

Study and Management of Fracture Mandible among Patients Admitted to Assiut University Hospital

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Abstract

Background: Mandible fractures are a frequent injury because of the mandibular prominence and relative lack of support. As with any facial fracture, consideration must be given for the need of emergency treatment.

Aim of Study: This study attempts to define current patterns of fracture mandible based on “414” patient demographics and mechanism of injury and variable methods of treatment in Assiut University Hospital in the period from (March 2014 to December 2016).

Patients and Methods: This study is a retrospective analysis of medical records available with Trauma Unit Assiut University Hospital. In period from March 2014 to December 2016 “414” patients.

Results: There were higher percentage in road accident (69.80%) and (19.80%) fall from height. There were (47.82%) of fracture in body, (36.95%) of cases in symphyseal, parasymphyseal. There were (60.86%) of cases had done by open reduction & intend fixation “ORIF” vs. (36.95%) of cases done by closed reduction and (2.2%) of cases treatment conservative. There were (27.77%) of cases have mouth opening normal with (69.0%) have normal occlusion. As regard there were (3.14%) of cases have infection post-operative.

Conclusion: As regard there were higher in percentage in function, infection risk of anesthesia and fixation in ORIF group than closed reduction with highly significance difference.

Key Words: Mandible fractures – open reduction – Intend fixation “ORIF”.

Introduction

MANDIBLE fractures are a frequent injury because of the mandible's prominence and relative lack of support. As with any facial fracture, consideration must be given for the need of emergency

treatment to secure the airway or to obtain hemostasis if necessary before initiating definitive treatment of the fracture [1].

The treatment of mandibular fractures has been in a constant state of evolution over the past few decades. The most significant advancements related to the management of fractures of the mandible are based on specific technical refinements in the methods of internal fixation [2].

Also there is improvement in the knowledge of anatomy, pathophysiology, pharmacology and biomaterial science which influence our current management of mandibular fractures. Recent mandibular fracture management techniques have allowed for decreased infection rates and biological stable fixation of bone segments. This philosophy produces bony union and restoration of preinjury occlusion and normally eliminates the need for wire maxillomandibular immobilization [3].

All this adds up to a faster, safer, more comfortable return to function. In spite of the presence of these modern techniques, closed reduction has by no means fallen by the wayside and still remains a commonly used procedure [4].

Mandibular fractures in children and adults need different treatment approaches. Similarly, fractures of different anatomical sites in the mandible need different treatment modalities; they differ in their biomechanics, treatment requirements and complications [5].

So each fracture is discussed individually taking care of the different schools of thought and controversies regarding their management. Major advances in the treatment of mandibular fracture

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in terms of biomaterials and minimally invasive surgical techniques are also discussed [6].

Patients and Methods

This study attempts to define current patterns of fracture mandible based on “414” patient demographics and mechanism of injury and variable methods of treatment in Assiut University Hospital in the period from (March 2014 to December 2016).

Study design: This study is a retrospective analysis of medical records available with Trauma Unit Assiut University Hospitals.

Site of the study: Trauma Unit Assiut University Hospitals.

Patients: This study is a retrospective analysis of medical records available with Trauma Unit Assiut University Hospital. The medical records of patients with fracture mandibular treated over the last 2 years were retrieved and reviewed for (age & sex of patients, site of fracture, method of treatment follow-up).

Clinical assessment: Patients with fracture mandible may present with the following:

Extra oral: Soft tissue swelling, pain on mandibular movement and restriction of mandibular movement.

Intra oral: Deviation of mandible, alteration of occlusion and laboratory investigation and prepare for surgery (CBC, kidney function,...).

Radiographic assessment: Plain X-ray (anteroposterior view, lateral view, town view), panoramic X-ray and MSCT facial bones with 3D film.

Treatment methods:

I- According to age:

1- Child “conservative treatment, ORIF by absorbable plates”.

2- Adults:

- Conservative treatment.
- Splinting for edentulous patients.
- Closed reduction by Maxillary Mandibular Fixation (MMF) or circummandibular wire.
- Open reduction and internal fixation either by interosseous wires, manipulates and screws.
- Grafting for mandibular defects.

II- According to shape of fracture:

1- Favorable “closed reduction”.

2- Unfavourable “ORIF” (in 1976, Spiessl and others continued to advance techniques of Open Reduction and Internal Fixation (ORIF) and developed the principles now advocated by the Arbeitsgemeinschaft fur Osteosynthesefragen (Association for Osteosynthesis/Association for the Study of Internal Fixation (AO/ASIF).

