CHARACTERISTICS OF SYMPHYSIS AND PARASYMPHYSIS MANDIBULAR FRACTURES

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ABSTRACT

This descriptive study was conducted to determine the most common site of mandible fractures. 200 patients with fracture mandible who reported to Department of Oral and Maxillofacial Surgery from April 2012 to September 2012 formed study group. Data concerning age, gender, mechanism of injury and site of fracture evaluated and recorded on specially designed proforma. Orthopentomogram (OGP) and where necessary postero-Anterior and right and left lateral oblique views of the mandible were used to diagnose the fracture site. Fracture mandible was predominantly common in males (84%) as compared to females (16%) with male to female ratio of 5.25:1. The age range was 2-65 years with mean age of 21.45 S.D ±12.59 years. The most common age group involved was 21-30 years (30%) and road traffic accident was the common mechanism of injury (57%) followed by fall (31.5%). Parasympysis was the most common site when mandible was fractures at a single site i.e., 43%, while parasympysis and angle fracture combination was observed in 31%. The study revealed that majority of the patients were young adult males. The most common etiological fracture was road traffic accident and isolated parasympysis was the most common fracture site.

Key Words: Fracture mandible, Symphysis, Parasympysis, Road traffic accident.

INTRODUCTION

Mandible is the strongest bone of facial skeleton but it is fractured most frequently because of its prominent position, anatomic configuration, mobility and less bone support.1 It is the only mobile bone of facial skeleton and it plays an important role in mastication, phonation, deglutition and maintenance of dental occlusion.2

Fracture mandible accounts for 36%-59% of maxillofacial trauma. The large variability in prevalence is due to variety of contributing factors such as gender, age, environment and socioeconomic status of patient.3 About 44.6 to 74.4 kg/m energy is required to fracture it which is about the same as the zygoma and about half that for the frontal bone.4 Fracture mandible may occur alone or in combination with other facial injuries. Fracture site depends upon mechanism of injury, magnitude and direction of impact force, prominence of mandible and anatomy of site. The common etiological factors are road traffic accidents, falls, assaults, sports injury, firearm injury, and industrial accidents. These etiological factors depend upon geographic location, physical activity, social, cultural and environmental factors.5

In third world countries road traffic accident is the common cause of mandibular fracture due to lack of implementation of the traffic laws, while alcohol related interpersonal violence and physical assault is the leading cause in developed countries. Road traffic accident is the most common causative factor in young adults and fall in younger population. The highest incidence is seen in the age group of 21-30 years and lowest incidence is observed in the age group above 60 years and below 5 years. Recent data indicates a male to female ratio of 3:16.

According to Ellis et al 33% of mandible fractures occur at body followed by condylar process 29% and angle 23%. Gilven has reported that 34% fractures occur at body, angle 25% and symphysis 20%.8

Fracture mandible if not treated or incorrectly treated can lead to significant functional and aesthetic sequale including facial asymmetry, malocclusion, temporomandibular joint dysfunction and osteomyelitis.9 Current established methods in the management of mandibular fractures include conservative treatment with maxillomandibular fixation by dental wiring, arch
bars and Gunning splints, open reduction and intraosseous wiring, open reduction with rigid internal fixation by miniplates, non compression plates, compression plates and lag screws.10

The purpose of this study is to determine the most common site of fracture mandible associated with symphysis and parasymphysis fractures and to give possible recommendations for the need to do further research studies.

METHODOLOGY

This study was carried out in the Department of Oral & Maxillofacial Surgery, Khyber College of Dentistry, Peshawar from April 2012 to September 2012. A total of 200 patients presented with mandible fracture were recruited in the study. Approval of hospital ethical review committee was taken. After taking consent thorough history was taken followed by clinical examination of patients presenting with fracture mandible. Orthopentomogram (OPG) was the standard radiograph and when required was supplemented by Postero-anterior (PA) view and left and right lateral oblique view of the mandible. The data was recorded on specifically designed proforma and evaluated and analysed by applying descriptive statistics using SPSS version.17

RESULTS

A total 200 patients were recruited in the study. Amongst them 168 (84%) were males and 32 (16%) females. The male to female ratio was 5.25:1. (Fig 1). The age of Patients at the time of presentation of mandibular fracture ranged from 2-65 years with mean age of 21.45±12.59 years. Majority of the patients reported in the third and second decade of life i.e. 30% and 26.5% respectively. Only 24% of patients were under 10 years of age. The details are given in Table 1.

The most common cause of fracture mandible was Road traffic accident (RTA) accounting for (57%) of total followed by fall (31.5%). Details of mechanism of injury are given in Table 2. Out of symphysis and parasymphysis fracture mandible, isolated parasymphysis is the most common site fractured (43%) followed by parasymphysis and angle in combination (31%) and parasymphysis and condyle (28%). The details are shown in Table 3.

