Treatment of Mandibular Fractures: Descriptive Study of 60 Cases

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ABSTRACT

Introduction: The mandible is one of the most fractured bones of the face. His surgical treatment is controversial. What would be the treatment to recommend? The present study aims to determine the different treatments, to appreciate them and describe their complications. Material and method: Observational epidemiological study, descriptive, transversal, retrospective, multicentric, non-exhaustive, non-representative. The study was based on records of patients with fractures of the mandible. The study was carried out between 2008 and 2011 in two Libreville University hospital departments in patients living in Gabon and presenting fractures of the mandible classified monofocal, bifocal, trifocal without antecedents and having been treated by abstention, orthopedic or osteosynthesis. Sources of information included service and operating room registers, patient records, and x-ray images. Data collection was done from a survey card. All patients with fracture of the treated mandible were excluded and all patients without mandibular fractures excluded. The following parameters were analyzed: sex (fractures of mandible predominated in men, sex ratio is 3/1), age (average age was 27.35 ± 13.59 years), radiological evidence, treatments and complications. Results: 60 files were included. Osteosynthesis was performed at 62% and orthopedic treatment at 28%. Orthopedic treatment gave the most complications. Discussion: Orthopedic treatment should only be performed in the absence of a maxillofacial surgeon skilled in plate osteosynthesis. Conclusion: The results of our study show that miniaturized plate osteosynthesis is the best adapted and gives the least complications.

Keywords: Mandible, Fractures; Osteosynthesis; Complications

1. INTRODUCTION

The anatomical peculiarity of the mandible causes all its parts to be fractured. Thus for many authors [1,2] in the case of unifocal bills, the condyles and the mandibular angle are the most frequently affected, whereas in the case of a bifocal bill, the angulo-symphysis region is the most affected. The dominant etiology is the accident of the public road [3]. The limitation of mouth opening or even trismus, which is a limitation of tight mouth opening, and the open-bite type of open-mouth disorder are often present clinical signs [4,5,6]. The treatment of fractures of the mandible mainly
involved two surgical methods. The orthopedic method which consists of a 45-day bimaxillary blockage imposing a liquid diet and a risk of bite for the practitioner during its implementation. Thus, Ngouoni et al in 1996 [7] wrote that the orthopedic treatment by bimaxillary blockage is the oldest but it is reproached for its duration and its discomfort. The other method is the osteosynthesis method either by steel wire or by miniaturized plate. Osteosynthesis by steel wire or bone coarction has the major disadvantage of not allowing a good stabilization of the bone reduction exposing the patient to a disorder of the dental articular and also to prick the fingers of the practitioner. These disadvantages are not found with miniaturized plate osteosynthesis, hence Ngouoni’s assertion [7] that the stabilization of the mandibular fracture sites must be done per plate. There is a third method the therapeutic abstention for which Dia Tine et al in 2009 [3] said that it should be advocated in incomplete fractures without displacement where the dental articulate is preserved and imposes a periodic control, a semi-automatic diet liquid or liquid. In our practice miniaturized plate osteosynthesis is the most performed however we practice the other processes in front of patients without medical coverage. Despite the results obtained with miniaturized plate osteosynthesis in the treatment of mandibular fractures regardless of their complexity, we have observed since Béziat et al in 1989 [8] that the choice of the treatment method remains controversial. Faced with manducatory dysfunctions due to a poor choice of treatment in the patient what would be the surgical treatment best suited to fractures of the mandible? The present study aims to determine the different surgical methods, to appreciate them and describe their complications.

2. METHODS

We carried out an observational, descriptive, cross-sectional, retrospective, multicentric, non-exhaustive, non-representative epidemiological study. The study was based on records of patients with fractures of the mandible.

Operating mode: The study was conducted between 2008 and 2011 in the maxillofacial surgery departments of the University Hospital Center of Libreville and the Omar Bongo Ondimba Army Training Hospital in Libreville, Gabon, in patients living in Gabon who consulted and treated in these two hospitals.

Patients had fractures of the mandible classified monofocal, bifocal, trifocal without antecedents and having been treated with abstention, orthopedically either bimaxillary blocking or by osteosynthesis with wire or by miniaturized plate. All patients with a fracture trait of the mandible treated with a complete file were retained, not retained all patients with untreated mandibular fractures and excluded any patient with incomplete file.

