000 patients from June 2019 to March 2020 from patient dental records. The study was conducted after getting ethical approval from the Institutional Ethical Committee (Ethical Approval Number: SDC/SIHEC/2020/DIASDATA/0619-0320). Cross verification was done with the help of patient dental records data. To minimise sampling bias all data were included.

Study design

Inclusion criteria for this study group were cases of midface fractures. All the records were analyzed thoroughly and data concerning patients' gender, age, prevalence and type of injury, etiology, consciousness status and alcohol abuse during trauma was extracted.

The fractures were subdivided into zygomaticomaxillary fracture (complex or arch), dentoalveolar, orbitozygomatic, Lefort I,II,III ,fracture of maxillary sinus walls, nasal bone fracture and multi trauma. All the data was entered in the excel sheet.

Analysis

Chi square test was performed to know the association between various parameters. Results with p value <0.05 was considered significant

RESULTS AND DISCUSSION

The results of our study suggests that incidence of zygomaticomaxillary complex (ZMC) fracture is the most common among the midfacial fractures followed by nasal bone fracture ,lefort fractures, orbital floor fracture,
orbital zygomaticomaxillary fracture in decreasing order. Contrary to this in female patients there is higher incidence of nasal bone fractures compared to ZMC fracture. Similar studies done previously indicated that RTA are the main causes of traumatic injuries in the developing countries such as Nigeria, Jordan, Austria, India etc. While in countries such as Zimbabwe assault have been shown as main cause for midfacial injuries. Whereas few studies done in developed countries show that increasing interpersonal violence are main causes of maxillofacial injuries followed by RTA (Imahara et al., 2008).

In our study, Road traffic accidents are the leading causes for the midfacial fractures. The reason for this high frequency are difficult to ascertain it may be one or combination of both inadequate road safety awareness, unsuitable road conditions failure to wear helmets, violation of traffic rules and alcohol intoxication etc. The most common cause for nasal bone fracture is fall followed by RTA. This can be attributed to the fact that nasal bone are more prone to fracture in case of fall. Although this may again depend on the site of impact of fall, terminal velocity, and mass of the subject. Another alarming aspect is the increasing assault injuries. This is an alarming trend and is a threat to society. Pearson Chi square test was done for association between gender and etiology in midface fracture with p value: 0.049 (<0.05); statistically significant and the association between the age and etiology in midface fracture and p value: 0.61 (>0.05) hence the correlation is not statistically significant.

The incidence of fractures were divided according to the international classification of diseases (ICD) into molar and maxillary, Panfacial trauma, nasal bone fracture, orbital floor, other facial bones, fractures involving skull. These broad categories were subdivided into specific sites of fracture as dentoalveolar fracture, zygomaticomaxillary complex fracture, nasal bone fracture, Lefort I, II, III, Orbital floor, maxillary sinus wall fracture was commonly found to accompany ZMC fracture. 15.8% of cases accounts to dentoalveolar fractures. 41.8% cases of ZMC fractures, 28.8% of nasal bone fractures, 5.7% of lefort I, 1.2% of lefort II, 0.2% of isolated lefort III, and 4.7% of orbital floor fracture. Among the sub category ZMC was found to be present most commonly followed by nasal bone fracture. Maxillary sinus wall fracture was commonly found to accompany ZMC fracture. RTA is found to be the most common etiology for the incidence for mid facial trauma 47.7%, followed from fall from height 38.5%, Assault in 10.5% and ADL in 3.2% cases. Male female ratio was found to be approximately 6:1. Previously our team had conducted numerous clinical trials (Jesudasan, Abdul Wahab and MuthuSekhar, 2015; Christabel et al., 2016; Mp, 2017a; Packiri, Gurunathan and Selvarasu, 2017; Patilet et al., 2017; Marimuthuet al., 2018) and lab animal studies (Kumar and Sneha, 2016; Kumar, 2017; Mp, 2017b; Rao and Santhosh Kumar, 2018; Abhinavet al., 2019) and in-vitro studies (Patturaja and Pradeep, 2016; Abhinav, Sweta and Ramesh, 2019) over the past 5 years. Now we are focussing on epidemiological surveys and retrospective studies. The idea for this retrospective study stemmed from the current interest in our community.

