Epidemiology and Diagnosis Fractures of the Mandible

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ABSTRACT

Introduction: The mandibular fractures result in a solution of continuity of the bone of the mandible. Its etiology is controversial, either it is the aggressions or accidents of the public road that are the causes. The objective of this work is to determine the epidemiological and diagnostic aspects. Material and method: This is cross-sectional, retrospective, multicenter, non-exhaustive, non-representative study. Study based on the records of patients with a fracture of the mandible between 2008 and 2011 in two hospital in Libreville, Gabon. Sources of information were service registers, patient records and X-ray images. Data collection was based on a fact sheet. Any patient with a mandibular fracture trait was retained and excluded any patient with no mandibular fractures. The following parameters were analyzed: sex, age, etiology, clinical and radiological signs. Results: 60 files retained. Fractures predominated in men. The mean age was 27.35 ± 13.59 years. Accidents of the public road predominated at 45%. Oral limitation was found in 54% of cases. Panoramic dental was the most requested 57%. Discussion: Our findings reinforce the The accidents of the public road as the first cause. It was responsible for serious associated lesions. Attacks take a large proportion. Conclusion: The presence of an injured person with the limitation of the mouth opening should encourage a search for a mandibular fracture.

Keywords: Mandible, Fractures, Etiology, Clinical

1. INTRODUCTION

Mandibular fractures result in a solution of continuity of the mandibular bone [1]. They are with those of the nasal pyramid, the most frequently encountered bone lesions in facial traumatology in about 70% of cases [2,3]. A combination of contributing factors including age, sex, environment, socio-economic status of the patient, and the mechanism of the injury result in fracture of the mandible. For each patient, the probability of suffering a fracture of the mandible depends on the combined effect of these factors [4]. The severity of the mandibular fractures lies in the occurrence of a fall back of the tongue (glossoptosis) during a bifocal symphysis fracture and haemorrhage inciting to look for the epidemiological and clinical elements that can facilitate its diagnosis. The objective of this work is to determine the epidemiological and diagnostic aspects of fractures of the mandible.
2. METHODS

Type and location of the study
The study was conducted between 2008 and 2011 in the maxillofacial surgery departments of the University Hospital Center of Libreville, ENT and Head and Neck Surgery of the Army Training Hospital, Omar Bongo Ondimba in Libreville, Gabon. This study is retrospective and transversal.

Study population
Patients had to reside in Gabon and present mandibular fractures classified as monofocal, bifocal, trifocal without history. They had to consult and be treated in these two hospitals.

Inclusion criteria
All patients with fracture of the mandible with a complete record were selected.

Exclusion criteria
All patients with no mandibular fractures and all patients with incomplete records were excluded.

Sample size
105 patients listed but only 60 patients met the inclusion criteria. This sample is not exhaustive. No criterion of nationality, ethnicity or geographical origin was used for the selection of patients included in this study.

Collection Method
The sources of information were service records, patient record, and x-ray images. The following parameters were analyzed: age; sex; profession; Public road accident; brawl; fall; sports accident; work accident; disorder of the articulated dentate with type of open bite, open bite; limitation of mouth opening, trismus; the sensitivity of the chin to type of anesthesia or hypoesthesia; the dental state; soft tissue wounds, edema, pain, fracture associated lesions of other bones of the face and bones of other appliances; dental panoramic, mandibular parade, low side skull radio, computed tomography; the line of fracture monofocal, bifocal, trifocal, and its symphysis seat, corpus, angle, ramus condyle, coronated. The data collection was done from a survey sheet that was a data collection sheet whose items were: Identity of the patient (age, sex, profession); Actuality (facial trauma, dental surgery); Lesional anatomy (road accident, brawling, fall, sports accident, work accident, others); Clinical (disorder of the articulated dental type of anterior open bite, lateral limitation of the mouth opening, trismus, the sensitivity of the chin with the type of anesthesia or hypoesthesia, the state dental, wounds of the soft parts; edema, pain, associated lesions fractures of other bones of the face, bone fractures of other appliances); Paraclinic (dental panoramic, mandibular parade, low side skull radio, CT scan).

Features of fracture and the seat (monofocal, bifocal, trifocal, symphysis, corpus, ramus, mandibular angle, condyle, coronated). The information was collected by the doctors.

