Mandibula Fracture by Fire Weapon Projectile: Surgical Treatment Through The Use Of External Fixers: Case Report.

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Abstract: The indiscriminate use of firearms, made firearm projectile injuries (PAF), common in large and small centers, which in turn affect the maxillofacial region, especially the lower third of the face. In these facial wounds, comminuted fractures in the mandible and the presence of infectious foci predominate. Despite the various possibilities for treating mandibular fractures, the use of external fixators has become a viable option, especially in cases of complex fractures associated with an infectious condition, even though they are adapted for use in the face. The objective of this work is to present a clinical case of a patient victim of a PAF injury in the face with a comminuted fracture in the jaw symphysial region, admitted to the service of Maxillofacial Surgery at Hospital de Urgência de Teresina - PI. The proposed treatment was closed reduction of the fracture and stabilization using the external fixation system.

Keywords: Skull Fracture, Basilar.Mandibular Injuries.Wound Closure Techniques.

I. Introduction

Firearm projectile injuries have become a worldwide public health problem. The use of firearms affects all individuals in society with increasing statistical indexes [1]. In 61% of the victims, injuries occurred to the head and / or face, with a greater incidence in the mandible region [2], with the mandibular body region being the most affected [1]. Mandibular fractures are usually comminuted, with small and / or multiple fracture lines, resulting in bone fragments in the area affected by the traumatic agent [2]. These are contaminated wounds whose projectile penetration path is extremely unpredictable.

An updated integrative literature The use of external fixators is another option for the treatment of wounds due to PAF in the mandible [3], being an unusual choice in the treatment of these fractures due to the use of plates and screws, in addition to having a restricted indication [4]. The regular use of external fixators for the treatment of jaw fractures began during the second world war [4]. Traditional fasteners have significant disadvantages. Systems composed of an acrylic bar with metallic pins require extra materials and equipment, which, once installed, can no longer be adjusted. The use of fasteners designed to treat wrist fractures, although fast and simple to apply, are bulky to use and the shapes of the pins and bars are not suitable for the mandible [3]. Unlike the traditional external fixator, there are fixators that are suitable for the mandible, adapting to the contours of this bone, being lighter, positioned just 1.0 cm from the skin surface and being adjustable [3]. As the bar is closer to the bone than in other systems, it promotes more stability at the fracture sites. The special titanium pins have the correct length of the screw head for the regions of parasymphysis, body and the mandible branch. The new combination of clamps for connecting the fastener bar, pins and all additional titanium connecting rods is of recent design [3]. The external fixation pin can be used on fractures that have edentulous sites or with inadequate dentition, where there are bone losses secondary to injuries by firearms, comminuted fractures, infections, pathological fractures or osteomyelitis. The use is also indicated in special conditions such as compromised upper airways, nutritional problems. It can also be used in fractures of atrophic edentulous mandibles or in mandibular fractures associated with those of the middle third of the face, when a quick and simple method for fixation is necessary [5].

The objective of this work is to present a clinical case of a patient victim of a PAF injury in the face with a comminuted fracture in the region of the mandibular symphysis, admitted to the Buccomaxillofacial Surgery service of the Hospital de Urgência de Teresina - PI. It was chosen as a treatment method the closed reduction of the fracture and stabilization using the external fixation system.
II. Case Report

Feoderma patient, 57 years old, male, was attended by the Oral and Maxillofacial Surgery and Traumatology of Hospital - PI, with history of injury by a firearm projectile (PAF) in the face after an attempt suicide with shotgun. He had difficulty feeding and drainage of purulent secretion through the PAF inlet in the submental region, with an evolution of 10 days.

On physical examination (Figures 1 and 2), swelling in the chin region, local hyperemia and sutured transfixing lesion in the submental region and oral floor with signs of infection and dehiscence, had spontaneous drainage of salivary secretions and purulent, atypical mandibular mobility at manipulation, altered intermaxillary relationship, partial edentulism, satisfactory and poor mouth opening oral hygiene. Computed tomography examination (figure 3) there was a comminuted mandibular fracture in a symphyseal region without great and shards of associated PA.

Intravenous antibiotic therapy followed surgical procedure for closed reduction and stabilization of the mandibular fracture, under general anesthesia, where irrigation was performed abundant, conservative wound debridement with removal of projectile fragments and unviable tissues, surgical exploration of intra and extra-oral wounds and suture. Assessing local conditions (infection, edentulism, comminution, inability to block adequate maxillomandibular (BMM), substantial loss soft tissue), history of trauma and evolution of disease, we opted for closed reduction of the fracture and stabilization using the external fixation system, by adapting an external wrist fixator. Eight bicortical pins were then installed, through trocar, two pins in the post foramen region bilaterally and four in the symphysis region, the next, the four pins on each side were joined through clamps and metal bar.

