Original Article

Four years prospective study of the maxillofacial trauma at a tertiary center in Western Nepal

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ABSTRACT

Purpose: This study was conducted to find the epidemiological characteristics of maxillofacial trauma in the Western region of Nepal. **Materials and Methods:** All the trauma patients attending the Department of Oral and Maxillofacial surgery in 4 years period at a tertiary center in Western Nepal were included in the study. The incidence, prevalence, age and sex distribution, etiologies and types as well as seasonal and daily variation of maxillofacial trauma were studied. **Results:** Maxillofacial trauma with male (71.55%) predominance was seen. Road traffic accidents (RTA, 46.5%) were the most common cause, and 41.65% of fracture cases due to RTA were under the influence of alcohol. Accidents were more common on the rural roads (38.9%), and majorities (43.3%) were due to motorcycle accidents. They were more common on Friday (36.7%) and in winter seasons (51.2%). The mandible fractures (65.85%) were more common than midface fractures (53.58%) and 19.44% of the fractures were combined fractures. Parasymphysis in mandible (32.16%) and zygoma (39.09%) in midface were the most common type of fracture. **Conclusion:** The increased incidence of maxillofacial trauma following RTA under the influence of alcohol noted in this study reveals the need for formulating preventive measures in the Western region of Nepal. Need to aware people to avoid drink and drive proper traffic management, prevention of carrying excessive passengers, especially on the rooftop of vehicles on the highway and disposal of out of date vehicles and timely maintenance of faulty roads is a must.

Key words: Mandibular fractures, maxillary fractures, maxillofacial injuries

INTRODUCTION

Incidence of maxillofacial trauma is almost always associated with motor vehicle accidents and interpersonal violence. Other causes include sports related injuries, occupational hazards and gunshot injuries.[1,2] However, etiological factors have varied in between country and region of study.[3,4] Similarly, patterns of fracture also have variability between different regions of study. Studies to determine the etiology and types of fracture patterns in the region helps health care providers to identify the risk factors, formulate plans to decrease the incidence of maxillofacial trauma and to provide proper management care. No studies have been done so far to find out the etiological factors and to estimate the extent of various maxillofacial trauma patterns in the Western region of Nepal. The study was carried out at a tertiary Center in the Western region of Nepal, which provides services to patients with major maxillofacial trauma. The profile of the maxillofacial trauma from the Western region of Nepal was studied by analyzing the trauma patients reporting to the emergency as well as Department of Oral and Maxillofacial surgery. A prospective study was conducted for a period of 4 years starting from January 2008 to assess the epidemiological characteristics of various maxillofacial trauma patterns. The purpose of this study was to determine the age, sex and etiology of maxillofacial trauma, incidence of maxillofacial trauma due to road traffic accidents (RTAs) on different roads; National highway,

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pattern and demographic distribution of the fractures at different sites of the maxillofacial skeleton and also to evaluate the seasonal and daily variation, as well as influence of alcohol on the incidence of maxillofacial trauma.

MATERIALS AND METHODS

All the patients with trauma to the maxillofacial region attending the department of emergency and Department of Oral and Maxillofacial surgery from January 2008 to January 2012 were included in this study. We included the personal data, date of injury, causes of injury and clinical signs and symptoms of the patients. Detailed clinical examinations were done, and diagnosis was made on the basis of signs and symptoms, investigations including X-rays and computed tomography scans. Types of fractures were noted. Mandible fractures were recorded as symphysis, parasymphysis, body, angle, ramus, condyle, coronoid and dento-alveolar fractures. Midface fractures were recorded as dento-alveolar, Le Fort I, II and III, zygoma, nasal, orbital, and palatine fractures. RTAs were analyzed regarding type of vehicle (motorcycle, light motor vehicle, heavy motor vehicle or bicycle), road types (national highway, city road or rural road) and whether the injured person was directly involved with vehicle (passenger or driver) or was pedestrian. Data regarding influence of alcohol was also recorded whether injured person was drunk at the time of accident or alcohol by any means was involved in. The data obtained were then analyzed.

