THE MAXILLOFACIAL TRAUMA MANAGEMENT TRENDS AT ARMED FORCES INSTITUTE OF DENTISTRY, RAWALPINDI

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ABSTRACT

The aim of this study was to evaluate and analyze current trends in the management of trauma in patients presenting to oral and maxillofacial surgery department of Armed Forces Institute of Dentistry, Rawalpindi from Jan 2008 to Dec 2010. In this retrospective study, data of 613 patients with maxillofacial fractures treated at oral and maxillofacial surgery department, Armed Forces Institute of Dentistry was reviewed and analyzed. The main parameters recorded were gender, pattern of facial bones fracture and treatment modality of fracture. Out of these 613 patients, 564 (92%) were males and 49 (8%) were females with a male to female ratio of 11.5:1. The mandible was the most common bone to be fractured, with 307 fractures (50.1%), followed by 116 fractures (18.9%) of zygomatic bone, 83 fractures (13.5%) of maxillary bone, 64 patients (10.5%) had panfacial trauma, 26 (4.3%) were having nasal fracture while Naso-orbito-ethmoid fractures (NOE) were seen in 15 (2.4%) cases. The management of the injured face has undergone major changes, outcomes are considerably better than 30 years ago as more comprehensive assessment and management is now possible.

Key words: Trauma, management, maxillofacial fractures, mandible, maxilla

INTRODUCTION

Maxillofacial fractures occur as a result of traumatic forces, in isolation or concomitantly with other injuries of the body. Diagnosis and treatment of these fractures remain a challenge for oral and maxillofacial surgeons, demanding a high level of expertise.1

The etiology of facial trauma varies in different cultures and societies2. Motor vehicle accidents and interpersonal violence remain the main causes of facial injuries.3 Road traffic accidents cause 15% of facial injuries in developed countries. In contrast to developing nations with a more chaotic system of road use where RTA is responsible for greater than 50% of injuries.4

Traditionally, there has been a high male-to-female ratio among craniomaxillofacial injury victims. However, the recent literature shows a trend toward a more equal male-to-female ratio. This can be attributed to a changing workforce and the fact that more females work outdoors in more high-risk occupations, thus becoming more exposed to RTA and other causes of craniomaxillofacial fractures.5

The diagnosis of facial fractures often includes conventional radiographs of the face usually followed by a CT scan to assess possible neurological complications and to diagnose complex fractures of the face and skull.6 Literature shows that the most commonly fractured facial bones are mandible, nasal, and maxilla/
zygoma. Nasal and maxillary fractures are more common among infants, and mandible fractures are more common among teenagers.

It has been generally accepted that stable, undisplaced or asymptomatic fractures are indications for non-operative treatment, but there is no evidence in peer reviewed journals to show whether long-term follow-up supports this view.

The purpose of this study was to highlight the pattern and treatment trends of facial fractures in our local population. A concise understanding of the topographic patterns of facial fractures will assist health care providers in management as they plan the treatment of maxillofacial injuries. This study reviews the demographic details and reasons for operative/non-operative treatment of patients with facial fractures in our unit.

**METHODODOLOGY**

In a descriptive case series study records and radiographs of all the patients with a maxillofacial fracture referred to the oral and maxillofacial surgery department, Armed Forces Institute of Dentistry Rawalpindi for treatment, over a 3-year period (Jan 2008 to Dec 2010) were reviewed. Armed Forces Institute of Dentistry, Rawalpindi is a tertiary health care center serving the area’s demographically diverse population. Patient information was collected using a specifically designed proforma for the task. Data regarding gender, pattern of facial bones injury and treatment modalities used were gathered from pertinent hospital inpatient and outpatient records. All these patients were examined and treated by trauma team comprising of three consultants in the department along with a team of residents. Patients with maxillofacial injuries, whether treated as indoor cases or day care cases, were included in this study. The patients with incomplete data were excluded from the study. Frequencies and percentages were calculated for categorical variables like gender, social backgrounds, pattern of fractures and treatment modality used.

