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AETIOLOGY, EPIDEMIOLOGY AND PATTERN OF MIDFACIAL FRACTURES IN A TERTIARY CARE CENTRE.

Otolaryngology

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ABSTRACT

BACKGROUND: Midfacial trauma is frequent occurrence owing to the prominence of face however, the studies of epidiomolgy, etiology and pattern of midfacial fractures are difficult to compare owing to multiple variants.

MATERIALS AND METHODS: 60 patients attending Department of ENT and Head & Neck Surgery, SMGS Hospital, GMC Jammu from November 2018 to October 2019 with midfacial trauma were consecutively recruited into the study. Thorough clinical examination of the head and neck was done. Appropriate investigations were instituted. A record was made of these patients regarding age, sex,cause and type of trauma and influence of alcohol.

RESULTS: The facial fractures were found to occur more commonly in males, 2.75 times more frequently than in females. The age group most commonly affected was 21-30 years. Road Traffic Accidents was the major cause of these fractures. RTA was seen to be the most common cause irrespective of the type of injury sustained. Assault was seen to cause nasal fracture in 10 cases and ZMC fracture in 1 case. Out of 60 patients, 18(30%) were under the influence of alcohol. Nasal fractures were seen in 45 (75%) of the cases followed by Zygomaticomaxillary complex fractures in 11(18.33%) of cases. Central midface fractures like Le Fort were least commonly found in just 1 case. 3 cases had combination of various fractures. Most commonly seen nasal fracture was Class I Nasal fracture in 32 (68.09%) of the cases followed by Class II Nasal fracture in 15 (31.91%) of cases

CONCLUSION: The understanding of epidemiology of midfacial fractures can provide a useful insight in developing a preventive strategies and efficiently dealing with these fractures.

KEYWORDS

Midfacial Trauma, Fracture, RTA.

INTRODUCTION

The skeleton of the middle face consists of the maxilla, lacrimal, ethmoid, nasal and malar bones and the zygomatic arch. It houses both the orbits and is intimately related to skull base. Trauma of the midface regularly lead to lesions of soft tissue, teeth, and bony structures of the skull. Not rarely, those lesions of the midface are combined with injuries of other parts of the body. Many epidemiological studies on the pattern of maxillofacial injuries have been published from different countries, but the demographic data is difficult to evaluate due to many variants. The incidence, patterns and etiology of maxillofacial fractures are influenced by geographic location, socio economic status of the cohort, and the period of investigation [1]. Maxillofacial traumatology is considered to be a pathology that is more common in young individuals. However, as the population ages, fractures of the face are being seen more and more in elderly individuals[2] . The main causes of maxillofacial fractures are usually road traffic accidents[3,4,5,6,7], physical assaults, injuries from fall and sports. Several studies show that physical assaults have now become the most common cause of maxillofacial fractures in developed countries even though RTAs remain most common cause in many developing areas[8]. Impact to the midface results in typical fracture types due to the particular anatomical structure and construction of the facial skull.

The purpose of this study is to determine the etiology, age group and gender involved, type and pattern of midfacial fractures in our institution.

MATERIALS AND METHODS

This prospective medical institute based study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, SMGS Hospital, GMC Jammu from November 2018 to October 2019. A total of 60 cases were taken. A record was made of these patients regarding age, sex, type of trauma influence of alcohol and various signs and symptoms. X-ray nasal bones were taken in all cases with nasal trauma whereas in cases with other central and lateral midface trauma, X-ray skull Occipitomental and Submentovertical views were taken for confirmation of diagnosis and documentation. CT scan was also done where ever necessary

Inclusion Criteria

All patients of facial trauma or polytrauma with facial injuries who had clinically or radiographically confirmed midface fracture.

Exclusion Criteria

1. Patients with fractures limited to mandible, frontal or temporal bones only.
2. Patients with incomplete records and patients who refuse treatment.
3. Patients with low GCS and patients with associated head injury requiring prolonged intensive unit care because definitive management of facial trauma might be delayed in these patients.
4. Too old fractures with malunion.
5. All patients with systemic diseases contraindicating General anesthesia.
6. Patients without next of kin to give consent.