Results

This study is a retrospective analysis of medical records available with Trauma Unit Assiut University Hospital. In period from March 2014 to December 2016 “414” patients.

Table (1): Demographic data in study group.

Item	Descriptive “n=414”
<i>1- Age “years”:</i>	
Mean ± SD	24.56±15.55
(Min-max)	(3.0-64.0)
-15yrs.	82 (19.80%)
15-40 yrs.	169 (40.82%)
40-60 yrs.	99 (23.91%)
>60 yrs.	64 (15.45%)
<i>2- Sex:</i>	
Male	333 (80.4%)
Female	81 (19.6%)

Table (1) shows demographic data in study group. There were mean of age in all patients 24.56 years as regard males are more effected (80.4%).

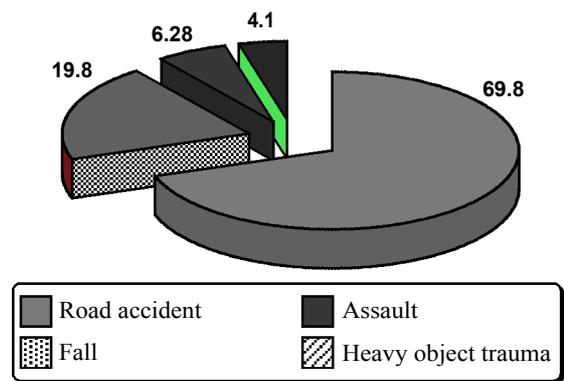


Fig. (1): Shows causes of trauma in study group. There were higher percentage in road accident (69.80%) and (19.80%) fall from height.

Table (2): Site of fracture trauma in study group.

Item	Descriptive “n=414”
<i>Types of fraction:</i>	
Symphyseal, Parasymphyseal	153 (36.95%)
Body	198 (47.82%)
Angle	135 (32.60%)
Condyle	117 (28.26%)
Dent alveolar	72 (17.39%)

Table (2) shows site of fracture of trauma in study group. There were (47.82%) of fracture in

body, (36.95%) of cases in symphyseal, parasymphyseal.

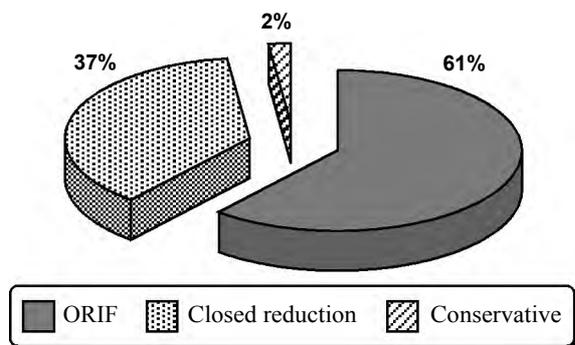


Fig. (2): Type of treatment of trauma in study group.

Table (2) shows type of treatment of trauma in study group. There were (60.86%) of cases had done by open reduction and intend fixation “ORIF” vs. (36.95%) of cases done by closed reduction and (2.2%) of cases treatment conservative.

Table (3): Follow-up of treatment of trauma in study group after 1 weeks after surgery.

Item	Descriptive “n=414”
Mouth opening normal	115 (27.77%)
Function “normal occlusion”	286 (69.00%)
Infection	13 (3.14%)
Malunion	10 (2.41%)
Ankylosis	5 (1.20%)
Nerve injury	3 (0.72%)
Root impingement	4 (0.96%)

Table (3) shows follow-up of treatment of trauma in study group after 1 weeks after surgery. There were (27.77%) of cases have mouth opening normal with (69.0%) have normal occlusion. As regard there were (3.14%) of cases have infection post-operative.

Table (4): Comparison between Open Reduction & Intend Fixation “ORIF” and closed reduction in follow-up of treatment of trauma in study group after surgery.

Item	ORIF “n=252”	Closed reduction “n=153”	p-value
Mouth opening normal	112 (44.44%)	18 (1.96%)	$p < 0.000$ ***
Function	212 (84.12%)	74 (48.36%)	
Infection	10 (3.96%)	3 (1.96%)	
Operative duration “min”	98.12±10.22	29.45±18.94	
Risk anesthesia	8 (3.17%)	2 (1.30%)	
Fixation	249 (98.80%)	53 (34.64%)	

Table (4) shows comparison between Open Reduction & Intend Fixation “ORIF” and closed reduction in follow-up of treatment of trauma in

study group after surgery. There were higher percentages in normal mouth opening (44.44%) in ORIF group vs. (1.96%) in closed reduction. As regard there were higher in percentage in function, infection risk of anesthesia and fixation in ORIF group than closed reduction with highly significance difference ($p < 0.000$).

