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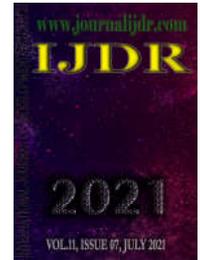
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CASE REPORT

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FRONTO-NASO-ORBITAL-ETHMOIDAL FRACTURE ASSOCIATED WITH LE FORT III FRACTURE: CASE REPORT

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ABSTRACT

Fronto-nasal-orbito-ethmoidal (FNOE) fractures result from complex high-energy trauma. They represent a therapeutic challenge and requires adequate surgical planning for the best functional and aesthetic patients recovery. The etiology is mainly related to car accidents and is more prevalent in men aged between 20 and 30 years. Traumatic Brain Injury (TBI) is commonly associated and multidisciplinary care in intensive unit is routinely necessary. The present work aims to describe a severe case of FNOE fracture associated with a le fort III fracture. Surgery was performed through coronal access, proceeding with the fractures osteosynthesis. In addition orbital and frontal walls were reconstructed with titanium meshes. The patient had a good postoperative evolution and stills under late follow-up.

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INTRODUCTION

The etiology of facial trauma is plural, being the traffic accidents the major cause on national studies and around the globe. A young male adult concentrates the highest incidence, due more busy social routine and consequent greater exposure to risk factors. The dangers of traffic are exacerbated by the frequent and dangerous association of alcohol and driving, causing severe high-energy bone-destroying fractures. As example, the fronto-nasal-orbito-ethmoidal fractures (FNOE), which cover the upper and middle facial thirds, configuring a trauma with a complex therapeutic. Therefore, an early approach is essential to reduce functional and aesthetic sequelae to the patient (Correa, Mello, & Pelizzer, 2013). NOE fractures are classified into three types. Type I: a single central fragment with the canthal ligament attached, type II: a single central comminuted fragment preserving the canthal ligament and type III, when there is a comminuted fragment with medial canthal ligament detachment. The diagnosis is clinical, complemented with computed tomography (Oliva et al., 2015). A late diagnosis and treatment can lead to secondary problems, such as nasal and eye deformities, epiphora or even blindness. This article aims to report a complex FNOE fracture case associated with a Le Fort III fracture, due a motorcycle accident. Surgery was performed to reduce and fix the fractures, such as frontal and orbital reconstruction through coronal access combined with subciliary and Caldwell-luc access.

CASE REPORT

A male patient, 16 years old, melanodermic, was victim of a motorcycle accident, has been admitted to a public service reference on maxillofacial surgery in a metropolitan region of the state of Bahia - Brazil. There was loss of consciousness at the time of trauma related to TBI. The patient was promptly taken to the emergency room and orotracheal intubation was performed (Figure 01). After systemic stabilization, the patient underwent laboratory and imaging tests. In the initial maxillofacial physical examination, it was noted a flattened fronto-nasal region, bilateral periorbital ecchymosis, with eyelid occlusion and ocular dystopia. Multiple abrasions on the face and lacerations in the frontal and periorbital regions. Upon examination of the face tomography, was detected fractures in the frontal bone, affecting the anterior and posterior wall of the frontal sinus, bilateral fracture in the frontozygomatic suture, in addition to fractures in the floor of the right orbit, maxilla, ethmoid, and nasal bones (Figure 02). Based on tomographic images, a Le Fort III and FNOE type II fractures were diagnosed. After general condition recovery and release by neurosurgery unit, the patient underwent to surgical procedure by the maxillofacial team after seven days of hospitalization. The procedure was performed under general anesthesia and orotracheal intubation. Coronal access was elected to expose the FNOE fracture and paracoronary hemostatic sutures were performed prior to the incision. For the orbital rim and floor fractures

were exposed through subciliary approaches. In addition, maxilla and zygomatic pillar were accessed by le fort I incision. After fractures exposure, was observed extensive destruction of the anterior and posterior wall of the frontal sinus, presence of saddle nose, comminuted right orbit floor and fractures in the right zygomatic-orbital-maxillary complex, in addition to slightly displaced fractures in the left orbit were (Figure 03).