OBSERVATIONS AND RESULTS:

ETIOLOGY OF MIDFACIAL TRAUMA IN OUR STUDY

The most common cause for maxillofacial injury was RTA, accounting for 55.67% of injuries (34/60), among which motorized two-wheelers were the major cause of these injuries including skids and falls, collision with other vehicles. Trauma due to fall accounted for 15% of injuries (9/60). Assault by a known person constituted for 16.67% of injuries (10/60). 4 cases of sports injury were recorded. 3 cases of industrial accident were recorded.

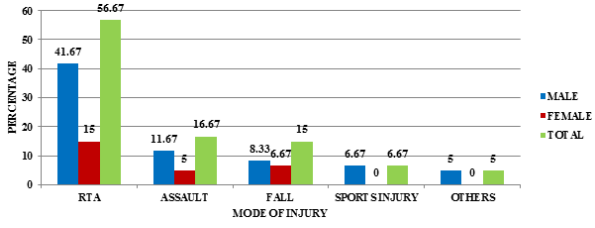

FIGURE 1: ETIOLOGY OF MIDFACIAL TRAUMA IN OUR STUDY (N=60)

SEX DISTRIBUTION OF MIDFACIAL TRAUMA IN OUR STUDY

Out of 60 cases with mid facial fractures 44 (73.33%) were males and 16 (26.67%) were females with male: female ratio of 2.75:1.

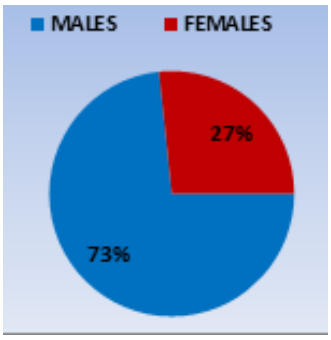

FIGURE 2:SEX DISTRIBUTION OF MIDFACIAL TRAUMA IN OUR STUDY (N=60)

AGE AND SEX DISTRIBUTION OF MIDFACIAL TRAUMA IN OUR STUDY

The average age was 31.1 years, ranging from 4 years to 64 years. Adults between 20 to 40 years of age were more commonly involved. While 30% of cases were found in age group 21-30 years, age group 31-40 also constituted a significant proportion of about 26.67%.

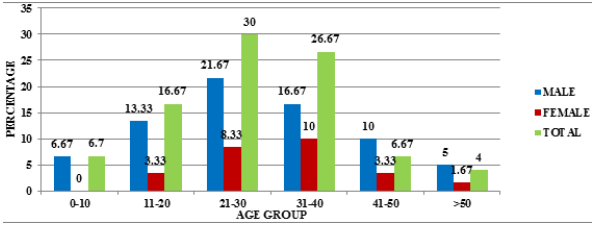

FIGURE 3: AGE AND SEX DISTRIBUTION OF MIDFACE(N=60)

EFFECT OF ALCOHOL ON MIDFACIAL TRAUMA IN OUR STUDY

The incidence of alcoholic patients at the time of injury was 30% (18/60) and all were males. Alcohol as a factor in midfacial trauma was seen 12 (44.12%) cases of RTA and 5 (50%) cases of assault.

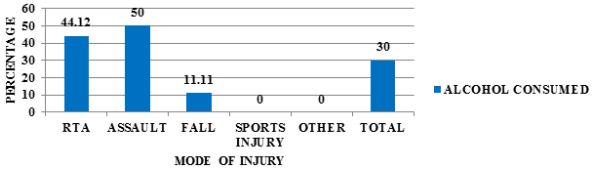

FIGURE 4: EFFECT OF ALCOHOL ON MIDFACIAL TRAUMA IN OUR STUDY (N=60)

TYPE OF FRACTURE SUSTAINED IN OUR STUDY

In our study the total no of patients presenting with midfacial fractures was 60 who had a total of 63 fractures. Nasal bone fracture was the most common fracture of midfacial region 75% (45/60). This was followed by fractures of Zygomaticomaxillary complex 18.33% (11/60) and 3 cases of combined fractures. There was one case with Le Fort I fracture. In total out of 63 fractures, 47 were nasal bone fractures, 14 were zygomaticomaxillary complex fractures and 2 were Le Fort I fracture. (Fig 5)