**RESULTS**

A 3-years retrospective clinical and epidemiological study evaluated 613 patients treated for maxillofacial fractures from Jan 2008 to Dec 2010 at Armed Forces Institute of Dentistry, Rawalpindi. There were 564 male patients (92%) and 49 (8%) female patients with an overall male-to-female ratio of 11.5:1 (Pie chart 1). Out of these 613 cases, 288 (47%) were army personnel while 325 (53%) were from civilian background. (Pie Chart 2). Road traffic accidents were the most common cause of facial fractures in our series. (Table 1)

The mandible was the most common bone to be fractured, with 50.1% fractures (307), followed by 18.9% fractures (116) of zygomatic bone, 13.5% fractures (83) of maxillary bone, 10.5% patients (64) were having panfacial trauma. (Graph 1)

The surgeons used several different approaches for reduction and fixation of facial fractures. Of 307 mand...
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dibular fractures, 169 patients (55%) were treated by open reduction and internal fixation using bone plates and 138 patients (45%) were treated by closed reduction. (Table 2)

Bone plating systems by synthes, true dynamic and bioresorbable system bonamates plates by true dynamic (which are made of combination of polylactic acid and polyglycolic acid) were used to stabilize the fracture segments. Bone plates of 2mm thickness were used to stabilize mandibular and zygomatic fractures and 1.3 or 1.5mm thickness plates were used in case of maxillary, orbital and NOE fractures. Bioresorbable plates were used only in the mandibular fracture depending upon the criteria of undisplaced fractures and minimally disturbed occlusion.

DISCUSSION

Facial bone fractures are one of the most common injuries and draw special attention from a great number of clinicians. Therefore, many reports analyzing these fractures have been presented. The findings of those analyses vary according to their timing and geographical region, which in turn relates to social, economic and cultural distinctions.9

A high male-to-female ratio among craniomaxillofacial injury victims has been widely reported in studies from developing countries. This is attributed to the fact that men are more involved in outdoor activities and more frequently exposed to violent interactions. Furthermore, male vehicle drivers outnumber female drivers.10, 11, 12 The gender distribution in the present study is consistent with that of others, with a higher frequency of craniomaxillofacial fractures in males compared with females. This study found a higher male-to-female ratio, there were 527 male patients (92%) and 45 (8%) female patients with an overall male-to-female ratio of 11.5:1. Recent literature also shows a trend toward a more equal male-to-female ratio.9

The pattern and distribution of facial fractures is related to the mechanism of these injuries, as well as the anatomy of the facial skeleton. The present study showed that mandible was the most commonly fractured bone. A recent retrospective study conducted in Korea showed that the most frequently fractured bone was the nasal bone, accounting for 42.5%, followed by the orbit, zygoma, mandible, maxilla, frontal bone and injuries of NOE complex.9 Another retrospective study conducted in India showed the most commonly associated fracture was that of zygomaticomaxillary complex, followed by Le Fort type fractures10.

Miniplate osteosynthesis has become increasingly popular for the management of mandibular fractures in

Pie Chart 2: Distribution according to Army and Civilian background

Graph 1: Frequency and Pattern of Maxillofacial Fractures
a number of European countries. Among 307 mandibular fractures treated in our department, 169 (55%) were treated by ORIF using miniplates of 2mm thickness and trans-osseous wiring while 138 (45%) were treated by closed reduction and MMF (using eyelets or custom fabricated arch bars). Among 169 patients who were treated by ORIF, 40 patients were treated using bioresorbable plating system depending upon the criteria of undisplaced fractures and minimally disturbed occlusion. Regarding condylar fractures, our policy was to perform open reduction in case of bilateral or severely displaced fractures where it was difficult to achieve occlusion. In a review on treatment of mandibular fractures, treatment was done by closed reduction with MMF in 170 patients while trans-osseous wiring was the most commonly used method in cases that required open reduction (15%) followed by miniplates. However another study showed that out of the 674 patients with mandibular fractures, 177 patients were treated by maxillomandibular fixation (MMF) with elastics and arch bars; 80 with arch bars only (without IMF); 278 with ORIF and MMF; 7 with ORIF and arch bar without MMF; and 204 with ORIF only.

