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ORIGINAL RESEARCH ARTICLE

A Study of Prevalence, Clinical Pattern and Management of Maxillo-Facial Fractures in a Tertiary Care Centre

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ABSTRACT

Introduction: Maxillofacial injuries are one of the most common injuries prevailing in society because of the strong reliance on road transportation. Road traffic accidents being the most common cause, affecting more than 20 million people worldwide. Multiple modality treatment is often required for the management of maxillofacial fractures, including clinical examination, radio-diagnosis and surgical intervention. 3-D CT face has helped in the reconstruction and reformation of fractures with some limitations to the same. Surgical management still holds a good approach towards the definitive management of maxillofacial fractures.

Material and methods: Prospective observational study from 1st February 2021 to 31st July 2022. The parameters used were age, sex, time of incident, etiology, type of vehicle used with preventive measures, type of fractures, and treatment received. All patients underwent proper history taking, clinical examination, radiographic evaluation, and 3-D CT face reconstruction.

Results: About 104 patients of maxillo-facial fractures presented to the emergency room of SRMS-IMS, Bareilly, out of which 63 patients were treated with surgical management

Conclusion: The study concluded that RTAs were the major cause of maxillofacial trauma with the mandible being the most common bone fracture. ORIF with mini-plate fixation as treatment. lack of helmet and seat belt use, alcohol abuse, over-speeding and failure to follow traffic rules and regulations were the contributing factors

Keywords: Maxillofacial fractures, Prevalence, Clinical patterns.

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INTRODUCTION

Maxillofacial injuries are among the most common injuries in the emergency room. They pose as one of the greatest challenges to public health services because of its high incidence & significant financial costs. Because of the strong reliance on road transportation and the population's expanding socioeconomic activities, injuries to the maxillofacial area have increased in frequency and severity over the years.[1] Road traffic accidents and assaults are the leading causes of maxillofacial fractures all over the world and over 25 million people are injured or physically disabled as a result of traffic accidents.[2] The etiology, prevalence and pattern of maxillo-facial trauma (MFT) is highly variable in different parts of India and this difference could be attributed to the difference in culture, topography, socioeconomic factors (SEF) increased urbanization, and environment. Along with the etiology and mechanism of injury, the severity of trauma also plays the major role in the management of maxilla-facial injuries. In the case of maxillofacial trauma, computed tomography is considered to be the gold standard and is the preferred technique for a precise diagnosis and for displaying the complex anatomic components of the maxillofacial region.

The additional benefit of MDCT is 3-D reconstruction and multiplanar reformation, which are extremely useful in assessing the bony architecture in large comminuted, displaced, and complex fractures involving multiple planes.[3] The epidemiology of maxillofacial fractures has changed throughout time, with new patterns in etiology, presentation patterns, and management emerging all the time. As a result, a continuous assessment of these injuries is required to stay up with recent findings and the changing pattern of their therapy. As a result, this study offers a look back at the prevalence, pattern, and treatment options for maxillofacial fractures at our facility.

MATERIAL AND METHODS

A prospective observational study was conducted in the Department of General Surgery, SRMS-IMS, a tertiary care center in Bareilly, Uttar Pradesh, India, from 1st February 2021 to 31st July 2022. The parameters used were age, sex, time of incident, etiology, type of vehicle used with preventive measures, type of fractures, and

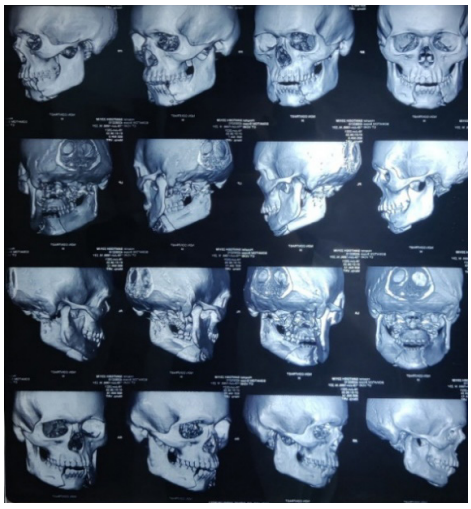

Figure 1: 3D CT reconstruction

treatment received. All patients underwent proper history taking, clinical examination, radiographic evaluation, and 3-D CT face reconstruction (Figure 1).

RESULTS

A total of 354 patients of RTA presented to emergency room, of which 104 were of maxilla-facial injuries. Of 104 patients, 63 underwent surgical correction of the fractures, and the rest were managed non-operatively and the most common age was 21 to 30 years (Figure 2).