Discussion

Maxillofacial trauma is a major cause of mortality and morbidity worldwide. It is a frequent occurrence in Pakistan and is associated with high incidence of facial fractures in different combinations [7].

Maxillofacial injuries are not uncommon in developed countries such Egypt. The frequency of facial injuries is high because the face is exposed and has a little protective covering. A unique aspect of facial injuries is that the restoration of appearance may be the chief indication for treatment [8].

Some of the most severe injuries are caused by automobile accidents but many others result from interpersonal violence, industrial accidents, sports, home accidents and missiles or gun shots. Road Traffic Accidents (RTA) have been reported as a leading cause of mandible fractures in many third world countries while interpersonal altercations are mainly responsible in the developed countries [9].

The differences reflect a lack of traffic regulations including seat belt and helmet enforcements, absence of air bags in the vehicles and poor road infrastructure in the underdeveloped and alcohol abuse in the developed countries [10].

Countries where the use of seat belt and safety helmet regulations have been made compulsory showed a decreased frequency of mandibular fractures associated with incidence RTA as compared to the past. Mandible fractures overwhelmingly occur in young males [11].

Mandibular fractures occur mostly for male patients, because the male to female ratio in the Lithuanian population in 2009 was 1.15:1. In the present study, the male-to-female ratio was even 80.4:19.6 mean 4.10:1. This agree with that reported in other Lithuanian study (6.8:1) [12].

Ratios in other studies ranged from 2.7-2.9:1 to 6.5-6.6:1 or even to 9:1-11:1 [15,16]. According to other studies, high male to female ratio, such as in Kuwait and United Arab Emirates, is associated with a great percent (55-75%) of mandibular fractures caused by traffic accidents [13].

In countries with lower male-to-female mandibular fractures ratio, such as Germany and Finland, the main cause of mandibular trauma was assault. Canada and Brazil studies report similar male-to female ratios (5.0:1 and 6.6:1, respectively) to the present study [14].

Male predominance in many studies [13] is associated with being prone to traffic accidents and violence.

In the present study, road accident was the main cause (69.8%) of mandibular trauma and it usually includes street assaults and domestic violence. These figures are one of the highest among similar studies: 10% in Kuwait, 28% in Freiburg, Germany, 37% in Oulu, Finland, and 54% in Toronto, Canada [15].

Traffic accidents were found to be the third cause (6%) of mandibular trauma and are less common compared to other countries. According to other studies, the number of traffic accidents, as a cause of mandibular fractures, varies among countries. Traffic accidents are less common in Toronto, Canada (6.6%). More mandibular fractures occur due to traffic.

Accidents in Germany (32%) and Brazil (22%), being the main cause of mandibular trauma in Portugal (53.9%) [15].

In Children's Hospital and were not included in this study therefore the percent of mandibular fractures due to traffic accidents could be a little higher.

The second cause of mandible fractures is falls and accidents. In present study were (19.80%) compared to other studies (this is also a high percentage from all mandibular fractures and the reasons for that might be mainly associated with alcohol abuse. Alcohol is a big problem in Lithuania, being a cause of traffic accidents, falls, and violence. For example, in 2009 almost 300 traffic accidents out of 3 750 accidents (8%) were caused by alcohol intoxicated drivers [2].

Many patients delay seeking medical care after trauma, try to conceal alcohol intoxication or deny the influence of alcohol or drugs because it directly affects health insurance and a patient loses money while in a hospital.

In present study the high percentage in trauma in the Body (47.82%), (36.95%) in symphyseal, parasymphyseal and (32.6%) in angle. The results of anatomic fracture location indicate weak sites of the mandible. In the present study, even 32%

were localized in the mandibular angle and 31% in the condylar process. The mandibular canine region was the most common mandibular body fracture site (15.73% of all fractures) [16].

Mandibular fractures have been successfully treated by closed-reduction methods for hundreds of years. Maxillo-Mandibular Fixation (MMF) is used to immobilize the fractured segments and allow osseous healing. When considering between open versus closed reduction of mandibular fractures the advantages should be weighed against the disadvantages.

In present study there were (60.86%) of cases had done by open reduction & internal fixation "ORIF" vs. (36.95%) of cases done by closed reduction and (2.2%) of cases treatment conservative. This agree with (Sirimaharaj, et al.) who reported in the present series, treatment of mandibular fractures involved closed reduction with the use of intermaxillary fixation in most (82.8%) cases; only few (11.8%) cases received mini-plate osteosynthesis.