RESULTS

Total numbers of patients were 689 and total numbers of fractures were 864 as some of the patients had multiple fractures. Number of male patients was 493 (71.55%) and number of the female patients was 196 (28.45%). Male and female ratio was 2.5:1. Mean age of patients was 33.2 years (standard deviation: 13.18, range: 20-40 years). Most common etiology was RTA (321, 46.5%), followed by fall (220, 31.93%) [Table 1]. Majority of injuries due to RTA were, as a result, of motorcycles accidents (139, 43.3%) [Table 2]. Two hundred and ninety-six patients (92.2%) were directly involved in accidents. They were either driver of vehicle or passengers. Twenty-five patients (7.78%) were pedestrian. Out of 321 cases of RTA, 125 (38.9%) occurred on the rural road, followed by 107 (33.33%) on city road and 89 (27.7%) occurred on the national highway. Alcohol by any means was found to be involved in 287 (41.65%) out of 689 cases of maxillofacial trauma. Out of 287 cases in which influence of alcohol was noted, majority were due to RTA [Table 3]. Majority of the cases of maxillofacial trauma occurred on Friday (253, 36.7%), followed by Saturday (101, 14.65%). Most numbers of maxillofacial trauma occurred in winters, in the month of November-March (353, 51.2%). Fractures of mandible were the most common type of fracture of the maxillofacial skeleton (569, 65.85%) [Table 4]. In the mandible, parasymphysis fracture was the most common type of fracture [Table 5]. Symphysis and bilateral subcondyle fractures were the most common type of combination fractures in the mandible (45, 35.15%) [Table 6]. The distribution pattern of mandible fractures according to sex is shown in Table 6. In the midface, most common types of fractures were fractures of zygoma (181, 39.09%). The distribution pattern of the midface fracture according to sex is shown in [Table 7]. Total numbers of dento-alveolar fractures were 241 (27.89%).

Table 1: Etiological distribution of maxillofacial trauma according to sex (*n* = Total number of patients)

Etiology	Male (%)	Female (%)	Total (*n* = 689) (%)
RTA	203 (63.23)	118 (36.77)	321 (46.50)
Fall	175 (79.54)	45 (20.46)	220 (31.93)
Interpersonal violence	72 (70.58)	30 (29.41)	102 (14.80)
Sports injury	25 (100)	0 (0)	25 (3.62)
Occupational hazards	18 (85.71)	3 (14.29)	21 (3.04)

RTA: Road traffic accidents

Table 2: Distribution of maxillofacial trauma according to victims, vehicles and roads in males and females resulting from RTA (*n* = 321)

Variable	Male (%)	Female (%)	Number (%)
Types of victim			
Drivers/passengers	188	108	296 (92.2)
Pedestrian	15	10	25 (7.78)
Total	203 (63.23)	118 (36.77)	321
Vehicle			
Motorcycle	99	40	139 (43.3)
Light motor vehicle	48	37	85 (26.47)
Heavy motor vehicle	30	25	55 (17.13)
Bicycle/rickshaw	26	16	42 (13.08)
Total	203 (63.52)	118 (36.77)	321
Roads			
Rural roads	72	63	125 (38.9)
City roads	71	47	107 (33.3)
National highway	60	31	89 (27.7)
Total	203 (63.52)	118 (36.77)	321

RTA: Road traffic accidents

Table 3: Distribution of maxillofacial trauma under influence of alcohol (*n* = 87)

Etiology	Male	Female	Number (%)
RTA	210	5	215 (74.9)
Interpersonal violence	21	51	72 (25.08)

RTA: Road traffic accidents

DISCUSSION

Different studies have indicated that maxillofacial trauma is more common in males than in females.

Table 4: Distribution of maxillofacial fracture in males and females (n = 864)

Fracture	Male (%)	Female (%)	Number (%)
Mandible	250	151	401 (46.41)
Midface	180	115	295 (34.14)
Combined midface and mandible	101	67	168 (19.44)
Total	531 (61.45)	333 (38.25)	864

Table 5: Patterns of mandible fractures in males and females (n = 569)

Types	Male (%)	Female (%)	Number (%)
Parasymphysis	101	82	183 (32.16)
Condyle	61	58	119 (20.91)
Symphysis	50	44	94 (16.52)
Angle	38	32	70 (12.30)
Body	38	24	62 (10.89)
Ramus	25	16	41 (7.20)
Total	313 (55)	256 (45)	569

Table 6: Combination fractures in the mandible

Combination fractures	Number (%)
Symphysis and bilateral subcondyle	45 (35.15)
Parasymphysis and angle	42 (32.81)
Bilateral parasymphysis	41 (32.03)

Table 7: Patterns of midface fractures in males and females (n = 463)