Out of a total of 47 nasal bone fractures, Class I fractures were seen more commonly (68.09%). Class II fractures constituted the rest 31.91%. No case of Class III fracture was seen. (Fig 6)

Out of 14 cases of zygomaticomaxillary complex, arch fractures were present in more than half (8) cases, 5 cases involved body of zygoma and 1 fracture involved both. (Fig 7)

2 cases of Le Fort I fracture were seen of which one was a solitary fracture and other occurred in combination with fracture of zygoma. (Fig 8)

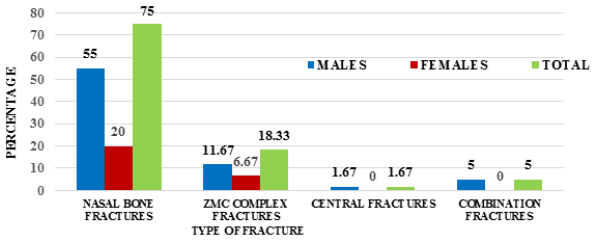

FIGURE 5: TYPE OF FRACTURE SUSTAINED IN OUR STUDY (N=60)

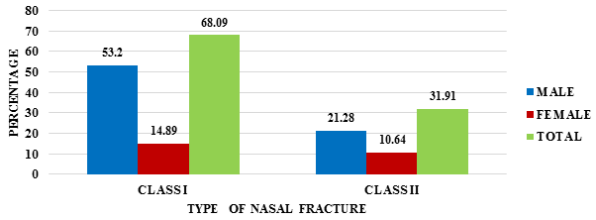

FIGURE 6: TYPE OF NASAL FRACTURE SUSTAINED IN OUR STUDY (N=47)

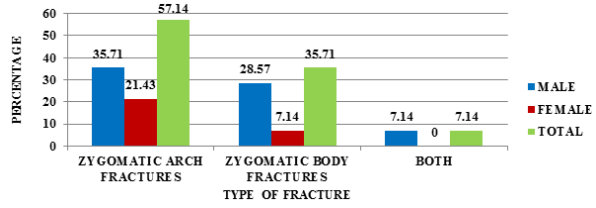

FIGURE 7: TYPE OF ZYGOMATICOMAXILLARY COMPLEX FRACTURES SUSTAINED IN OUR STUDY (N=14)

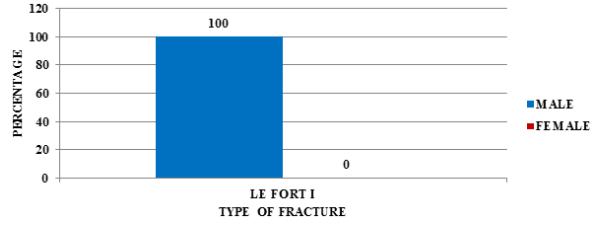

FIGURE 8: TYPE OF CENTRAL MIDFACE FRACTURES SUSTAINED IN OUR STUDY (N=2)

FIGURE 9: X-RAY NASAL BONES LATERALVIEW SHOWING CLASS II NASAL FRACTURE

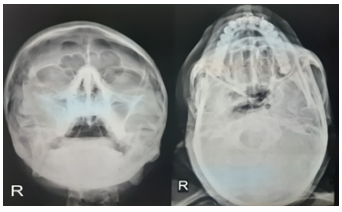

FIGURE 10: X-RAY SKULL SUBMENTOVERTICAL AND OCCIPITOMENTAL VIEWS SHOWING FRACTURE ZYGOMA®

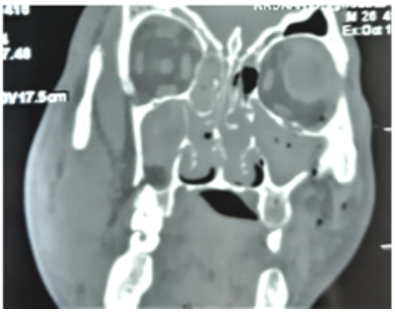

FIGURE 11: CT NOSE AND PNS CORONAL SECTION SHOWING LE FORT I FRACTURE

DISCUSSION

Though factors such as geographical location, culture, and socioeconomic status influence the causes and incidence of midfacial fractures, some findings are consistent across most studies including predominance of men and involvement of 21–30 year-old age group. In the present study 44 (73.33%) males and 16 (26.67%) females with a male to female ratio of 2.75:1.The results correlate well with observations made by many authors[6,9,10,11] who have reported a ratio ranging from 2.3:1 to 3.7:1.