Sources of information included service and operating room registers, patient records, and x-ray images. The following parameters were analyzed: age (mean age was 27, 35 ± 13.59 years with extreme ages of 2 years and 62 years); sex (fractures of the mandible predominated in men, sex ratio was 3/1); road accident (1st cause with 45% of cases); fight (2nd cause with 40% of cases); fall (3rd cause with 12% of cases); sports accident (4th cause with 3% of cases); disorder of the articulated dentate with type of open bite, open bite; panoramic dental, computed tomography; the line of fracture monofocal, bifocal, trifocal, and its seat symphysis, corpus, angle, ramus condyle, coronated, treatment by abstention; orthopedic treatment and its compliance good or bad, complication, duration of oral immobilization; osteosynthesis treatment with steel wire or miniaturized plaque, good or bad compliance, complication, duration of oral immobilization, mixed steel wire osteosynthesis and bimaxillary fixation and miniaturized plate osteosynthesis and bimaxillary blocking, his compliance good or bad, complication, duration of immobilization oral.

The data collection was done from a survey sheet that was a data collection sheet whose items were:

- Identity of the patient (age, sex)
- antecedents (facial trauma, dental surgery)
- Lesional anatomy (road accident, brawling, fall, sports accident, work accident, others)
- Clinic (disorder of the articulated dental type of open bite, lateral, hypoesthesia, anesthesia, limitation opening mouth and trismus)
- Paraclinic (dental panoramic, CT scan)
- Features of fracture and the seat (monofocal, bifocal, trifocal, symphysis, corpus, ramus, mandibular angle, condyle, corona)
- Treatment (Forbearance why, Orthopedic, observance of the treatment good or bad, complication, duration of the immobilization of the mouth, osteosynthesis steel wire or miniaturized plate, observance of the treatment good or bad, complication, duration of the

immobilization buccal; steel wire osteosynthesis and bi-maxillary blockage, miniaturized plate osteosynthesis and bi-maxillary blocking treatment compliance good or bad, complication, duration of oral immobilization) Good: results of patients in whom occlusion was reestablished, the functionality of the articulated has been restored, the aesthetic preserved, no neurological disorder.

Bad: when the patient was noticing the uncommitted function of the dental articular, the presence of non-union, a malunion, an unsightly scar, a neurological disorder.

The information was collected by the doctors.

Statistical analysis of the data was performed on 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. Comparisons were made using the chi2 test.

### 3. RESULTS

60 files were selected for our study.

Clinic: The sensitivity of the lower labial area was normal in 87% of patients, in 6 cases, 10% of cases were hypoesthesia and 2 cases or 3% of cases anesthesia. Postoperatively, hypoesthesia persisted in 2 patients, ie 3% of cases. Oral opening was normal in 23% of patients, it was in the form of oral opening limitation in 54% of patients, and tight trismus in 23%. After treatment there was normal mouth opening in 67% of patients, oral opening limitation in 10% and in 33% this sign was not appreciated. Dental articulation was normal in 48% of patients with anterior open bite in 40% of patients and 12% in open-bite type. After treatment, the joint was normal in 67% and revealed a lateral open bite in 1%, and not specified in 32% of patients.

Radiography: Dental panning was requested in 52 patients, ie 86% of cases, computed tomography in 2 patients or 4% of cases and the combination of both in 6 patients, ie 10% of cases. In the 72 hours postoperatively 54 patients or 90% had benefited from a x-ray of control. Of these 54 patients 52 or 96% of patients had benefited from a panoramic dental scan and 2 patients, ie 4% of cases, had a basal aspect of the skull.

Methods of treatment: The 60 patients had benefited from 4 therapeutic methods which were a surgical treatment by osteosynthesis to 52% that is 31 patients, orthopedic to 28% or 17 patients, mixed to 10% or 6 patients and the therapeutic abstention to 10% or 6 patients. The 34 patients with monofocal fractures had received orthopedic treatment, osteosynthesis and therapeutic abstention (fig1). For the 26 patients with multifocal fractures the treatment was mixed at 23% ie 6 patients, orthopedic at 19% or 5 patients and by osteosynthesis at 58% or 15 patients. Osteosynthesis was performed mainly by targeted miniaturized plate that the fracture is monofocal or multifocal (fig2).

Evaluation of the treatment: Osteosynthesis was the method that gave the most good results (fig3).