In current day practice regarding condylar fractures, fractures with a deviation of more than 10⁰ should be treated with open reduction and fixation, irrespective of level of the fracture. One of the most common midfacial fractures is fracture of the zygomaticomaxillary complex. Some clinicians favor minimal exposure of the fracture site, whereas others advocate open reduction and fixation. Marked differences in clinical practice exist about which method is most frequently used because of local traditions and the country for the patient’s treatment. Among our 116 fractures of zygoma, 77 patients (72%) were treated by ORIF and in 21 patients (28%), fracture was reduced using hook or Gillies technique and when found stable were left as such. When compared with a retrospective analysis of 141 patients with zygomatic complex fractures, conducted in Brazil, 113 patients (83.7%) had internal fixation with miniplates as their main treatment method. Isolated zygomatic arch fractures occurred in 4 patients in their series and were reduced using Gillies technique.

All three types of Le Fort fractures disrupt the pterygomaxillary buttress. Among 83 of total maxillary fractures in our study 27 were classified as Lefort I, 33 as Lefort II and 23 as Lefort III. Among 83 of total maxillary fractures 33 patients (39%) were treated by ORIF using microplates of 1.5 mm thickness and 50 patients (61%) were treated conservatively using arch bars or custom fabricated splints followed by IMF and suspension wiring (circumzygomatic suspension in Lefort II and frontomandibular suspension in Lefort III) showing a more conservative approach being adopted at our centre for maxillary fractures.

Panfacial fractures are often associated with soft tissue injuries and loss of bony structures that can lead to severe posttraumatic deformities and disabilities like malocclusion, “dish” face deformity, enophthalmos. Out of 64 patients of panfacial trauma in our series, 43 patients (67%) were treated by ORIF and 15 patients (23%) were treated by closed reduction using MMF and suspension wiring. Bottom to top approach was used in management of theses fractures. In a study on panfacial fractures conducted in China the very same sequence of bottom to top was used in panfacial trauma management and bone gaps more than 5mm were grafted with iliac crest grafts. However we did not find any need of reconstruction in our series.

The goal of treatment for nasal fractures is to restore the pre-traumatic anatomy, as patient airway and normal function. In our setup mostly ENT surgeons manage nasal fractures so only a meager percentage (4.3%) was treated by us and all of them were treated by closed reduction. Closed reduction was performed using Walsham and Asches forceps to reduce the nasal bones and septum. In a study conducted in America out of 50 patients treated in their series, 44 patients were treated by closed reduction and septoplasty, 6 patients did not require any surgical treatment because of comorbidities. 10 of their total patients required secondary septo-rhinoplasty; however none of our patients needed secondary procedures.

Naso-orbito-ethmoid fractures were seen in 15 (2.4%) cases while only 2 (0.3%) were having frontal bone fracture and those frontal bone fractures were treated by open reduction using a coronal approach. Management is generally dictated by the extent of injury, and this is best summarized by the Markowitz and colleagues classification of NOE fractures. In a study on management of NOE fractures in Canada, 10 of their consecutive patients were having type III NOE fractures, coronal flap was used and transnasal reduction, primary grafting, plate and screw fixation were used for all patients.

Maxillofacial fractures occur in people of all ages and races in a wide range of social settings. Open reduction and internal fixation has become popular for
the management of facial fractures in Europe, the same was adopted in our series mainly in displaced fractures. It is hoped that assessments and analysis such as the one presented here will be valuable to oral and maxillofacial surgeons and health care professionals involved in managing the patients of maxillofacial fractures

CONCLUSION

The management of the injured face has undergone major changes following greater understanding of the healing process and advances in technology. Outcomes are considerably better as compare to last three decades, as more comprehensive assessment and management is now possible. Too many factors influence the decision making for an adequate treatment option. The analysis of facial fractures presented in this report considers the distinctive social and cultural aspects of the region and provides important data for the planning and treatment of maxillofacial injuries. It also provides comparison of the pattern and treatment of facial bone fractures in other regions.

RECOMMENDATIONS

The management of the multiply injured patient requires close interaction between various specialties and communication is essential to provide optimal management. Radiologists should evaluate facial fractures in multiple planes. Three-D images can also facilitate a broader understanding of the fracture impact on facial width, height, and projection and are useful for an overview of more complex fracture patterns that involve multiple facial bones. Reconstruction of combined bone and soft tissue deformity is difficult after severe maxillofacial injuries due to unpredictable soft tissue and hard tissue changes. New algorithms for soft and hard tissue reconstruction may solve these problems in the future.

CONFLICT OF INTEREST

The author’s declare no conflict of interest.

REFERENCES