The midfacial complex is constructed of a series of vertical pillars bilaterally that primarily provide protection from traumatic vertical forces. The vertical pillars are nasomaxillary, zygomaticomaxillary and pterygomaxillary buttresses (Rahman et al., 2007). The vertical buttresses are further supported by horizontal buttresses which are supraorbital or frontal rim, infraorbital rims and zygomatic arches. In addition to these buttresses the midface have support, although weak from maxillary walls, nasal septum and lateral nasal wall. This framework results in a few
anatomic sites of weakness, resulting in fairly predictable pattern fractures (Subhashraj, Nandakumar and Ravindran, 2007).

Among various midfacial fractures, zygomatic fractures are one of the most commonly encountered fractures, second in frequency after nasal bone fractures. The high incidence of these fractures probably relates to their prominent position within the facial skeleton, which frequently primarily exposes them to the traumatic forces first, compared to other bones of the facial skeleton. However, the incidence cause, age, and gender predilection vary depending on largely on social, economic, political, and educational status of the population being studied. So the aim of the study is to find the incidence and etiology of midface fractures. Gender distribution of incidence of midfacial fractures revealed that there is male predominance where 86.6% of cases were male, only 13.4% were female patients. Thus at a ratio of 6:1. This can be attributed to the fact that most of these injuries occur from activities where men are commonly involved such as RTA, work-related accidents and assaults.

**CONCLUSION**

The present study supports that regular epidemiological evaluations of maxillofacial fractures allow a detailed analysis of these lesions, providing important support for clinics and research priorities, since risk factors and patterns of presentation can be identified. From the study we can understand that the common etiology for midface fracture is RTA followed by assaults and falls. Males commonly report with midface fracture with RTA as the most common etiology. The correlation is statistically significant. According to the data there is a need to improve road traffic awareness among the society and reduce the risk of such incidents.

**AUTHORS CONTRIBUTION**

Data collection: Dr. Rezin Ahmed
Data analysis and interpretation: Dr. Rezin Ahmed
Drafting of the article: Dr. Rezin Ahmed
Critical revision of the article: Dr. M. R. Muthusekhar, Dr. Pradeep D
Final approval of the version to be published: Dr. M. R. Muthusekhar, Dr. Pradeep D

**ACKNOWLEDGEMENT:**

The authors would like to acknowledge the chancellor, Director of academics; the Principal and the Vice Chancellor, Saveetha University; HOD and their professors, readers, lecturers, and their fellow postgraduates, Department of Oral and Maxillofacial Surgery, Saveetha University. the support from their parents, and from their family

**CONFLICT OF INTERESTS:**

The authors would like to declare that there is no conflict of interests in this study.
REFERENCES


FIGURE 1: This pie chart represents the gender predilection in midfacial fractures. The green colour represents MALES with 86% and blue represents FEMALES with 14%.

FIGURE 2: This bar chart represents the various sites of mid face injuries and the incidences. X axis represents the different sites of mid face fracture and the Y axis represents the frequencies of the sites. 64.2% involves the ZMC, 24.2% involves dentoalveolar fracture, 9% of LEFORT I, 2% of LEFORT II and 0.3% of LEFORT III.
FIGURE 3: This pie chart represents the etiology for midface fractures. The violet colour represents RTA constituting 48%, the blue colour represents assaults which constitutes 40%, Green represents falls of 9% and the 3% shows other causes of midface injuries.
FIGURE 4: Bar chart represents the association between the gender and etiology of midface fracture. The X axis represents the gender and the etiology with assault (blue), Fall (green) & RTA (beige) whereas y axis represents the number of patients. Chi square test was done association was found to be statistically significant value: 0.049 (<0.05) proving that males are prone to RTA than females.
FIGURE 4: This chart represents the association between age and etiology. X-axis represents the Age groups and the etiology leading to fracture of midface whereas y axis depicts the number of patients. Pearson Chi square test was done, p value: 0.61 (>0.05) hence statistically not significant, proving that there was no association between age and etiology in midface fracture.