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Research Article

Pattern of Mandibular Fracture in West of Libyan Ali Omar Askar Neuro and Spine University Center during Years of 2010-2012: A Retrospective Study

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Abstract

Purpose: To analyze the frequency, pattern etiology of mandible fracture in Ali Omar Askar Hospital; and to provide reference point to improve health care strategies in attempt to reduce and minimize the incidence of the fractures.

Patient and Methods: This retrospective study of mandibular fractures seen and treated in Ali Omar Askar Neuro and Spine Center in 3 years period (2010-2012). The files and radiographs of the patients enrolled were retrieved, reviewed, and analyzed. The following data were collected: the patient's file number, name, age, sex, date and mechanism of injury, associated injuries, site of fracture, and treatment modality.

Results: A total of 120 patient's files were reviewed 104 males (86.67%) and 16 females (13.33%). Road traffic accident constituted 62.50% the highest incidence as a cause of mandibular fracture, followed by assaults 13.33%, gunshot wounds 12.50%, and falls 40%, kicked by horse/camel 0.83%, sports were 0.83%. The main age group was 21 - 30 (42.50%) followed by 31 - 40 (21.67%) and 11-20 18.33%.

During this study the sites of fracture were the following: 20% parasymphysis, 20% angle, 20% condyle, 15.26% symphysis, 12.11% body.

Conclusion: The road traffic accident is the major cause of mandible fracture in the Ali Omar Askar Neuro and Spine Center, followed by assault and gunshot wounds. The uprising in Libya can be considered as a case of increase of fracture mandible as it rose from 22 patients in 2010 to 37 in 2011, and 61 in 2012.

79.17% of patient ORIF, 5% treated by IMF, 7.5% treated conservatively in no treatment, and 8.33% left against medical advice (LAMA).

Keywords: *Mandibular Fracture; Ali Omar Askar Neuro and Spine Center*

Introduction

Ali Omar Askar Neuro and Spine Center is located in west of Libya 40 km away from Tripoli, 20 km from the airport considered as the main center in Libya for treating Neuro and Spine Surgery: 300 beds. 120 cases of fracture mandible are out of 188 cases of maxillofacial injury treated in year between 2010 and 2012.

Maxillofacial injuries in isolation or in combination with other injuries account for a significant percent of emergency room and hospital admission [1].

Verification of the etiology of maxillofacial fractures provides insight into the behavioral patterns of people from different countries and also can help to identify ways to prevent such injuries [34]. Many causes of mandible fractures have been reported including road traffic accidents, assaults, and sport injuries.

Factors such as geographic location, culture, alcohol, drug abuse, and socioeconomic status influence the cause and incidence of such injuries and it is different between countries [3,5,6] with some consistent findings like the predominance of men. High men to women ratio ranges from 3 to 6.1:1, and people in 20 to 29 years old age group are the most affected [7,8].

However, the recent literature shows trend toward a more equal male to female ratio [9,10]. This can be attributed to changing in life-style and change in work force the fact that more women work out doors in more high risk occupations, this becoming more exposed to RTA and other causes of maxillofacial fractures [9,11,12].

The aim of this study is to determine the age group, sex portion, and etiology, site of mandibular fractures, associated injury, and treatment modality during the years of 2010 - 2012 and to provide statistical analysis that can help as reference point for health care planners to reduce and prevent such fracture in the future.

Patient and Methods

This is a retrospective study the target patient is 120 patient seen diagnosed and treated in Ali Omar Askar Neuro and Spine Center in 3 years period (2010 - 2012) suffering from mandibular fractures with or without other maxillofacial injuries.

The files and radiographs of 120 patients were retrieved, reviewed, and analyzed. The following date were collected, age, gender, etiology, site of fracture, associated injury, and treatment procedure.

Results

A total of 120 patient's files were reviewed during the study. The main age group involved in mandible fracture 21 - 30 (42.50%) followed by 31 - 40 (21.67%), 11 - 20 were (18.33%), children in age group 0 - 10 were (8.33%), the patients under the age of 41 - 50 were (5.83%), 51 - 60 (0.83%), 61 - 70 (0.83%), 71 - 80 (1.67%) (Table 1).

