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PATTERNS OF FACIAL BONE FRACTURES IN WESTERN REGION OF NEPAL

Objective:

The aim of this study was to determine pattern of facial bones fracture in western region of Nepal.

Material and Methods:

A descriptive cross sectional study was carried out in department of ENT, Nepalgunj medical college, Nepalgunj. Records from emergency department, inpatient ward and OPD of ENT and dental department of last 3 years (Jan 2012 to Dec 2014) were enrolled in the study and entered into proforma. Comparison was done between mode of injury, demography and types of injuries. Data was analyzed using SPSS 17 software.

Results:

Out of included 626 cases, there were 410 male patients and 216 female patients. Age ranged from 3 to 68 years with average age being 32.4 years. Most of the male patients sustained trauma due to road traffic accidents (51.7%) followed by physical assault (23.9%). In female also same mode of injuries were common with higher proportion due to physical assault. Majority of cases were from Midwestern Terai region (35.4%). There were 288(46.0%) cases with isolated facial bone fracture. The maximum was that of mandibular fracture (29.1%) followed by nasal bone fracture (27.7%) and maxilla (24.3%). Rest of 338 patients had multiple facial bone fractures with zygomatic bone fracture (79.2%) being commonest. It was followed by maxilla (64.4%) and mandible fracture (36.6%). The overall frequency of fracture is mainly involving zygomatic bone (49.5%) followed by maxilla (46.0%) and mandible (33.2%).

Conclusion:

Middle aged male patients are usually involved in facial bone fractures with road traffic accident and physical assault being common modes of injury. Zygomatic bone is the commonest bone to get fractured in isolated cases while mandible is commonest bone to get fractured in multiple fracture cases.

Key words: Facial Bones, Fractures, Mandible, Maxilla

INTRODUCTION:

Face is the window of a person's identity and personality. The framework of face is formed by various bones integrated together to give shape to face. Injuries to the face are relatively common and are the reason for about 10% of all accident and emergency department attendances.¹ Due to increase violence and automobile accidents and availability of better health services, more number of cases of facial bone fracture are encountered these days. The maxillofacial regions can be divided into 3 regions. Upper third comprises frontal bone and sinus and lower third comprises mandible and temporomandibular joint. Middle third which is between supraorbital ridge and angle of mouth comprises of nasal bone, zygomatic bone and maxilla. There are considerable differences in the reported worldwide pattern of maxillofacial fractures. In the more developed countries in Europe, violence followed by road crashes are the predominant causes while in the developing world the causative factors are reversed with most being the result of road crashes.²⁻¹⁰ Other causes of trauma are accidental fall, gunshot injuries, sports related injuries, animal attack.² More females and younger children are involved now.^{4,5,11,12} The differences noted in etiology of injury, fracture patterns and concomitant injuries between sexes and different age groups likely reflects the differing activities that each group is engaged predominantly. In addition the growing facial skeleton offers varying degrees of protection to the cranial contents as force-absorbing mechanisms develop.³ Fractures of multiple sites showed higher facial injury severity scale and were associated with injuries to other sites of the body at a higher rate.¹³ Concomitant fracture includes basilar skull fractures and cervical spine.^{14,15}

In most studies, most frequent bone fractures was mandible^{2,3,5,6,8,9,10,16,17} followed by zygomatic complex and then maxilla. In some studies, zygoma fracture followed by maxilla and nasal bone fracture were found.⁷ Younger age groups showed a propensity for orbital fractures as opposed to older age groups where mandibular fractures predominated.^{3,18} While the incidence of mandibular fractures declined, a statistically significant increase was observed for fractures of the middle face specifically Le Fort 1 and zygomatic complex fractures.⁴ Majority of the mandibular fractures (33.3%) were located in parasymphiseal region. Zygomatic complex fractures were the most common in the mid-facial region.^{8,19}

The lack of enforcement of legislation on the use of seat belts, drunken driving and inadequate emergency medical care has continued to cause considerable mortality and morbidity. Service of maxillofacial surgery is increasing in Nepal and few patients are being referred to higher center. So assessment of type and mode of fracture is needed for legislations preventive measures. As fracture of facial bones are dealt by ENT surgeons, dental surgeons, eye surgeons and neurosurgeons; the proportion of different fractures are better represented if all these departments are included. So there was a need of a preliminary study about frequency of such fractures and proportion of individual variety. The aim of this study was to determine pattern of facial bones fracture in western region of Nepal.

MATERIAL AND METHODS:

A descriptive cross sectional study was carried out in Nepalgunj medical college at Nepalgunj. Ethical approval

was taken from institutional review committee. Records from emergency department, inpatient ward and OPD of ENT and dental department of last 3 years (Jan 2012 to Dec 2014) were enrolled in the study and entered into proforma with questionnaire. All ages and sex were included. The records which were not properly filled up were excluded. Patients who didn't allow proper examination or denied required investigations along with those who were referred, left the hospital on their own or expired before detail evaluation were excluded from the study. Comparison was done between mode of injury, demography and types of injuries. Data was analyzed using SPSS 17 software. Descriptive statistics was presented including mean, SD, frequency and percentage.