Complications: Whatever the method of late complications had been found in 10 patients (Table 1).
Table 1: Late complications found according to the method of treatment

<table>
<thead>
<tr>
<th>Complications</th>
<th>Orthopedic</th>
<th>Mixed</th>
<th>Osteosynthesis</th>
<th>Abstention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Articulation Disorder</td>
<td>1.66%(1case)</td>
<td></td>
<td></td>
<td>1.66%(1case)</td>
</tr>
<tr>
<td>Cal vicious</td>
<td>3.33%(2case)</td>
<td></td>
<td>1.66%(1case)</td>
<td>1.66%(1case)</td>
</tr>
<tr>
<td>Suppuration</td>
<td></td>
<td>1.66%(1case)</td>
<td>1.66%(1case)</td>
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<tr>
<td>Delayed consolidation</td>
<td>1.66%(1case)</td>
<td></td>
<td></td>
<td>3.33%(2case)</td>
</tr>
</tbody>
</table>

4. DISCUSSION

The clinic: The hypoesthesia was 3% postoperatively. These data are close to the post-operative nerve lesions of Camuzard et al in 1990 [4] with 2.7% hypoesthesia. The limitation of the mouth opening postoperatively was 10%, so higher than those of Van Hove et al [5] which were even lower or 2.4%, unlike those of Razafindrabe et al. in 2007 [9] who found in his study a figure of 29.3% of cases but only by the orthopedic method. The disorder of the articulated tooth was 1% after treatment. This result is not as good as de Van Hove et al [5] which was 0.2%, but better than that of Rocton et al in 2007 [6] which was 1.4%. X-rays: Dental panning was the most requested radiological picture. But this cliche can cause a fracture to be underestimated because the horizontal dimension escapes the panoramic analysis [10]. However for several authors [11,12,13] dental panning is the most reliable examination and the only one useful for post-operative diagnosis and follow-up. However, the CT scan should not be a second-line examination as noted in the study but earlier because it is easy to achieve regardless of the clinical condition of the patient, and it is an undeniable contribution to understanding fractures and their treatment [14,15].

Treatment methods: The treatment of fractures of the mandible required the use of three methods. Therapeutic abstention was one of them. It is unusual and involved 10% of patients in the study. This method, as noted by Dia Tine et al [3], should be recommended only in incomplete fractures without displacement where the dental articular is preserved. However, as pointed out by Crézoit et al in 1993 [16] that this method, certainly non-traumatic, has many disadvantages that can be serious. The orthopedic method involved 28% of patients. It was indicated in monofocal or bifocal fractures. We agree with Dia Tine et al [3] to say that its relatively low cost, the lack of availability of osteosynthesis material and its ease of implementation explain its strong indication. But we disagree with him that late consultation is a reason for not performing osteosynthesis. For Van Hove in 2000 [5] the treatment of fractures of the mandible is orthopedic. This reasoning became different when the fracture was multifocal [8]. This method should only be performed if there is no maxillofacial surgeon skilled in plate osteosynthesis [14,17]. Osteosynthesis involved a large part of the patients in the study. We agree with Séguin et al in 1989 [18] to say that osteosynthesis offers more comfort to the operated, because it allows to do without bi-maxillary blocking. We made it by miniaturized plate and screws. It was indicated in front of any type of fracture and whatever its location. For Dia Tiné et al [3] it is the choice of the fracture of mandibular fracture supported early. In the case of multifocal fractures and or comminuted most authors [5,6,13,17] agree to practice it. The evaluation of the treatment: We note that the osteosynthesis is very well appreciated as well as the orthopedic treatment. This led Larroque et al in 1987 [19] and Dia Tine et al [3] to write that orthopedic treatment gives results similar to osteosynthesis. But for Ngouoni et al [7] although good orthopedic treatment should remain routine treatment against stabilization of fracture centers in the active subject should be done by miniaturized plate. Complications: Therapeutic abstention and orthopedic treatment were the two most complicating methods. The abstention according to Dia Tine et al [3] is a method that imposes a regular check and is also according to Crézoit et al [16] source of persistent pain, secondary displacement, non-union and infection. For Rocton et al [6] orthopedic treatment gives more complication involving an additional investment of up to one or more new operations thus confirming the writings of Ngouoni et al [7] who noted that the orthopedic method gave more complications than the osteosynthesis method. We can agree with Camuzard et al [4] that the use of screwed plates must replace the bimaxillary blockage.

5. CONCLUSION

The fracture of the mandible is a fracture where the disorder of the articulated tooth and the limitation of the mouth opening are always present signs. Panoramic dental X-ray is still useful, but CT should become the gold standard. Of the three modes of treatment, osteosynthesis is the one that is the most appreciated and gives the least number of complications for the miniaturized plate.
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