Data processing and analysis
The statistical analysis of the data was performed on the SPHINX Plus2 software. After a flat sorting to establish the descriptive statistics for the different variables studied, a search for a possible association between the result obtained and the therapeutic method, the type of fracture, the topography of the fracture line was made. A risk $\alpha = 5\%$ has been retained.

Statistical test
Comparisons were made using Chi2 test

3. RESULTS

Epidemiological
60 files out of a total of 105 files were selected for our study. 14% of the fractures were in the mandible, 78% in the facial and 8% in the frontal bone.

Age
All age groups were affected by fractures of the mandible with a predominance in 20-30 years (fig1). The average age was $27.35 \pm 13.59$ years old with extremes that were 2 years old and 62 years old.

![Figure 1: Distribution of mandibular fractures by age group](chart.png)
Gender
Fractures predominated in men at 77% and 23% in women. The sex ratio was 3.2.

Etiology
27 cases or 45% of the cases resulted from a road accident (AVP), 24 cases or 40% of cases of aggression, 7 cases or 11.7% of cases of falls and 2 cases or 3.3% cases of sports accidents. Closer examination reveals clear differences in sex (Table I).

These etiologies led to all types of invoice traits (fig2). 43% of monofocal fracture traits are due to accidents public road, 39% to brawls, 15% to falls, 3% to sports accidents. The bifocal fracture traits were accidents public road at 46%, bifurcated at 42%, falls at 8% and sports accidents at 4%. In 7 cases of accident public road there were associated bone lesions involving 5 patients in the bones of the head and skull, and in 2 patients the bones of other devices.

Table 1: The etiologies of mandibular fractures by sex

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Number of women (%)</th>
<th>Number of men (%)</th>
<th>Total number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident Public Road</td>
<td>11(78.6)</td>
<td>16(34.8)</td>
<td>27(45)</td>
</tr>
<tr>
<td>Agressions</td>
<td>1(7.2)</td>
<td>23(50)</td>
<td>24(40)</td>
</tr>
<tr>
<td>Falls</td>
<td>2(14.2)</td>
<td>5(10.9)</td>
<td>7(11.7)</td>
</tr>
<tr>
<td>Sport accident</td>
<td>0(0)</td>
<td>2(4.3)</td>
<td>2(3.3)</td>
</tr>
<tr>
<td>Total column</td>
<td>14(100)</td>
<td>46(100)</td>
<td>60(100)</td>
</tr>
<tr>
<td>Overall ratio</td>
<td>14/60(23.3)</td>
<td>46/60(76.7)</td>
<td>60(100)</td>
</tr>
</tbody>
</table>

Clinical and radiological

Clinical assessment
The sensitivity of the lower labial area was normal in 52 patients or 87% of patients, in contrast in 6 patients or 10% of patients there was hypoesthesia and in 2 patients or 3% of patients anesthesia. Oral opening was normal in 23% of cases, there was a limitation of mouth opening in 54% of cases and a tight trismus in 23% of cases. Dental articulation was normal in 48% of patients. A disorder of the dental articular was noted, with type of anterior open bite in 40% of the patients, and in 12% with type of open bite. 48 cases or 80% of the cases were dentate, in 11 cases or 18% of cases there was a partial edentation and in 1 case or 2% of cases a total edentation during the lesional assessment.

X-ray examination
101 radiological examinations were performed, ie an average of 1.68 examinations per patient. As of 101 exams, the panoramic dental had been the most
requested X-ray incidence at 57%, followed by X-ray of the skull face and profile at 27%, the maxillary parade right and left at 8%, the CT scan at 8%.

Features and topography of fractures
90 fracture lines were listed in the 60 patients. These features were frequent at the left of the mandible at 53.34%, at the right at 43.33% and symphyseal at 3.33%. These features were located at 3.3% at the symphysis, at 34.5% at the parasymphysis, at 17.8% at the body, at 27.8% at the mandibular angle, at 6.6% at the ramus, at 4.4% in Condyle. 2.2% in Corone. Fractures found were monofocal in 56.7% or 34 patients, bifocal in 40% or 24 patients and trifocal in 3.3% or 2 patients. The monofocal fractures were first located in the symphysis region (Fig. 3), when they were bifocal at the angle and the symphysis (Fig. 4).