Advantages of closed reduction include simplicity, decreased operative time, and avoidance of damage to adjacent structures. Disadvantages of maxillomandibular fixation include inability to directly visualize the reduced fracture, need to keep the patient on a liquid diet, and difficulties with speech and respiration. The traditional length of immobilization of fractures when treated by closed reduction has been 6 weeks. Juniper and Awty found that 80% of mandibular fractures treated with open or closed reduction and maxillo-mandibular fixation had clinical union in 4 weeks

[18].

They were able to show a correlation between the age of the patient and the predictability of early fracture union. Armaratunga found that 75% of mandible fractures had achieved clinical union by 4 weeks. Fractures in children healed in 2 weeks whereas a significant number of fractures in older patients took 8 weeks to achieve clinical union

[19].

Closed reduction of mandibular fractures can adversely affect bone, muscles, synovial joints, and periarticular connective tissues. The effects of immobilization on bone have been recognized in the orthopedic literature for many years as "disuse osteoporosis". Cortical and trabecular thinning, vascular distention, and increased osteoclastic activity have been described following joint immobilization [9].

Changes involving the musculature include not only muscle atrophy but also changes in muscle length and function. In various studies, complication rate ranges from 7 to 29%, 33, and 34 and has been correlated to the severity of the fracture. In our study, the complication rate was found to be 3.2% with no significant difference between the CR and ORIF [12].

Linan et al., found no difference in the complication rate of fractures treated by MMF (4.3%) versus open reduction and internal fixation (5.4%). 35 wound infection is the most common complication in all types of mandibular fractures. Other complications that occur less often, include malocclusion, nonunion, malunion, tooth loss, trismus, ankylosis, deviation, unsightly scars and paresthesias [12].

As regard there were higher in percentage in function, infection risk of anesthesia and fixation in ORIF group than closed reduction with highly significance difference ($p < 0.000$).

Microorganisms, typically colonized on the fixation devices themselves, such as plates, screws and pins, combine with the formation of a membranous bio-film that can resist antibiotic penetration to create considerable difficulty in treating the infection.

If these microorganisms invade the bone via channels formed by pin and screw holes, the resultant infection is called osteomyelitis. This can be catastrophic and cause lengthy healing, abscess formations and bone and tissue destruction.

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تشخيص وعلاج حالات كسور الفك السفلى لدى المرضى بمستشفى أسيوط الجامعى

لا تزال الحوادث عبئا صحيا على الصعيد العالمى على الرغم من التدابير الوقائية المختلفة التى تم وضعها. أثناء الإصابة. فإن منطقة الوجه والفكين معرضة بشدة للإصابة إما فى عزلة أو بالإشتراك مع أنظمة أخرى.

الفك السفلى هو ثانى العظام الأكثر شيوعا كسر بعد عظم الأنف فى صدمة الوجه والفكين، على الرغم من أنه هو أكبر وأقوى عظام الوجه. كسور الفك السفلى يمكن أن تنطوى على موقع واحد فقط أو يمكن أن تنطوى فى كثير من الأحيان على العديد من المواقع التشريحية فى وقت.

تهدف هذه الدراسة إلى التعرف على الأنماط الحالية للفك السفلى على أساس الخصائص الديموغرافية للمريض وآلية الإصابة وطرق العلاج المتغيرة فى مستشفيات جامعة أسيوط فى الفترة من (مارس ٢٠١٤ إلى ديسمبر ٢٠١٦).

هذه الدراسة هى تحليل رجعى وإستباقى للسجلات الطبية المتاحة مع وحدة الصدمة - مستشفيات جامعة أسيوط. تم إسترجاع السجلات الطبية للمرضى الذين يعانون من صدمة الوجه التى تمت معالجتها على مدى العامين الماضيين وإستعرضت ل (عمر وجنس المريض، موقع الكسر، وطريقة العلاج والمتابعة).

متوسط العمر لدى جميع المرضى ٢٤.٥٦ سنة فيما يتعلق بالذكور أكثر تأثيرا (٨٠.٤٪). وكانت هناك نسبة أعلى فى حوادث الطرق (٦٩.٨٠٪) و (١٩.٨٠٪) نسبة السقوط من علو. كانت هناك (٦٠.٨٦٪) من الحالات التى تم القيام بها عن طريق تثبيت داخلى بواسطة الشرائح والمسامير مقابل (٣٦.٩٥٪) من الحالات التى تم إجراؤها عن طريق التثبيت الخارجى بواسطة السلك والإشبار و (٢.٢٪) من الحالات العلاج التحفظى.