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Original Research

Analysis of Mandibular Fractures

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ABSTRACT:

Background: To evaluate and analyse mandibular fractures. **Materials & methods:** A total of 100 patients were enrolled. The age of patients was 20 to 60 years. Mean age of patient was 40.32 years. The data was analyzed and result was obtained using SPSS software. The level of significance was at $P < 0.05$. **Results:** A total of 100 patients were enrolled. The mandibular condyle was the most common site of fracture in this study found in a vast majority of trauma patients (43.4%) followed by the mandibular angle (20%), parasymphysis (12%) and dentoalveolar (12%). The fracture at body of mandible was 6.7%. **Conclusion:** This correlation will help in exploring the causes in cases of improper and partial history given by the patient.

Keywords: fracture, mandible, parasymphysis.

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INTRODUCTION

Facial fractures make up a comparatively small proportion of Emergency Department visits, but of these injuries, the most common are nasal and mandible fractures. While the vast majority of nasal fractures can be managed without surgery, operative intervention for mandible fractures is relatively common due to the complexity of the structure's anatomy and function. The mandible is a mobile, ring-like bone that frequently fractures in more than one location; these fractures are at risk for wound contamination with oral flora, may be complicated by teeth in the fracture line, and in some cases, can compromise the patient's airway. [1]

In the entire human body, the maxillofacial area is injured quite frequently. In it, the second most often fractured adult facial bone is mandible because of its projecting and vulnerable position in the face. [2] Mandibular fractures comprise 15.5%–59% of all maxillofacial fractures. [3]Several variables are related to the study of mandibular fractures which have resulted in differences in demographic characteristics reported in the literature. Various countries across the globe have provided statistics of mandibular fractures, but information provided is distinct for the countries of origin and the people residing there. [4] Increase in incidence of mandibular fractures is stated in long-term studies. Reported data show that mandibular fractures occur usually in the third decade of life with male predominance.[5]The socioeconomic trends, geographic locations, and local behavior have a considerable impact on the etiology of the injury which sequentially influences the distribution of fracture sites. [6] The key etiology for maxillofacial fractures may vary from road traffic accidents to assaults and from fall to sports injuries. Most mandibular fractures which occurred from assault have alcohol consumption as an eminent contributing factor.[7]

The mandible is immaculate in design with varying strength of bone in different regions, in correlation with stress distribution on function. It is a tubular V-shaped bone that articulates with the skull via paired temporomandibular joints. It is the second most common maxillofacial bone prone to trauma second to nasal bones. [8]Maxillofacial trauma disrupts efficient form, function, and esthetics. The first description of mandibular fractures dates to the 17th century BC in the "Edwin Smith papyrus" brought by Smith in Luxor in 1862 and later translated by Breasted. [9] Management of the mandibular fractures has evolved with time. It has come a long way from the initial use of horse hair as interdental wiring tool, to the present-day use of resorbable hardware and custom-made titanium hardware.[10] Hence, this study was conducted to evaluate and analyse mandibular fractures.

MATERIALS & METHODS

A total of 100 patients were enrolled. The age of patients was 20 to 60 years. Mean age of patient was 40.32 years. Patients were examined clinically and radiographically in the outpatient departments of the hospital, and a detailed history was taken. The etiology of fractures and age group relation was evaluated. The data was analyzed and result was obtained using SPSS software. The level of significance was at $P < 0.05$.

RESULTS

A total of 100 patients were enrolled. The mandibular condyle was the most common site of fracture in this study found in a vast majority of trauma patients (43.4%) followed by the mandibular angle (20%), parasymphysis (12%) and dentoalveolar (12%). The fracture at body of mandible was 6.7%.

