Original Research

Pattern of Maxillofacial Injuries in University Hospital of Bhubaneswar: A Retrospective Study

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Abstract

Background: Trauma can be designated as the most common cause for injuries to maxillofacial region and it may lead to fracture of bone, soft tissues injuries and even both in some instances. Identification of the cause of trauma provides the insights on the behavioural pattern of the individuals which differ from country to country. It also assist us preventive approach to reduce the incidence of maxillofacial injuries.

Aim: To evaluate the demographic data of the patients with maxillofacial trauma and to assess the major risk factors and prevention strategies to reduce maxillofacial fractures.

Material and Methods: A 5 years cross-sectional retrospective study was conducted by the case records of the patients reported at Kalinga Institute of Medical & Dental College & hospital in Bhubaneswar. A total 494 patient records were evaluated for various demographic, etiological factors, type and location of injury, alcohol involvement, treatment done, daily and monthly variation of injury.

Results: Majority of the maxillofacial injuries occurred in male than in female. Third decade being the most common age group for occurrence of maxillofacial fractures. 78.9% of cases occurred due to RTA. 40% of cases were reported in rainy season and the least in the winter season. Influence of alcohol is very high (74.89%) in occurrence of maxillofacial fractures.

Conclusion: Maxillofacial fractures are one of the common injuries during trauma by any cause. Identification of the risk factors for the cause of trauma may give us a clue to prevent maxillofacial injuries.

Keywords: Maxillofacial, Mandibular, Trauma, Road Traffic accidents.

Introduction

Maxillofacial injuries depict the injuries that occur to the face, skull and mandible. Maxillofacial injuries are one of the common cases that an oral and maxillofacial surgeon encounter in his day to day practice. Trauma can be designated as the most common cause for injuries to maxillofacial region and it may lead to fracture of bone, soft tissues injuries and even both in some instances. Identification of the cause of trauma provides the insights on the behavioural pattern of the individuals which differ from country to country. It also assist us preventive approach to reduce the incidence of Maxillofacial injuries.¹ ²
A major factor for trauma are Road traffic Accidents (RTA), Interpersonal Violence, Sports Injuries, Industrial Mishaps, attack by animals etc. These etiological factors are influenced by a wide range of predisposing factors like geographical location, social trends, road traffic legislations, alcohol and drug abuse and climatic variations. All of these may contribute to trauma either directly or indirectly.

Bhubaneswar, one of the most populated city and capital of the state Orissa. Recently Bhubaneswar has been selected for the list of World smart cities. According to the reports of Census India, population of Bhubaneswar in 2011 is 843,402; of which male and female are 446,204 and 397,198 respectively. A report by Government of India in 2015 stated that Orissa stood at 12th position among 29 states in India with an annual fatalities by RTA being 11,825/year. Apart From RTA other causes also cause maxillofacial injuries. Other causes for maxillofacial injuries constitute a very less percentage of the overall percentage of maxillofacial injuries occurring in the present scenario. Though they constitute to a low prevalence they may cause severe disability or disfigurement causing considerable mortality/morbidity to an individual. So measures should be taken to prevent these domestic violence, industrial accidents and sports injuries etc.

Based on the above literature a study was designed to assess the maxillofacial injury pattern in the Bhubaneswar city to know the behavioural and treatment status of the injured patients.

Material and Methods

A 5 year institutional retrospective study was conducted based on the medical reports of the patients who were treated by the Emergency Service Department and the Dept of Oral & Maxillofacial Surgery, Kalinga Institute of Medical & Dental Sciences, Bhubaneswar between January 2012 to 2017 January were analysed.

Demographic data such as Date, age, gender, occupation, etiology, site of injury, type of injury, date of injury, date of surgery, addictions, date of hospital discharge, monthly and daily variation and treatment were gathered from hospital inpatient and outpatient records. Anatomical location of the fracture site in the maxillofacial region and associated injuries was also recorded. All the available medical records pertaining to the maxillofacial injuries & associated injuries were assessed and included for the study. Records with insufficient data (Clinical, Radiological or follow up) were excluded from the study.

The collected data was entered into specific proforma designated for the study. Ethical clearance was obtained from the institutional ethical committee.

The data was entered into excel spreadsheet and subjected to statistical analysis using SPSS (Statistical Package for Social Sciences, IBM Inc) ver. 22.