Out of 63 patients, 54 (85.7%) were males and 9 (14.3%) were females, with a male-to-female ratio of 6:1. (Table 1)

Figure 3 shows that RTA was the leading cause of maxillofacial injuries, with an incidence of 90.4% (57 patients), followed by assault (4.8%) and static (4.8%), causing maxillo-facial fractures.

The three most common clinical findings found to be tenderness and swelling over the face, which was present in 100% of patients, followed by restricted jaw movement (85.7%) and malocclusion (Table 2) of teeth (79.4%) and the most common type of fracture was isolated (Figure 4).

It signifies the lack of use of preventive measures like helmets for riders in two-wheelers and use of seat belts in four-wheeler vehicles.69.8% of patients were not using either of the safety measures (Table 3).

Determines that 63.5% of patients who have suffered maxillofacial trauma were under the influence of alcohol or drugs (Table 4).

Out of 35 isolated maxillofacial fractures, the mandible was the most common fractured bone accounting for 54.3% followed by the maxilla (20.0%), and nasal bone (14.3%) (Figure 5).

Table 1: Gender distribution of patients

Gender	*No. of patients*	*Percentage (%)*
Female	9	14.3
Male	54	85.7

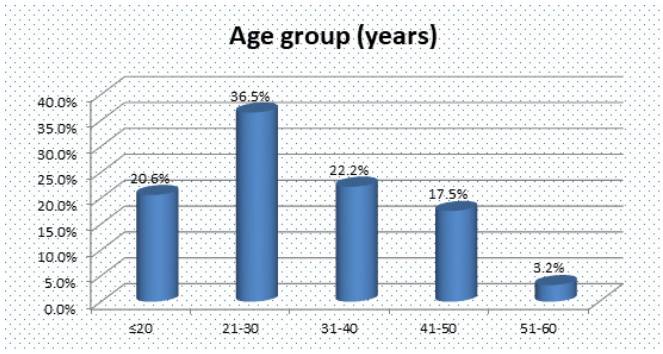

Figure 2: Age group affected

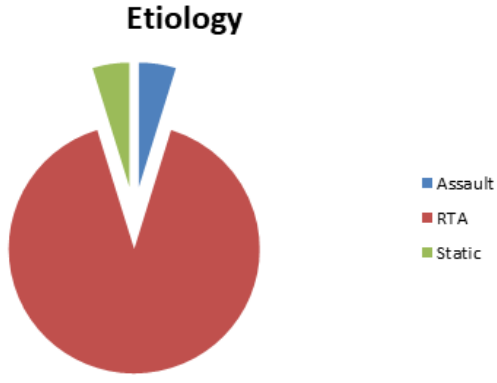

Figure 3: Etiology of maxillo-facial injuries

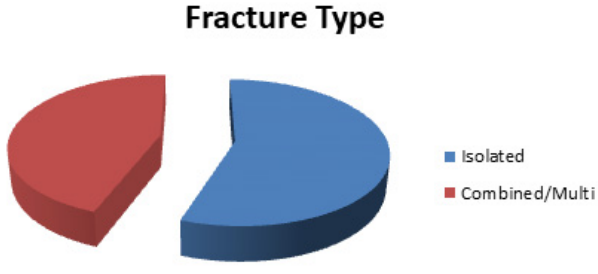

Figure 4: Type of fracture found in maxillofacial trauma patients

Table 2: Clinical features of maxillofacial trauma patients

Clinical pattern	*No. of patients*	*Percentage (%)*
Tenderness & swelling	63	100.0
Restricted jaw movement	54	85.7
Malocclusion of teeth	50	79.4

Table 3: Use of preventive measures in maxillofacial trauma patients

Preventive measures	*No. of patients*	*Percentage (%)*
No	44	69.8
Yes	16	25.4
No Measures	3	4.8

Table 4: Use of alcohol/drugs in maxillofacial trauma patients

Alcohol/Drugs	*No. of patients*	*Percentage (%)*
Yes	40	63.5
No	23	36.5

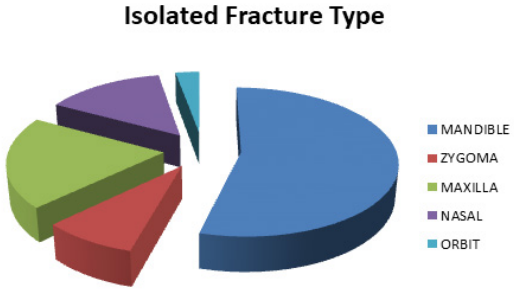

Figure 5: Distribution of isolate fracture location of maxillofacial injury patients (n = 35)

Table 5: Distribution of combined/multi fracture location of maxillofacial injury patients (n = 28)

Combine fracture location	*No. of patients*	*Percentage (%)*
Maxilla + zygoma	20	71.4
Mandible + maxilla	15	53.6
Mandible + zygoma + maxilla	10	35.7

Table 6: Surgical intervention used for maxillofacial fractures

Surgery type	*No. of patients*	*Percentage (%)*
Orif with mini plate	30	47.6%
IMF	3	4.8%
Titanium mesh	1	1.6%
Orif + IMF	22	34.9%
Nasal bone reduction	10	15.9%

In combine/multi fracture (28) the most common fracture combination was maxilla + zygoma 71.4% followed by mandible+maxilla 53.6% (Table 5).