RESULT:

There were 812 patients recorded in study duration but 186 cases were excluded. Out of remaining 626 cases, there were 410 male patients and 216 female patients. Age ranged from 3 to 68 years with average age being 32.4 years. Different modes of injury in both sexes have been depicted in table 1. Most of the male patients sustained trauma due to road traffic accidents (51.7%) followed by physical assault (23.9%). In female also same mode of injuries were common with higher proportion due to physical assault. Other common modes of injuries were fall and sports injuries. The address of patient was divided into Farwestern and Midwestern regions and further into Terai and Hilly areas. The frequency of different regions is shown in table 2 with majority of cases from Midwestern Terai region (35.4%). There were 288(46.0%) cases with isolated facial bone fracture. The maximum was that of mandibular fracture (29.1%) followed by nasal bone fracture (27.7%) and maxilla (24.3%). Rest of 338 patients had multiple facial bone fractures with zygomatic bone fracture (79.2%) being commonest. It is followed by maxilla fracture (64.4%) and mandible (36.6%). The overall frequency of fracture considering both types of cases as shown in table 3 is mainly involving zygomatic bone (49.5%) followed by maxilla (46.0%) and mandible (33.2%). Nasal bone (30.3%) and frontal bone (14.6%) were least involved bones of face in facial fractures. There were associated injuries noted mainly in cranium (180 cases) followed by Cervical spine (35) and ethmoid injury.²⁴ There were 16 cases involving base of skull bone fractures.

Table 1: Mode of injury in different sexes

Mode of Injury	Male	Female	Total
RTA	212	91	303
Physical assault	98	72	170
Fall	60	38	98
Sports	32	11	43
Animal Attack	8	4	12
Total	410	216	626

Table 2: Address of presenting cases

Region	Terai area	Hilly area	Total
Mid Western	222	148	370
Farwestern	176	80	256
Total	398	228	626

Table 3: Different types of facial bone fractures

Bones	Isolated cases	Multiple fracture cases	Total	Percentage
Zygomatic	42	268	310	49.5
Maxilla	70	218	288	46.0
Mandible	84	124	208	33.2
Nasal Bone	80	110	190	30.3
Frontal bone	12	80	92	14.6

DISCUSSION:

Face is part of body which is dealt by ENT surgeons, dental surgeons, eye surgeons and neurosurgeons; hence for estimating frequency of fracture in this area all these departments should be involved. So this study initiated by department of ENT has involved data from other departments of our hospital to make it more comprehensive. There are few reported studies from Nepal but not including that of midwestern and farwestern region of Nepal. This study would form a basis of pattern of fracture that could help in further studies and formulating new legislative rules. A considerable number of patients were excluded mainly because of inadequate data entry and few getting referred to other hospitals before detail evaluation were carried out. More than 600 patients is, however, good number of cases to analyse as compared to other studies of small sample size.^{3,5,6,8,14,18,20} In our study, male patients were predominant almost accounting for two third of cases. This is in accordance to other studies like that of Yamamoto¹³, Zhou¹⁸, Mohajerani⁷ and study from Nepal.²¹ Male patients are involved in more outdoor activities and likely to suffer in road traffic accidents and physical assaults. Similarly, predominant age is that of 3rd decade, most of which are not limited to home but involved in outdoor activities. Regarding mode of injury road traffic accident topped the list irrespective of age which is in accordance to some studies.^{3,5,6,14,20,21}

The study was done in a tertiary referral center located in Mid western region of Nepal which is the only institution with ENT, Dental and Neurosurgery services. Hence, we had patient referred from Farwestern and Midwestern region. As this institute lies in terai belt we had maximum patients from Midwestern terai. Terai area has good facility of roads and transportation so it was not surprising to have more patients from terai. As more number of vehicles run in terai, chances of road traffic accident is also higher in terai. It could be another reason for more facial bone fracture cases from terai. We have divided cases into isolated bone fracture, multiple facial bone fracture and fractures involving other sites as well. In totality, the commonest bone to get fractured was Zygomatic bone(49.5%) which is similar to other studies.^{5,14,21} Few studies have shown Maxilla as commonest bone⁸ which is second in our study. There has been widely reported results^{1,3,6,11} showing mandible being commonest bone to get fractured. It is true in our context also if isolated bone fracture cases are taken into account. This type of classification has not been done in other studies so we need further more similar studies to compare the findings. In contrary to what we used to

think, nasal bone being projected part of face and liable to break in trauma, was not shown in this study. Nasal bone though second when isolated bone fracture is considered, may be more involved in low velocity trauma and physical assault. Zygoma which also forms projection in face and is liable to get involved in multiple fractures case, seems to be affected in high velocity trauma. Other bones of cranium are also fractured in facial bone fracture cases. Ethmoid and base of skull are less involved than temporal, parietal and frontal (beyond hairline) bones. Cervical spine injury was seen in considerable number of cases as in Munding study.¹⁵

This study lacks inclusion of occupation as variable as it was not documented in many cases. Similarly, precise fracture line delineation can help to categorize these fractures into their subtypes. So fracture in zygoma can be analysed in sub groups as buttress fracture, orbital portion or temporal process fracture. Nevertheless, it gives preliminary idea of different types of facial fractures in western region of Nepal and need to implement rules and formulate legislation for decreasing road traffic accident. With availability of advanced CT scan with 3D reconstruction cases, precise description of fractures can be done in our setting nowadays.

CONCLUSION:

Middle aged male patients are usually involved in facial bone fractures with road traffic accident and physical assault being common modes of injury. Zygomatic bone is the commonest bone to get fractured as a whole while mandible is commonest bone to get fractured in isolated fracture cases. There is need for further study describing subtypes of facial bone fracture and outcome with open reduction and internal fixation

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