Results

During the 5 year period (2012-2017), 570 patients were reported to the hospital out of which 76 were excluded from the study due to lack of data. So a total of 494 cases were reviewed for the patterns of maxillofacial injuries.

A total of 494 individual, in which 385 (77.93%) were male and 109 (22.07%) were female. Age wise distribution of the maxillofacial injury patients showed maximum maxillofacial injuries occur in the age group of 21-30 years (33.19%) followed by 31-40 years age group (25.10%). With a least (3.03%) at the age group of 0-10 years. Monthly distribution of cases reported showed variation as follows with highest in the months of June (52, 10%), July (93, 18%) and August (86, 19%) and the least were in the months of October (14, 3%), November (14, 3%) and December (25, 5%).

Road traffic accidents were the major cause of injury which accounted for 78.9% (390 out of 494) cases while the least are industry related injuries.
accounts for 1.82% (9 out of 494) cases. There is statistically significant difference between the genders in the type of cause of injury with male being more often affected than female. (p<0.001) (Graph 2)

Occupation of the individual is evaluated in the study population showed that 21.86% of cases in which maxillofacial fractures occurred were labourers (Class IV) employees, followed by the unemployed people (18%) and the least was the government employees (7.08%) (Graph 3)

Influence of alcohol in road traffic accidents is evaluated and the results showed that 74.89% (370 of 494) cases had alcohol involvement at the time of injury, only 18.21% (93 of 494) of cases were reported without alcohol involvement. (Graph 4)

Distribution of type of maxillofacial injuries showed that mandibular fractures were the most common fractures (42.30%, 209 of 494 cases) followed by middle third injuries (20.85%, 103 of 494 cases), soft tissue injuries (18.01%, 89 of 494 cases) and the least were cranial bone involvement (3.03%, 15 of 494 cases). There is statistically significant differences present between the genders in occurrence of various fractures (P=0.02) (Graph 5)

Isolated maxillofacial injures were uncommon they may be associated any other injuries at various locations. Further evaluation of associated injuries along with maxillofacial injuries were done which revealed, isolated maxillofacial injuries account for 33% (163 of 494 cases), the highest were maxillofacial injuries associated with orthopaedic injuries (40.08%, 198 of 494 cases) and the least were maxillofacial injuries along with abdomen/thoracic injuries (3.03%, 15 of 494 cases). (Graph 6)

Mandibular fractures includes various fractures like condylar, body, symphysis etc. detailed evaluation of the type of mandibular fractures in the study population showed parasymphysis fractures were highest (27.27%, 57 of 209 cases), followed by condylar fractures (14.83%, 31 of 209 cases), symphysis fractures (12.44%, 26 of 209 cases), dentoalveolar (9.09%, 19 of 209 cases) and the least were coronoid fractures (3.34%, 7 of 209 cases). (Graph 7)

Response of the patients towards the treatment were evaluated, it revealed that 92% (457 of 494 cases) underwent treatment and only 8% (37 of 494 cases) were not treated due to any unavoidable reasons. (Table 3)

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| Graph 1 : Age group distribution of maxillofacial injuries. |
Graph 2: Cause of injury

Graph 3: Distribution of study population according to occupation

Graph 4: Alcohol involvement

Graph 5: Distribution of study population by type of maxillofacial injuries

Graph 6: Associated injuries in patients with maxillofacial injuries

Graph 7: Distribution of study population according to mandibular fractures
Discussion

Trauma is typically considered as a main cause affecting primarily young adult male. Road traffic accidents remain the most common aetiology for maxillofacial trauma in the present scenario. Other factors such as sports injuries, fall, industrial accidents contribute to some extent. The number of cases of maxillofacial trauma are increasing day to day. The main reason for this hike in maxillofacial trauma are modifications in life style, food and drinking habits, industrialization/urbanization.9,10

The most common age group of maxillofacial fractures are the younger adults (21-30 years) which is in consistent with previous studies like Vasiu Larne et al (2005),11 Al-khateeb T et al (2007),10 Rajinikanth K etal (2014)12 and several other studies in various parts of the world.13-18 The high incidence in 3rd decade of life might be due to the facts that people belonging to this decade are more active and tries to take risky stunts in life. The low incidence in 3-10 (2.87%) years has been explained by the high elasticity of paediatrics bones size and less common to expose to major trauma.