Figure 1. Preoperative patient appearance

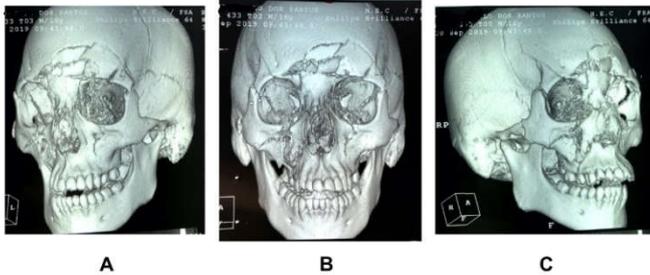


Figure 2. Preoperative 3D reconstruction

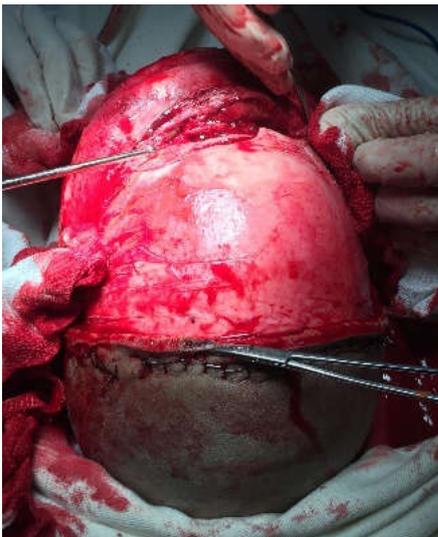


Figure 3. Bicoronal access for fracture visualization

Fractures were reduced and fixed using 2.0 mm system plates and monocortical screws. The top to bottom sequence was followed for better anatomical fixation. The floor of the orbit was reconstructed with malleable titanium mesh and fixed with screws. Finally, a rigid titanium mesh was used on the anterior wall of the frontal sinus to cover the bone defect (Figure 04 and Figure 05).

