PATTERN AND MANAGEMENT OF MANDIBULAR FRACTURES: A STUDY CONDUCTED ON 264 PATIENTS

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ABSTRACT

The descriptive study was undertaken to determine the pattern and different methods of treatment of maxillofacial fractures. Two hundred and sixty four patients with mandibular fractures were treated during the year 2001-2002. A review of patients' records and radiographs was conducted. Data regarding age, gender, cause of fracture, anatomic site and treatment modalities were reviewed. There was higher prevalence in male (4.8:1), with occurrence peak between 21-30 years. The principal causes of fracture in this study were RTA (Road Traffic Accidents) representing 62.8%(n=166), followed by fall (n=53; 20%), assault, sports, Fire Arm Injury (FAI). The most injured sites were, in decreasing order, body of the mandible (30.3%) followed by condylar region (24.2%), angle, paraymphysis, dentoalveolar, symphysis, ramus, coronoid. Most patients of mandibular fractures were treated by closed reduction [eyelet wiring, arch bars with intermaxillary fixation (IMF) & splint fixation], 18.9% of patients were treated with open reduction (Interosseous & miniplates fixation. This study reflects patterns of mandibular fracture within the community and, it is hoped that assessment presented here will be valuable to government agencies and health care professionals involved in planning future programs of prevention & treatment.

Key words: *Trauma, Mandibular fractures, facial fractures, Etiology*

INTRODUCTION

The mandible is a unique bone having a complex role in aesthetics of the face and functional occlusion. Because of the prominent position of the lower jaw, mandibular fractures are the most common fractures of the facial skeleton. Given that the mandible is the only facial bone that has mobility and the remaining portion is part of the fixed facial axis, the fracture is never left unnoticed because it is very painful, pain that worsens with mastication and phonation movements, and even respiratory movements; sometimes there are facial asymmetry complaints. Mandible fractures may lead to deformities be them by displacement or non-restored bone losses, with dental occlusion affection or temporomandibular joint disorder. If not identified or inappropriately treated, these lesions may lead to severe sequelae, both cosmetic and functional.[1,2]

It has been reported that fractures of the mandible account for 36% to 59% of all maxillofacial fracture.[3-5] The large variability in reported prevalence is due to a variety of contributing factors such as gender, age, environment, and socio-economic status of patient, as well as the mechanism of the injury. The most favourable site of fracture(in descending order) in mandible are the body, angle, condylar region, symphysis, and coronoid process.

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Treatment of mandibular fractures has changed over the last 20 years. There has been a decrease in the use of wire osteosynthesis and intermaxillary fixation and an increase in preference for open reduction and internal fixation with miniplates.[6,7] This has helped to reduce malocclusion, non-union, improved mouth opening, speech, oral hygiene, decrease loss and the ability for patients to return to work earlier.[6,8]

The aim of the study was to examine the pattern and treatment of mandibular fractures. A clearer understanding of pattern of mandibular fractures will assist health care providers as they plan and manage the treatment of traumatic maxillofacial injuries. Such information can also be used to guide the future funding of public health programmer geared toward prevention.

MATERIALS AND METHODS

The records and radiographs of all patients were reviewed who have presented with mandibular fractures to the department of Oral and Maxillofacial Surgery, de Montmorency College of Dentistry, Punjab Dental Hospital Lahore, from June 2001 to Dec 2002. Punjab Dental Hospital is a tertiary care hospital serving central Punjab's demographically diverse population. All patients treated for mandibular fracture, whether admitted to hospital and treated in operating room or seen as outpatients, were included in this investigation. Patient information was collected by proforma specially designed for this purpose. The fractures were classified according to standard nomenclature. An appropriate management plan was devised and followed up for 6-weeks. The mandibular fractures were compiled according to age, gender, etiology, anatomic site and methods of fixation.

RESULTS

In the studied period, mandibular fractures were diagnosed in 264 patients. The main cause of mandibular fractures in the study was RTA (n=166; 63%). Falls were the second most frequent causative factor of fractures (n=53; 20%), followed by fight (n=26; 10%), sports (n=16; 6%). The causes of mandibular fractures are listed in table 1.

By crosschecking the data collected from age and gender, we detected a predominance of male gender cases in all age ranges, mean of approximately 4.8:1, we also found a peak occurrence in young adults, age 21-30 years.

	No of cases	Percent
RTA	166	63
Fall	53	20
Assault	26	10
Sports	16	6
FAI	3	1
Total	264	100

TABLE 1: DISTRIBUTION OF MANDIBULAR FRACTURES ACCORDING TO ETIOLOGY

Approximately 15% cases involved combination fractures (2.65% sustained fractures of both Mandible and Maxilla whereas Zygoma is involved in 12.97%(n=34) of patients with mandibular fractures). The distribution of the mandibular fractures is detailed in tables 2, 3. The most common site was body of the mandible (30.3%), followed by condylar process (24.2%), angle (21.6%), parasymphysis (10.6%), dentoalveolar (5.7%) symphysis (4.9%), ramus (1.9%) and the coronoid process (8%).