The male: female ratio in maxillofacial fractures in the present study was 3.5:1 there are various other studies which showed higher incidence of maxillofacial fractures in male like Ellis E etal, Fridirch KL etal, Hussain K etal, Batianeh etal.19-22

In our study we have evaluated the occupation of the injured in which the major accidents or the maxillofacial fractures occurred in the Class IV employees and the unemployed persons and even the business persons also had these type of injuries which showed that there is no correlation between the type of occupation and maxillofacial trauma.

The reasons for higher frequency of RTA in developing countries are unsuitable road conditions without expansion of the motorway network, violation of speed limit, inadequate road safety awareness, old vehicles without safety features, violation of highway code, not wearing seat belts or helmets and use of alcohol or other intoxicating agents. This finding is consistent with reports by Obuekwe ON et al23, Odunsany SA et al24, Odai ED et al25, Abiodun A et al26. Studies published by Lee KH et al27, Snape L et al28 and O Meara C et al29 have also found the interpersonal violence to be a major cause of maxillofacial trauma when alcohol is involved. However, in our study RTA was the major cause of maxillofacial trauma. In our study we found that the majority of cases with alcoholic influence were due to RTA, which is in contrast to numerous studies conducted elsewhere.

In our study, we found that mandible was more commonly fractured than midface and parasympysis (31 %) was the most common site of fracture followed by condyle (17%). The mobile nature of the bone, angulation and presence of tooth sockets has been implicated to make it prone to fractures. This is similar to findings of the many indigenous studies by Schaftenaar E et al30, Kubilius R et al31, Banks P et al32, and Pradip KG et al33.

Patterns of fracture also vary in study. Studies by Rashid A et al34, and ZixJA et al35 have found the body of the mandible, angle of the mandible or condyle and subcondyle to be the most common sites of fracture.

In our study, in middle third fractures, ZMC (38.2 %) was most commonly involved. This is because of the prominent positions; zygomatic bone and nasal bone are more vulnerable to trauma followed by lefort fractures.

Variations in the incidence of maxillofacial trauma on various days in a week have also been reported in many studies, Fasola AO et al14, Kontio R et al38, Chrcanovic BR et al39 and they have found it to be most common on the weekends.

In our study, we found Friday & Saturday to be the most common day of occurrence of maxillofacial trauma. Saturday is the last working day of the week, and people tries to relax and enjoy by doing party and most of the road traffic accident occurred at the night time.
During the 6-year period, the highest incidence of maxillofacial fractures was during August, September and October, the monsoon season. Insufficient visibility, bad maintenance of vehicles, poor road condition, and rash driving all contributed to the increased number of injuries. Other studies, RajibKhadka et al\textsuperscript{37} stated that winter season is the most common time for maxillofacial injuries as there will be high amount of fog and snow fall in some countries. So climatic variations also play an critical role in the occurrence of trauma which is unavoidable. Apart from climate, Natural calamities like Tsunami, Earthquakes may also be a part of these incidents which are prevalent in many geographical locations like northeast India.

It’s a moral duty that every citizen should be educated about the safety legislations of the government and the personal safety measures to control the RTA, strict rules and ordinances by the government regarding alcohol consumption and diving under the influence of alcohol as it can be treated as the main reason for most of the maxillofacial trauma.\textsuperscript{36}

**Conclusion**

Risk indicators for maxillofacial fracture included male gender, alcohol consumption, and RTA. Therefore, there is a need to ensure strict traffic rules and regulations, improvement in automotive safety devices, organize prevention programs to minimize assaults, implement school education in alcohol abuse, improve protection during sporting activities, and legislate wearing of protective headgear in workers. These should include the mandatory use of seatbelts and crash helmets. Also, community education to the urban population on proper road use and safety measures would complement the other measures in the further reduction of maxillofacial injuries. Preventive strategies remain the cheapest way to reduce direct and indirect costs of the squeal of trauma. Attitudes of the society towards road safety and behaviours must be modified before a significant reduction in the incidence of maxillofacial fractures will be seen.

**References**


31. Kubilius R, Keizeris T. Epidemiology of mandibular fractures treated at Kaunas
36. Personal communication. Iowa Department of Transportation, Office of Driver Safety and Improvement, Des Moines, IA, October 199.