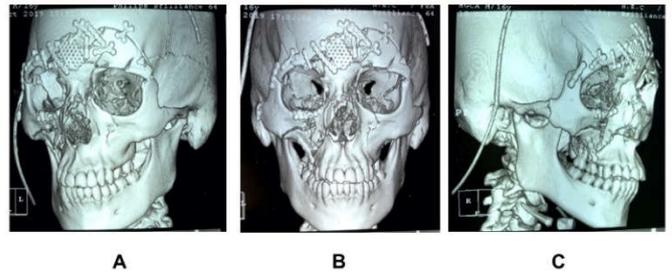


Figure 4. Post-operative computed tomography

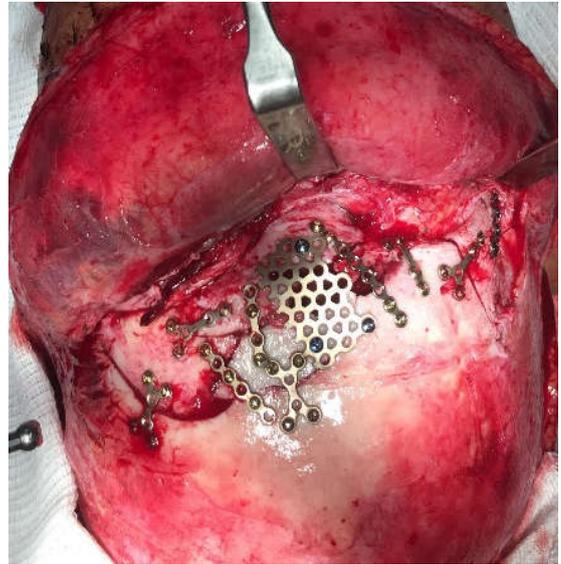


Figure 5. Osteosynthesis in FNOE fracture

In sequence, abundant irrigation with 0.9% saline solution was proceeded and hemostasis with electrocautery and superficial temporal arteries ligation. Vycril 4.0 was chosen for the musculature and intraoral access synthesis and nylon 2.0 to the skin in coronal access and 5.0 for subciliary access. Before closure, a vacuum drain was installed to contain postoperative edema along the coronal access. Compressive bandage was applied and maintained for 72 hours associated with activation of the suction drain once a day. During hospitalization the medication protocol included antibiotic therapy with Ceftriaxone 1g 12/12h, analgesia with Tramadol 100mg 08/08h and Tenoxicam 40mg 12/12h. On the 3rd postoperative day, the drain was removed, the 3rd POD with great function on swelling control. Patient received hospital discharge the next day, with an oral prescription and local care orientations. On the 15th POD, all skin sutures were removed, with no signs of inflammation. After 5 months of follow-up, the patient evolved without complications, with total regression of the edema, good mouth opening, maintained visual acuity, without trauma sequelae on aesthetic and functional scope.

DISCUSSION

For Rodrigues et al. (2020) the etiology of FNOE fractures is varied, present approximately on 6 to 12% of facial fractures. However, Silva et al. (2014) states that most FNOE fractures are associated with high-impact car and motorcycle accidents, which corroborates with the present case. Regarding signs Fernandes et al. (2017) mentions that, due to the high energy of trauma, an attentive neurological assessment is essential, once it may be associated with a cranioencephalic injury. Johnson and Roberts (2021) add that FNOE trauma can result in cerebrospinal fluid rhinorrhea (CFR) and secondary meningitis. In the present case, there was no occurrence of neurological complications or CFR after the period of surveillance by the neurosurgery team, neither in the postoperative period. Rosenberger, Kriet, and Humphrey (2013) states that the initial examination of NOE fractures shows a coarse periorbital edema and

hematomas with significant soft tissue distortion. Patients usually present signs and symptoms such as epiphora due to obstruction of the nasolacrimal duct, diplopia related to orbital fractures, telecanthus due to medial canthal ligament detachment. On physical examination, great nasal crepitation, mobility in the maxilla and a convex face, with a dip in the middle third, are commonly noted. Regarding surgical approach, most authors indicate the coronal access, due to its aesthetic advantages, less irrigation in the region and wide visibility also state that an “eyebrow” or “gull-wing” superciliary incision can also be performed for direct access to the region of the medial canthal ligament (Lima et al., 2014). In the present case, coronal access was performed combined with subciliary incisions to expose the inferior orbital rim and floor, as well as a Caldwell-luc access for osteosynthesis of the zygomatic pillar and maxilla. The type of surgical approach is also defined by severity. More conservative when it is considered type 1 or even with close reduction, or on the other hand, when it is type 2 or type 3, a larger approach, as coronal, when a greater exposure is required (Onişor-Gligor, Ţeņ, Bran, & Juncar, 2019). On the present case, the surgical access chosen was the bicoronal, since it was a type 2 FNOE fracture, associated with a Le Fort III fracture. Being coronal considered the gold standard approach for these types of treatment (Pontes et al., 2020). Miloro (2016) states that meningitis or sinusitis in the nasofrontal duct, are among the most frequent complications. Therefore, often cranialization and duct obliteration may be required, nonetheless, when the duct drainage path is patent or restored, it is not necessary. According to Pisano and Tiwana (2019) even when indicated, this procedure should be performed 2 weeks after the trauma. The indication wasn't observed in the present case, with normal duct patency. Thanks to the diagnosis and surgical treatment evolution evolutions in recent decades, the prognosis has become more favorable, with improvements in aesthetic and functional results (Marao et al., 2010).

CONCLUSION

It is a fact that the treatment of fronto-naso-orbito-ethmoidal fractures is challenging, considering the complexity of trauma, especially when associated with other types of fractures. In the present case, in addition to the FNOE fracture, the patient had an associated Le Fort III fracture, which made the approach to be taken more cautious. When making an early diagnosis, associated with good surgical planning, the chances of the patient developing trauma sequelae is quite reduced, with a good prognosis.

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