On the first postoperative day (DPO), salivary drainage through the skin by pressure from the tongue on the oral floor, communication was buffered with vaseline gauze. In the seventh DPO, observed external fixator in position (figure 4), discrete mandibular mobility to manipulation, intra-oral injury with healing by second intention and without signs of infection. It was then the union of the pins and metallic bar of each side with acrylic resin (figure 5), aiming at greater fracture stabilization, and irrigation of intraoral injury with saline. On postoperative imaging (figure 6) the good bone pins positioning, alignment and satisfactory bone contour.

Three months after surgery, repair was noted mucous and bony, with no signs of infection and no signs of mobility in mandibular symphysis, through examination clinical-radiographic examination, the external fixator local anesthesia. One year after surgery, the patient returned with pain complaints associated with the element 35, which was removed, ceasing the patient’s pain. Ois still being preserved through revision sessemester, the last one being held in the twentieth month after surgery, where contour was observed maintained mandible, absence of atypical mobility and preserved jaw functions.

III. Results And Discussion

Comminuted fractures of the mandible have been treated in a variety of ways, including open reduction with plates and screws, use of internal fixation with steel wires, closed reduction using BMM and, in some cases, through closed reduction with use of external fixators [6]. External fixators have proven to be a method popular way to treat gunshot wounds. Systems incorporating an acrylic bar with metal and pins require extra materials and equipment [3] such systems made of titanium are biocompatible and ensure strength and stiffness [7]. External fixation of fractures of the jaw is a technique in which the segments are manipulated in place by the pins and fixed with connectors [4]. It is often considered a subtype closed reduction even when an open technique is used to place the external fixator, no body stranger is introduced at the fracture site [3]. Provides semi-rigid fixation to the mandibular segments fractures [4], even so, such fixation guarantees the adequate fragment stability [7].
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Figura 1 – Exame físico extra-oral.

Figura 2 – Exame físico intra-oral.

Figura 3 – Tomografia computadorizada pré-operatória.

Figura 4 – Sétimo dia pós-operatório.

Figura 5 – União de fixadores externos com resina acrílica.

Figura 6 – Radiografia oclusal pós-operatória.
Despite the few cases evaluated with external fixation in human mandible, the fixators aren't external.

factors seem favorable for osteosynthesis. Generally, the indications for external fixation are when maxillomandibular block is not adequate because of dental absences, fractures, comminuted, infection present, soft tissue of insufficient coverage or against indication due to concomitant medical reasons.

Of the post-operative infections, cellulite in around the pins, the unions, the malocclusions, and the pins loosening are frequent problems within this fixation technique. Other complications include injury to the lower alveolar nerve, especially natalicypopharyngeal, with addition to damage to the parotid gland and formation of mucoceles. The burning of the skin by acrylic polymerization can occur if precautions and the appropriate technique are not followed. In this work, no complications were observed after operations, the union of the fragments and the absence of foci of infection. No problem related to the use of the equipment was verified.

More recently, open reduction using plates and/or screws was indicated for fractures by comminutivas, even contradicting basic concepts of maxillofacial surgery where fracture states comminuted should be treated by closed reduction to prevent a shortage of blood supply. However, the literature suggests that preventing some source of vascularization does not lead to the incidence of increased infection, as long as stabilization bone fragments is achieved. Currently, the treatment considered standard for complex mandible fractures is the use of rigid internal fixation and use of bone grafts. However, the use of external fixators as a treatment option for such mandibular injuries it still has its space, particularly in injuries associated with conditions infectious, with the presence of an extensive reaction in inflammation and areas of bone sequestration, as well as abscesses and infections caused by firearms, with extensive bone and soft tissue destruction. External fixation with orthopedic fixators should be remembered as a valid and more affordable option for treatment of complex injuries, as the device used is available in the public health system, therefore not needing specific material.

IV. Conclusion
In mandibular comminuted fractures originating from PAF injuries there is no consensus for any form of treatment. The use of fasteners treatment is a viable and effective treatment option when well indicated, as could be observed in the case clinical description, where satisfactory mandibular contour, absence of atypical mobility, good intermaxillary relationship and mandibular function preserved. It is concluded that fracture stabilization is achieved by the use of external fixation method is sufficient when respecting the techniques of use and antibiotic therapy protocols.

References