No of	Percent cases	
Mandibular Fractures alone	223	84.4
Mandible and Maxilla	7	2.65
Mandible and Zygomatic Complex	34	12.97
Total	264	100

TABLE 2: DISTRIBUTION OF MANDIBULAR FRACTURES

	Number of cases	Percent
Body	80	30.3
Condyler	64	24.2
Angle	57	21.6
Parasymphysis	28	10.6
Dentoalveolar	15	5.7
Symphysis	13	4.9
Ramus	5	1.9
Coronoid	2	0.8
Total	264	100.0

TABLE 3: DISTRIBUTION OF MANDIBULAR FRACTURES ACCORDING TO ANATOMIC SITE

Several methods of reduction and fixation were used in the treatment of mandibular fractures as shown in table 4. Of the 264 mandibular fractures, 214 cases (81%) were treated by closed reduction; 106(40.2%) of these with IMF (eyelet wiring), 65(24.6%) with arch bars and IMF used to treat condylar fractures, 28(10.6%) with splint fixation mostly used for children and edentulous patients. 50 (19%) patients were treated by open reduction and fixation with interosseous wiring and miniplates.

	Number of cases	Percent
IMF (eyelet wiring)	106	40.2
IMF (arch bar+elastics)	65	24.6
Splint fixation	28	10.6
Interosseous wiring with IMF	28	10.6
Miniplates fixation with IMF	22	8.3
Plain arch bar	15	5.7
Total	264	100.0

TABLE 4: TREATMENT MODALITIES FOR MANDIBULAR FRACTURES

DISCUSSION

The mandible is the only mobile bone of the face and it participates in basic function such as mastication, phonation, swallowing and maintenance of dental occlusion.[1] Despite the fact that it is the heaviest and strongest facial bone, the mandible is prone to fractures for some specific reason: 1) it is an open arch; 2) it is located in the lower portion of the face; 3) it is the mechanism of hyperextension and hyperflection of the head in traffic accidents; 4) it gets atrophy as a result of aging.[9]

The results of this investigation of patients with mandibular fractures are largely in agreement with those of previous reports particularly with regard to age and gender of the patients. The finding that age group 21-30 years constituted the group with the highest frequency of jaw fractures is consistent with previously published reviews.[10-15] It has also been consistently shown that the frequency of mandibular fractures among male is far grater than that of female. Reported overall ratios of male to female have ranged from 3:1 to 5.4:1[4,5,10,14] similar to the ratio observed here (4.8:1).

When the maxillofacial region is injured, the mandible is more vulnerable than the midface fractures.[17] This could be because the mandible is mobile and has less bony support than midfacial bones. These fractures are, however, more common in certain sites of the mandible than others. Almost all studies showed that the body of the mandible was the most frequently affected area. The least affected site is the coronoid process.

In this study condyler region of the mandible is the 2nd most commonly involved site, which is in contrast with figures obtained from studies in Nigeria[18] and Jordan.[10] It is difficult to cite a reason for this difference; perhaps further study on the causes of the regional mandibular fractures would be useful. One can speculate that inter-population difference in the sites of mandibular fractures partly related to the diverse etiologic factors involved.

There are many different therapeutic possibilities, given that many author disagree about the best treatment approach. Regardless of the type of fracture and treatment, we should achieve anatomical reduction by positioning the teeth and precisely readjusting bone fragment for appropriate treatment, whose main objective is to maintain mandible function[19]. Therefore, the objectives of the therapy are: mandible symmetry, absence of pain or cracking upon TMJ palpation with closed and opened mouth, satisfactory dental occlusion, maximum interincisal opening greater than 40mm, and absence of midline deviation or deviation smaller than 2mm at mouth opening.[20]

Several studies have suggested that most mandibular fractures can be treated by closed reduction and I.M.F. Olson et al[21] and Hill et al[22] concluded that most mandibular fractures were amenable to management by Closed Reduction. Of the 264 patients in our series, 50 cases of mandibular fractures had required open reduction. All methods were used for fixation without the use of any devices for external fixation. Furthermore, simple methods of Reduction and Immobilization were used on outpatient basis under local anesthesia. And the results were satisfactory.

In recent years, there has been a trend towards rigid fixation with miniplates. In our study 22 cases (8.3%) were treated with miniplates. The postoperative results were satisfactory. Most of the patients belong to low socio-economic status; therefore, limited numbers of cases were selected for miniplate fixation.

CONCLUSION & RECOMMENDATIONS

In the present study, the mandibular fractures were more prevalent in male patients and during the 3rd decade of life. The most common cause was RTA and the more frequently affected regions were body and condyle. Isolated mandibular fracture occure in more than 80% of cases. Most patients were treated with closed reduction and conventional means.

It is hoped that assessments such as the one presented here will be valuable to the government agencies and health care professionals involved in planning futures programmes of prevention and treatment.

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