Table 1: distribution of mandibular fractures according to location

Site	Number of fractures
Dentoalveolar	18 (12%)
Symphysis	4 (2.6%)
Parasymphysis	18 (12%)
Angle	30 (20%)
Body	10 (6.7%)
Condylar process	65 (43.4%)
Coronoid process	2 (1.4%)
Ramus	3 (2%)
Total	150

The most common cause of mandibular fractures was road traffic accidents (n = 49, 49%), followed by fall (n = 29, 29%), assault (n = 21, 21%) and sports (n = 1, 1%).Road traffic accidents were the most common etiology in patients with the age range of 20–30 years. This relation between age group of patients and etiology was found to be statistically significant (Chi-square value = 0.015, $P < 0.05$)

Table 2: Relation of age group and etiology of fractures

Age group	Etiology				Total
	RTA	Assault	Fall	Sports	
20-30	22	14	15	1	52
31-40	13	3	9	0	25
41-50	10	2	4	0	16
51-60	4	2	1	0	7
Total	49	21	29	1	100

RTA – road traffic accidents

DISCUSSION

Because of its ring-like structure, multiple fractures are seen in more than 50% of cases. The most common combination of injuries is a parasymphyseal fracture with a contralateral angle or subcondylar fracture. While studies vary in reported fracture frequencies, the most common individual fracture sites are the body, the condyle, and the angle. The symphyseal/parasymphysealarea is less commonly fractured, and the ramus and coronoid process are rarely involved. In automobile accidents, the condyle was the most common fracture site; whereas, the symphysis was most commonly fractured in motorcycle accidents. In assault cases, the angle is the most common fractured site.[11]Hence, this study was conducted to evaluate and analyse mandibular fractures.

In the present study, a total of 100 patients were enrolled. The mandibular condyle was the most common site of fracture in this study found in a vast majority of trauma patients (43.4%) followed by the mandibular angle (20%), parasymphysis (12%) and dentoalveolar (12%). The fracture at body of mandible was 6.7%. A study by Shah N et al, studied correlation between different factors associated with mandibular fractures. A database of 277 patients between July 2011 and October 2018 with mandibular fractures was retrospectively retrieved. Information on age, gender, etiology, pattern of fracture, and treatment done was obtained, tabulated, and analyzed statistically. In a total of 277 patients, a statistically significant correlation was found between age and the etiologic agent, site and side of fracture, and site of fracture and the treatment done with value of $P < 0.05$.[12]

In the present study, the most common cause of mandibular fractures was road traffic accidents (n = 49, 49%), followed by fall (n = 29, 29%), assault (n = 21, 21%) and sports (n = 1, 1%). Road traffic accidents were the most common etiology in patients with the age range of 20–30 years. This relation between age group of patients and etiology was found to be statistically significant (Chi-square value = 0.015, $P < 0.05$). Another study by Van den bergh B et al, studied the etiology, incidence, and complications of patients with mandibular fracture in

Amsterdam for a period of 10 years. Two hundred thirteen patients were included with a mean age of 32.5 (SD, 15.2) years. Male-female ratio was 2.2:1. A total of 410 fracture lines were identified. In violence-related injuries, angle fractures were proved to be the main fracture site. For male patients, violence (33.6%) was the main cause of injury. The most common cause for female patients was traffic related. In 169 patients, open reduction with internal fixation was performed in 17 patients without intermaxillary fixation. Twenty-seven patients were treated only with intermaxillary fixation. A total of 1738 screws and 393 plates were used. Sixty patients presented with complications. [13]Morris et al., in their retrospective analytical study of 4143 fractures in 2128 patients, found that the highest number of fractures occurred at the mandibular angle (1123), followed by the mandibular symphysis (882), condyle/subcondylar complex (761), body (695), and ramus (225). It is the opinion of these authors that a specific association between different locations of fractures is an important consideration when performing clinical assessment of a patient with a mandible fracture. Knowledge that one particular type of fracture may be more likely with a fracture at another location can aid in diagnosis. [14]On the basis of cause, the distribution of fractures may be linked to factors related to the mechanism of the injury. The direction and magnitude of impact force, the kind of object leading to impact, anatomy of the site, prominence and physical characteristics of the mandible, direction of the victim's head position, and status of occlusion are responsible for the wide-ranging clinical outcomes.[15,16]

CONCLUSION

This correlation will help in exploring the causes in cases of improper and partial history given by the patient, for the precise diagnosis and treatment of the fracture as well as in maintaining medicolegal records.

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