Types	Male (%)	Female (%)	Number (%)
Zygoma	95	86	181 (39.09)
Lefort 1	66	42	108 (23.03)
Orbital	45	32	77 (16.66)
Lefort 2	29	21	50 (10.79)
Palatine	15	12	27 (5.83)
Lefort 3	11	9	20 (4.31)
Total	261 (56.37)	202 (43.66)	463

Result of our study is also similar to that of other studies. However, major cause of maxillofacial injuries varies between areas of study. Recently, Rashid *et al*. in their study in London hospital found that interpersonal violence was the most common cause. Many studies have found interpersonal violence to be a major cause for maxillofacial trauma.[5-7] Interpersonal violence as a major cause in maxillofacial trauma in this part of the world is relatively higher than other parts.[8] However, in our study RTA was the major cause of maxillofacial trauma. Numbers of male patients were greater than female patients. In this part of Nepal, it is more common for female members of the family to stay at home which could be a reason that their numbers involved in RTA were lesser compared to male. The majority of patients who presented with maxillofacial injuries due to RTA were either drivers or the passengers and very few were pedestrian.

Majority of RTA were due to motorcycle accidents and alcohol consumption, and they occurred on Friday. Numbers of female patients involved were again less than the number of males. This was because of alcohol consumption being more common in males. Similarly, females were commonly involved when alcohol consumption resulted in domestic violence. Many authors have found that alcohol consumption and incidence of maxillofacial trauma are inter-related.[5,7,9-11] Studies have also found the interpersonal violence to be a major cause of maxillofacial trauma when alcohol is involved.[7,11-13] However, 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. The reason for this to be more common in Nepal could be a free availability of alcohol. We also found motorcycle accidents to be most common cause which are similar to result by Atanasov and Wong.[14,15]

Variations in the incidence of maxillofacial trauma on different days of the week have also been reported in many studies, and they have found it to be most common on the weekends.[16-18] In our study, we found Friday to be the most common day of occurrence of maxillofacial trauma. Friday is the last working day of the week, and people feel to relax and enjoy and alcohol as is easily available has become one of the main mode of enjoyment. As males usually indulge themselves in this kind of weekend party, they commonly become the victims of maxillofacial injuries. Similarly, road accidents are increasing in Nepal due to increased vehicle fleet and speed. According to the national statistics, more than 11,000 people were injured due to RTA in 2009/10 and are increasing year by year. Many of the accidents are not reported to police so the number could be even more. We found RTA to be more common on rural roads, which could be due to faulty tracks and ditches and lack of traffic awareness in a rural population.

Besides these, seasonal variations regarding incidence of maxillofacial trauma have also been reported in various studies.[17,19] Ogundare *et al*. in their study found that maxillofacial trauma were more common in summer than in winters.[19] We in our study found that the maxillofacial trauma in this region were more common in winters. The weather in winters in Western Nepal is very foggy, and visibility is very low. In addition, hilly roads and consumption of alcohol to keep oneself warm during winters could be one of the reason for RTA to occur which increases the incidence of maxillofacial trauma.

Patterns of fracture also vary in study. Studies have found the body of the mandible, angle of the mandible or condyle and subcondyle to be the most common sites

of fracture.[20,21] We in our study found that mandible was more commonly fractured than midface and parasymphysis was the most common site of fracture followed by condyle.

Nepal is a developing country. Majority of cases of maxillofacial trauma in our study due to RTA and motorcycle accidents were under the influence of alcohol and were in rural roads. This indicates that there needs to be awareness in general people about hazards of drink and drive. Following traffic rules, use of seat belts and helmets, not carrying passengers more than the capacity of vehicle, disposal of out of date vehicles and timely maintenance of faulty roads seem to be extremely necessary. Recently, drink and drive law has been enforced in Nepal and hopefully this will bring down the rates of RTA and trauma. We hope that the study conducted would help health care workers to identify the major etiological factors involved in maxillofacial trauma in the region and provided proper care of trauma patients.

CONCLUSION

Mandible is more commonly fractured than midface in this region of Nepal. Parasymphysis in mandible and zygoma in midface is the most common fracture among the patients with maxillofacial injuries in this part of the world. There is an increased incidence of maxillofacial trauma due to alcohol consumption. RTA due to motorcycle accidents is the most common etiology. As the majority of these trauma occurred on Friday, which is also a weekend in Nepal — time for relaxation, so we need to aware people to avoid drink and drive. Along with that, proper traffic management, prevention of carrying excessive passengers especially on the roof top of vehicles on the highway and disposal of out of date vehicles and timely maintenance of faulty roads, is a must.

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