All 63 patients were managed by surgery. ORIF with IMF was performed for 44.4% of fractures (28/63), 38.1% of fractures (24/63) were treated by ORIF + mini plate fixation (Table 6, Figures 6 and 7).

DISCUSSION

Trauma is associated with significant morbidity and mortality in individuals. Maxillofacial injuries may lead to functional impairment and aesthetically altered appearance if not attended properly. Factors like geographic area, population density, socioeconomic status, and the cultural varieties amongst the study population have influenced the incidence, etiology and pattern of maxillofacial injuries since ages. Thus, findings from our study will reveal the characteristic association of these variables leading to improved management strategy in central Uttar Pradesh. The prevalence of maxillofacial injuries varies from 17 to 69%, and this large difference might be due to various variables as discussed above.[4] Similarly, in the present study, we have found 29% prevalence of maxillofacial trauma.

The peak incidence was seen in age 21 to 30 year category (36.5%). The male-to-female ratio was 6:1. Our study depicted maxillofacial trauma in third and fourth decade with male predominance. This can be explained by the fact that more males are involved in rigorous outdoor activities and are drivers and bike riders.[5] These findings were similar to a study conducted by Jindwani K, Sahu AK, Tripathi G, *et al*., which revealed a male: female ratio of 8:1 and peak incidence in young adults in their third decade involving 34.3% of MF injuries.[6] When the maxillo-facial area is injured, the mandible is the more vulnerable bone than the midface bones, this preponderance is due to the fact that the mandible is the most prominent and only movable facial bone with less bony support and it is easily reached. In our study, the mandible was the most common fractured bone accounting for 54.3% of all the cases followed by maxilla (20.0%). Similarly, Jindwani K, Sahu AK, Tripathi G *et al*. mandibular fractures were the most common facial fractures encountered in 53.92% cases. Patients who sustained maxilla-facial trauma present

Figure 6: Orif with mini plate fixation

Figure 7: Orif with arch bar fixation

with various clinical presentations most common being the tenderness and swelling over the face followed by restricted jaw mobility and malocclusion of teeth.[7,8] Two-wheeler vehicles are more involved in road traffic accidents. This can be attributed to the fact that there is lack of adherence to traffic law and preventive measures. Most of the patients who sustained maxillo-facial injuries did not use safety measures like use of helmets in two-wheelers or use of seat belts in four-wheelers. In our study, 69.8% of patients were lacking in the use of safety measures. This is attributed to the casual behavior of the population towards the use of helmets and seat belts while in transit.[9] In the recent study by Singh RK, Kumar V, Ganguly R *et al*. where only 10% bike riders reported wearing helmets during accidents. In this study, all patients were managed by surgery. ORIF with Mini Plate was done for (30/63) patients, followed by ORIF with IMF in 22 patients. Most of the patients were treated with open reduction internal fixation, which is considered the gold standard for treating maxillofacial fractures. It results in improved oral hygiene, mouth opening, better speech and early return to function.[10] The treatment of facial fractures varies from surgeon to surgeon and it also depends on available instruments. Closed reduction using stainless steel arch bar fixation and ligature wires is a simple economical method used for treating maxillary and mandibular fractures and yields satisfactory clinical results.

CONCLUSION

This study concluded that RTAs were the major cause of maxillofacial trauma. Most fractures occurred in the age group of 21 to 30 years. The frequency of mandibular fractures was more than that of midfacial fractures. Factors like lack of helmet and seat belt use, alcohol abuse, over-speeding, and failure to follow traffic rules and regulations were the contributing factors. Therefore, strict implementation of traffic laws, especially on young people, is necessary to curb reckless driving and over-speeding and create awareness. Maxillo-facial injuries are also life-threatening in nature and might cause esthetic or functional deformities, which might lead to psychological, financial, and social costs for people and society. Therefore, identifying the etiology, epidemiology, and treatment plans of maxillo-facial traumas is highly important. This sample might provide useful knowledge about the current distribution of facial fractures in the subset of the central Uttar Pradesh population as well as offering a new valuable health-care system database that might improve medical and dental policies to prevent and manage facial trauma.

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