The lower incidence in females is related to their less outdoor activity with lesser involvement in driving and related activities particularly of two wheelers, lesser physical assaults among them and also the fact that some of them being victims of domestic violence may not even report. Another factor accounting for less number of females suffering from trauma is that incidence of alcohol consumption is less among them.

The most common age group involved in this study was 21-30 years (30%) followed by age group 31-40 years (26.67%) and minimum number of cases were seen below 10 and above 50 years of age. This observation is in agreement with similar observations made by **Gupta *et al.* (1985)** and others[3,6,11,12]

Road Traffic Accidents was leading etiological factor as reported in various studies[3,4,5,6,7] accounting for 56.66% of cases, 16.67% cases were due to assault, 15% due to falls while as sports injury contributed to 6.67% of cases**.** The high contribution of RTAs is reflective of high velocity trauma sustained during RTAs particularly involving two wheelers. It also points to the rashness of drivers with disregard for traffic rules and bad condition of the roads. In view of this, it is imperative to take strict measures to prevent accidents . **Schultz (1989)** found out that 54% of all facial injuries were sustained due to RTAs, 17% due to domestic accidents and 11% due to athletic injuries.

In the present study 30% of cases sustained trauma under the influence of alcohol. While as 44.12% of RTAs happened under the influence of alcohol, the association of cases of interpersonal violence with alcohol consumption was found in 50% of cases comparable to those of **Voss (1983)** and others[14,15]**.** This calls for stern measures to tackle cases of drunk driving and domestic violence under the influence of alcohol.

In our study nasal bone fractures were most commonly seen midfacial fractures (75%) followed by zygomaticomaxillary complex fractures (18.33%) and other central midface fractures i.e. Le Fort I (1.67%). 5% of cases had multiple fractures which included various combinations of these fractures. **Park *et al.* (2015)** reported findings in accordance with the present study where in the nasal bone (65.0%) was the most frequent fracture area. Comparable observations were made by **Hwang *et al.* (2010)** and others[4,18,19] though there are studies[2,20] which make contrasting observations. Fractures were more frequent in the nasal bone because the low mechanical strength and thinness increase the likelihood of a small force inducing fracture, compared to areas where greater impact must be applied to cause a fracture such as the ZMC or central midface. Furthermore, these results are in accordance with other research showing that nasal bone fractures are the most common, as the nose is the most exposed facial area.

Among nasal fractures class I fractures (68.09%) were more common frequently seen than class II fractures (31.91%). No case of class III fracture was recorded in our study.

In case of fractures of Zygomaticomaxillary complex, 8(57.14%) were arch fractures and 5(35.71%) were fractures of body of zygoma including zygomatico maxillary buttress. Fractures involving both arch and body were seen in one case. This was in accordance with the observations made by **Hwang *et al.* (2010),** who found fractures of zygomatic arch (64.71%) to be more common than those of zygomaticomaxillary (35.29%) and zygomaticofrontal buttresses (0%).

Fractures of central midface were of Le Fort type I .Out of 2 such fractures one was seen in association with other fractures.

CONCLUSION:

Rising incidence of midfacial trauma in recent times is attributable to an increase in a number of road traffic accidents. Reluctance to use helmets, exceeding speed limits, more exposure to outdoor activities and violent interactions among young men could explain the increased incidence of facial injuries . Abuse of alcohol adds to the burden especially in cases of RTAs and interpersonal violence. The males in third decade of life are most vulnerable to such injuries due to their nature of activities and physical nature of job. RTA was the most common cause of midfacial trauma irrespective of the type of fracture sustained with alcohol intake being an important cofactor. Nasal bone was the most injured bone. This mandates stringent implementation of traffic rules and regulations. Laws should be made to discourage drunken driving . It also calls for application of latest technology for better management of traffic and ensuring compliance of public.

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CONFLICT OF INTEREST: None declared

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