Age Group	2012	2011	2010	Total	Percentage
0 - 10	7	3	0	10	8.33
11 - 20	15	5	2	22	18.33
21 - 30	22	21	8	51	42.50
31 - 40	11	7	8	26	21.67
41 - 50	3	0	4	7	5.83
51 - 60	0	1	0	1	0.83
61 - 70	1	0	0	1	0.83
71 - 80	2	0	0	2	1.67
Total	61	37	22	120	100

Table 1: *Distribution of Age Group.*

One hundred four (104) were male (86.67%), and sixteen patients (16) were female (13.33%) (Table 2).

The road traffic accident (RTA) constituted the highest incidence as a cause of trauma in mandibular fracture accounting 75 patients (62.50%) followed by assault in 16 patient (13.33%), gunshot wound as a mechanism of mandibular fracture were 15 patients (12.50%), falls from high 12 patient (10%), sport injury was 1 patient (0.83%), kicked by horse 1 patient (0.83%) (Table 3).

Gender	2012	2011	2010	Total	Percentage
Male	51	32	21	104	86.67
Female	10	5	1	16	13.33
Yearly Total	61	37	22	120	100

Table 2: *Distribution of Sex Ratio.*

Aetiology	2012	2011	2010	Total	Percentage
Road Traffic Accident	43	17	13	73	60.83
Assault	5	7	3	15	12.50
Gunshot	2	13	0	15	12.50
Falls	8	0	6	14	11.67
Kick By Horse/Camel	1	0	0	1	0.83
Sports	1	0	0	1	0.83
Iatrogenic	1	0	0	1	0.83
Total Fractures	61	37	22	120	100.00

Table 3: *Distribution of Aetiology.*

The parasymphysis constituted 38 fractures (20%), angle 38 fractures (20%), fracture condyle 38 (20%), symphysis 29 fractures (15.26%), fracture body 23 (12.11%), dentoalveolar fracture 11 (5.79%), coronoid process fracture 9 (4.74%), ramus fracture 4 (2.11%) (Table 4).

Site Of Mandible Fractures	2012	2011	2010	Total	Percentage
Parasymphysis	12	13	13	38	20.00
Angle	20	15	3	38	20.00
Condyle	19	7	12	38	20.00
Symphysis	16	9	4	29	15.26
Body	14	6	3	23	12.11
Dentoalveolar	7	2	2	11	5.79
Coronoid Process	5	4	0	9	4.74
Ramus	3	1	0	4	2.11
Total	96	57	37	190	100

Table 4: *Distribution of Sites of Mandible Fractures.*

The most common associated injuries were head injury 8 (44.44%), followed by upper extremity 4 (22.22%), chest injury 3 (16.67%), lower extremity 2 (11.11%), cervical injury 1 (5.56%) (Table 5).

Other Injuries	2012	2011	2010	Total	Percentage
Skull	3	1	4	8	44.44
Chest	1	0	2	3	16.67
Lower Extremity	0	0	2	2	11.11
Upper Extremity	2	1	1	4	22.22
Neck (Spine Injury)	1	0	0	1	5.56
Yearly Total	7	2	9	18	100

Table 5: *Distribution of Associated Injuries.*

The open reduction and internal fixation (ORIF) is the main treatment procedure in 95 (79.17%), leave against medical advice (LAMA) 10 (8.33%), conservative treatment 9 (7.50%), intermaxillary fixation (IMF) 6 (5%), Table 6.

Treatment Procedure	2012	2011	2010	Total	Percentage
Open Reduction and Internal Fixation	45	31	19	95	79.17
Intermaxillary Fixation	2	3	1	6	5.00
Conservative Treatment	5	2	2	9	7.50
Left Against Medical Advice	9	1	0	10	8.33
Yearly Total	61	37	22	120	100

Table 6: *Distribution of Treatment Procedures.*

Discussion

Due to its anatomical position in the face the mandible is the more frequent in the fracture of the facial bone than other bones.