4. DISCUSSION

Epidemiological

Age
We agree with several authors [1; 4; 5; 6; 7] that the age group of 20-30 years is the most concerned by mandibular fractures. It is an active population engaged in sport, and is very concerned by aggression and risk taking while driving motorized vehicles [1].

Gender
The mandibular fractures concern in our study to 77% the men. This figure is in line with African and European studies which show a male predominance ranging from 70% to 80% [5; 8; 9] or even 83.3%, as shown by the Sojat & al study in 2001 [4]. Our sex ratio was close to that of Dia Tine & al [1].

Etiology
The causes of mandibular fractures vary from one study to another, given the geographical, political, socio-economic and demographic context [10]. Our results on road accidents and assaults are up compared to those of Ngouoni & al in 1995, which reported 41.4% of road accidents and 37.9% of assaults [5]. This can be explained with regard to accidents on the public road by the explosion of the car fleet, the non-compliance with the code road and the quality of roads in our country. We observe that the respect of these prescriptions reduces these figures as mentioned by several studies done in the West [11; 12; 13; 14; 15]. As for the increase of fractures by aggression, it would be due to the renewed violence and insecurity which prevails today in our country thus comforting Sojat & al [4] who gave the aggressions like first cause and the explained as reflections of the growing insecurity of the metropolises. Our results on the relationship between the accident of the public road and fracture are contrary to the findings of most authors [16; 17; 18] who observed that accidents in the public highway caused shocks that were often anteroposterior and that preferentially resulted in pure condylar and symphyseal fractures.

Clinical and radiological

Clinical assessment
The sensitivity is a sign in our series but low proportion. There was hypoaesthesia in 10% of patients and anesthesia in 3%. These data allow us to agree with Gola & al in the 1994 and 1996 clinical studies [16; 19] that the involvement of the child is often symphyseal or parasympathetic in front of the
foramen mentally when they are posterior the lines are above the lingual. The limitation of the oral presentation is the most important case of anterior open bite in the case of dental articular disorder. Trismus was present during angle, ramus or condyle fractures. This report gave higher results than those of Camuzard in 1990 [3] who found 4.5% of trismus or Van Hove who scored 2.4% in 2000 [8] but for condylar fractures. The dental state does not seem to be a factor favoring the fractures of the mandible because it is only one of the most important factors in the history of oral hygiene [7,20].

Radiological assessment
We note a strong demand for radiological examination. A patient may have 2, or 3 requests for radiological examination which is too much to help confirm the diagnosis of fractures of the mandible. The dental panoramic was in our study the radiograph most requested what was not the case for Dia Tine & al [1] where it is the incidences of low and maxillary parade are the most requested. We agree with some authors [21; 22; 23] that dental panning is the most appropriate examination for the radiological diagnosis of mandibular fractures. However, it presents radiological traps that may cause a fracture to be underestimated because the horizontal dimension escapes the panoramic analysis [24]. In our countries, the future is the tomodensitometry. It should no longer be a second-line examination as noted in our study but earlier than first because it is easy to achieve regardless of the patient’s clinical condition, it produces quality images, and three-dimensional reconstructions are of a undeniable contribution to the understanding of fractures and their displacements.

Features and topography of fractures
Fracture lines predominate on the left in our study and sit between the symphysis and para-symphysis supporting the study of Dia Tine & al [1] who noted 53.30% of fractures of the mandible localized in the symphyseal region. This sector is the most exposed to shocks whether direct or indirect because of its prominent position. Fractures classified monofocal are in our study more numerous than those classified bifocal. Dia Tine & al [1] also made this finding with results of 60% of monofocal fracture lines and 33% of bifocal fracture lines.

5. CONCLUSION
The fracture of the mandible is a fracture of the young and predominantly male adult. Road accidents remain the main etiology of these fractures, but aggression plays an important role and may soon be the first cause. The limitation of mouth opening, and anterior open bite are two clinical signs to look for to make the diagnosis. The panoramic dental incidence is the radiological image to be requested to avoid a multitude of radiological examination in case of isolated fracture of the mandible. But the future is tomodensitometry to understand and appreciate the movements of fractures of the mandible or examine in a time a fractured mandible with impact on other organs.

REFERENCES

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