DISCUSSION

Mandible is the strongest and heaviest bone of facial skeleton but it is prone to fracture due to specific reasons (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 hyperflexion of head in traffic accidents. (4) It gets atrophy as result of aging.11

The results of epidemiologic surveys on the causes, incidence and distribution of mandible fracture vary with geographic region, socio economic condition, culture characteristics and era.12

In the present study male to female ratio of 5.25:1 showed that maxillofacial trauma involving fracture mandible is predominantly common in male population in this part of world. This finding is consistence with

<table>
<thead>
<tr>
<th>S. No</th>
<th>Age range (years)</th>
<th>No. of patients (n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1-10</td>
<td>48</td>
<td>24.0</td>
</tr>
<tr>
<td>2.</td>
<td>11-20</td>
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<td>26.5</td>
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<td>23</td>
<td>11.5</td>
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<td>41-50</td>
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<td>7.</td>
<td>61-70</td>
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<table>
<thead>
<tr>
<th>S. No</th>
<th>Mechanism of injury</th>
<th>No. of patients (n)</th>
<th>Percentage</th>
</tr>
</thead>
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<td>Fall</td>
<td>63</td>
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</tr>
<tr>
<td>2.</td>
<td>Assault</td>
<td>11</td>
<td>5.5</td>
</tr>
<tr>
<td>3.</td>
<td>Road traffic accident</td>
<td>114</td>
<td>57.0</td>
</tr>
<tr>
<td>4.</td>
<td>Sports</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>5.</td>
<td>others</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>200</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Mandibular fractures

The results of previous studies conducted all over the world. The relatively high male to female ratio is due to the fact that males are engaged more in outdoor activities while females are confined to indoor activities. The predominant age group having fracture symphysis and parasympysis was 21-30 years followed by 11-20 years, these findings are similar with the results of previous studies however these findings are in contrast to other studies where the dominant age group having a high incidence of fractures were 0-10 years and 11-20 years. The possible explanation for higher frequency of fractures in age group 21-30 years is that people in this period of life are more active regarding high speed transportation, sports, fights, violent activities and industry. The lower frequencies of very young and very old age groups are due to lower activities of these age groups.

In the present study road traffic accident is the leading cause of fracture mandible followed by fall from height. Previous epidemiological studies reported similar findings about cause of maxillofacial injuries in developing countries. This may be due to lack of seatbelt law obligation, over speeding, overloading, under age driving and poor condition of roads and vehicles. However in western countries assault and interpersonal violence is the major cause of fractures due to alcohol abuse and use of illicit drugs. Fracture parasympysis was the most common fracture site in this study followed by parasympysis and angle in combination similar to the results of study conducted by Dongas and Hall and Czerwinski et al and Elgahani and Orafi but in contrast to study by Natu et al where fracture parasympysis plus subcondyle was the common combination. In another study conducted by Subhashraj et al fracture parasympysis and condyle was the usual combination.

Mandible is similar to an architectural arch which distributes the applied force along its length but not being a smooth curve in a uniform cross-section. Areas of mandible where force per unit area developed is greater results in increased concentration of tensile strength and fracture occurs at the site of maximum convexity of the curvature. The reason for increased frequency of parasympysis fracture is probably the presence of permanent tooth buds in children presenting a high tooth to bone ratio while length of canine root weakens the parasympysis in adults resulting in its fracture.

The combination of parasympysis and condyle fracture is probably due to the horizontally directed impact to parasympysis leading to its fracture; this axial force of impact against parasympysis is transferred to cranial base through the condyle resulting in condylar fracture due to concentration of tensile strain at the condylar neck.

CONCLUSIONS AND RECOMMENDATIONS

Fracture mandible is common in young adult males. The most common etiological factor was road traffic accident followed by fall, while the most common fracture site was parasympysis when mandible was fractured at a single site, followed by parasympysis and angle in combination.

As there is high frequency of mandibular fractures in developing countries due to road traffic accidents followed by fall so to reduce such incidence of road traffic accident, it is recommended that the laws regarding the precautions like seat belts, motorbike wheeling and

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Site</th>
<th>No. of patients (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parasympysis</td>
<td>43</td>
<td>21.5%</td>
</tr>
<tr>
<td>2</td>
<td>Symphysis</td>
<td>17</td>
<td>8.5%</td>
</tr>
<tr>
<td>3</td>
<td>Parasympysis + Angle</td>
<td>31</td>
<td>15.5%</td>
</tr>
<tr>
<td>4</td>
<td>Parasympysis + Condyle</td>
<td>28</td>
<td>14%</td>
</tr>
<tr>
<td>5</td>
<td>Parasympysis + Subcondyle</td>
<td>23</td>
<td>11.5%</td>
</tr>
<tr>
<td>6</td>
<td>Parasympysis + Body</td>
<td>9</td>
<td>4.5%</td>
</tr>
<tr>
<td>7</td>
<td>Parasympysis + Bilateral Condyle</td>
<td>12</td>
<td>6%</td>
</tr>
<tr>
<td>8</td>
<td>Parasympysis + Ramus</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>9</td>
<td>Parasympysis + Symphysis</td>
<td>3</td>
<td>1.5%</td>
</tr>
<tr>
<td>10</td>
<td>Symphysis + Bilateral Condyle</td>
<td>9</td>
<td>4.5%</td>
</tr>
<tr>
<td>11</td>
<td>Symphysis + Angle</td>
<td>6</td>
<td>3%</td>
</tr>
<tr>
<td>12</td>
<td>Symphysis + Ramus</td>
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</tr>
<tr>
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</tr>
<tr>
<td>14</td>
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</tr>
<tr>
<td>Total</td>
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<td>100</td>
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</table>
traffic rules should be improved and must be enforced strictly. Parents should be educated about consequences of fall in children.

REFERENCES