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 [13]. Despite the fact that it is the heaviest and the strongest bone on the face the mandible more prone to fracture for some specific reasons:

1) Anatomical location on the lower portion of the face
2) It gets atrophy as result of aging [14]
3) It's an open arch

The results of this study of mandible fracture are largely an agreement with those of previous reports especially with regard to age and gender of the patients. The finding that age group 21 - 30 years constituted the group with highest frequency of mandibular fractures is consistent with previously published reviews [15,16]. It has also been consistently shown that the frequency of mandibular fractures among male is far greater than that of female.

Reported overall ratios of male to female have ranged from 3:1 to 5.4:1 [15,17-19] Similar to the ratio observed in this study (6.5:1)

In this study RTA was the main cause of mandibular fractures which constitute 60.83% as a result of lack of seatbelt legislation as there is no single case reported in this study wearing a seat belt!! ,high speed no respect to traffic regulation which practically not implemented in this country after the uprising in 2011, another reason of high incidence of RTA bad road conditions , many vehicles to passenger when crossing the roads, many youngster (under age) have no driving liscence and even those who have one have not much knowledge about rules and Traffic regulations!!

Childrens usually accompany their family in the car without car seat and instead they freely moves between front and back seats which make them vulnerable to sustain injury, which can be serious as there is cases reported that children hit the dash board!! The road do not have minimum safety standard to be used, drivers in many occasions reported using mobile phones or even texting when driving which is responsible for cause of many accidents , no respect .It is followed by assault and gunshots which constitute 12.5% for each as a result of uprising in Libya 2011. The gunshot jumped from 0% on 2010 to 35.1% on 2011, Gun ownership before law and this prohibit the uprising in feb 2011 is another cause of facial bone fractures in Libya.

Assault is the second cause of mandibular fracture in this study the cases reported of fighting using fist iron bar ,wooden stick and usually patients will not tell the real story ,however alcohol drink ,drugs are common underlying cause but in Muslim state religiously and socially patients will not admit this as underlying cause.

In 2012 due to lack of security and no police control some cases of robbery using various weapons resulted in jaw fractured reported.

Fall is another cause of mandibular fracture in this study due to fall from olive trees in farms during collection of olive , and palm trees, as some farmer don't follow proper safety instructions. Others fall in mountain areas, fall in the road due to poor pavement conditions in some area especially early morning or evening with poor or absent of light, poor design of stairs in some houses.

When the maxillofacial region is injured the mandible is more vulnerable than the mid face fracture [20]. This could be because the mandible is mobile and has less bony support than midfacial bone. This fracture is more common in certain sites of mandible than the other. Almost all studies showed that the body of the mandible was the most frequent affected area, other least affected site is the coronoid process. In this study the region of parasymphysis, angle, and condyle constitutes 20% each. On this study which comes in contrast of other study [15-21] followed by symphysis 15.26% and ramus 2.11% See table 4.

As the Ali Omar Askar Neuro and Spine Center considered National Center for treating the Neuro Surgery cases so the main associated injury in this study was in skull which constitute 44.44% which may relate the anatomical proximity of the mandible to skull and severity of trauma See table 5.

There are many different therapeutic possibilities given that may authors disagree about the best treatment approach. Regardless of the type of fracture and treatment modality, we should achieve anatomical reduction by positioning the teeth and precisely readjusting bone fragments for appropriate treatment whose main objective is to maintain function of the mandible [22].

Several studies have suggested that most mandibular fractures can be treated by Closed Reduction and IMF Olson*., et al.* [2] and Hill., *et al.* [23] concluded that most mandibular fractures were amenable to management by closed reduction.

In our study 95 patients out of 120 were treated by O.R.I.F. using Titanium miniplates and screws which constitute 79.17%. I.M.F. (Intermaxillary Fixation) were done in 6 patients out of 120, 5%. 10 patients out of 120 left against medical advice (LAMA) and seeking treatment approach.

Conclusion and Recommendation

In this study the mandibular fracture were more prevalent in male patients and during 3rd decade of life. Most common cause was RTA and more frequently affected regions were parasymphysis, angle, and condyle with 20% each. The most associated injury to mandibular fracture was the skull. Most of the patients were treated by ORIF.

It is hoped that this study will be valuable to government and health care professionals involved by planning programs for prevention and treatment.

Conflict of Interest

There is no conflict of interest in this work.

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