Artigo Clínico

Surgical management of fnoe fracture associated with telescopic le fort I fracture

Manejo cirúrgico de fratura fnoe associada a fratura le fort I telescópica
Manejo quirúrgico de la fractura fnoe asociada a fractura telescópica de le fort I

ABSTRACT

Objective: Fronto-naso-orbito-ethmoidal (FNOE) fractures result from complex high-energy trauma. They represent a therapeutic challenge and require adequate surgical planning, especially when associated with other fractures, as they affect the function and aesthetics of the patient. This paper aims to describe the surgical management of a FNOE fracture associated with a Le Fort 1 fracture. **Case Report:** A male patient, a victim of a traffic accident, was admitted to the reference public service in CTBMF, being referred to the ICU for neurological surveillance due to the associated TBI. After stabilization of the general condition, the patient was released to undergo the surgical procedure by the CTBMF team. A facial tomography was requested, which showed an FNOE fracture associated with a Le Fort 1 fracture. The procedure was performed under general anesthesia and ventilation via OTI. After 01 year of follow-up, the patient evolved without sequelae of the trauma, both in the aesthetic and functional scope. **Conclusion:** Complex fractures of the face are challenging due to the need to maintain the transverse dimension of the face and the patient's occlusion. When performing an early diagnosis, associated with good surgical planning, the chances of the patient developing associated sequelae are minimized, thus presenting a good prognosis. **Keywords:** Trauma; Fractures; Diagnosis.

RESUMO

Objetivo: As fraturas fronto-naso-orbito-etmoidais (FNOE) são decorrentes de traumas complexos de alta energia. Representam um desafio terapêutico e exigem um adequado planejamento cirúrgico, principalmente quando associadas à outras fraturas, pois repercutem na função e estética do paciente. O objetivo deste trabalho é descrever o manejo cirúrgico de uma fratura FNOE associada a fratura Le Fort 1. **Relato de Caso:** Paciente do gênero masculino, vítima de acidente de trânsito, deu entrada no serviço público de referência em CTBMF, sendo encaminhado a UTI para vigilância neurológica devido ao TCE associado. Após estabilização do quadro geral, o paciente foi liberado para realizar o procedimento cirúrgico pela equipe de CTBMF. Foi solicitada tomografia de face que evidenciou fratura FNOE associada a fratura Le Fort 1. O procedimento foi realizado sob anestesia geral e ventilação via IOT. Após 01 ano de follow up o paciente evoluiu sem sequelas do trauma tanto no âmbito estético quanto funcional. **Conclusão:** Fraturas complexas da face são desafiadoras pelo fato da necessidade de manter a dimensão transversa da face e a oclusão do paciente. Ao realizar um diagnóstico precoce, associado a um bom planejamento cirúrgico, minimizam-se as chances de o paciente desenvolver sequelas associadas, apresentando assim um bom prognóstico. **Palavras-chave:** Trauma; Fraturas; Diagnóstico.

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ISSN 1808-5210 (Online)
ISSN 1679-5458 (Linking)

RESUMEN

Objetivo: Las fracturas fronto-naso-órbito-etmoidales (FNOE) son el resultado de un traumatismo complejo de alta energía. Representan un desafío terapéutico y requieren una adecuada planificación quirúrgica, especialmente cuando se asocian a otras fracturas, ya que afectan la función y la estética del paciente. Este artículo tiene como objetivo describir el manejo quirúrgico de una fractura FNOE asociada a una fractura de Le Fort 1. **Caso clínico:** Paciente masculino, víctima de accidente de tránsito, ingresó al servicio público de referencia en el CTBMF, siendo remitido a UCI para vigilancia neurológica por TCE asociado. Después de la estabilización del estado general, el paciente fue dado de alta para ser sometido al procedimiento quirúrgico por el equipo del CTBMF. Se solicitó tomografía facial que mostró fractura FNOE asociada a fractura de Le Fort 1. El procedimiento se realizó bajo anestesia general y ventilación vía OTI. Luego de 01 año de seguimiento, la paciente evolucionó sin secuelas del traumatismo, tanto en el ámbito estético como funcional. **Conclusión:** Las fracturas complejas de la cara son un desafío debido a la necesidad de mantener la dimensión transversal de la cara y la oclusión del paciente. Al realizar un diagnóstico precoz, asociado a una buena planificación quirúrgica, se minimizan las posibilidades de que el paciente desarrolle secuelas asociadas, presentando así un buen pronóstico.
Palabras clave: Trauma; Fracturas; Diagnóstico.

INTRODUCTION

The main cause of multiple facial fractures continues to be traffic accidents, followed by physical aggression, sports accidents, and finally falls[1]. Fronto-naso-orbito-ethmoidal fractures (FNOE) involve the upper and middle center of the face. The Le Fort I fracture pattern, on the other hand, is the result of a force directed above the upper teeth, which induces a fluctuation of the palate, according to Rene Le Fort[2]. These injuries can occur together in a traumatic episode, which makes diagnosis and treatment even more challenging.

Fractures of the fronto-naso-orbito-ethmoid complex commonly involve the lacrimal apparatus, the medial canthal ligament, and the anterior ethmoidal artery and may affect the frontal sinus, anterior and posterior wall of the frontal bone. Therefore, the extension of the fracture may result in communication with the anterior cranial fossa, which is related to the leakage of cerebrospinal fluid[3].

The treatment of FNOE fractures aims at the adequate restoration of the architecture of the frontal bone, the intercanthal distance, the maintenance of the lacrimal drainage system, and the restoration of facial aesthetics. Thus, as pointed out by Markowitz et al[4], the clinical examination must be aligned with the analysis of imaging tests, such as computed tomography, in order to carry out efficient surgical planning. When examining the patient, attention should be paid to common signs, such as epistaxis, periorbital edema, and traumatic telecanthus, but palpation can often be difficult to perform due to post-traumatic edema and pain. Therefore, computed tomography with three-dimensional reconstruction is essential to conclude the diagnosis[5].

In order to minimize eventual aesthetic-functional sequelae, the repair of these injuries must be performed as quickly as possible and requires surgical approaches that allow wide visualization, in order to enable adequate anatomical repair, prevent infections, and correct drainage of cerebrospinal fluid[6]. These factors are also essential to avoid compromising the final results, represented by widening of palpebral fissures, retrusion of the middle third of the face, ocular complications, nasal deformities, and formation of cerebrospinal fistulas[6].

Based on the above, this work aims to report a treatment of FNOE fracture associated with Le Fort I fracture, present the surgical steps performed, and review and discuss the literature on the treatment of FNOE fractures.

CASE REPORT

Male patient, 32 years old, melanoderma, victim of a traffic accident, was admitted to the public service of reference in oral and maxillofacial surgery in the metropolitan region of the state of Bahia - Brazil, being referred to the ICU for neurological surveillance due to traumatic brain injury (TBI) associate.

At the initial maxillofacial physical examination, a blunt-cut injury was noted on the right eyebrow and in the nasal region, bilateral periorbital edema, occlusal dystopia, limitation of mouth opening, atypical mobility in the maxilla and bone discontinuity in the infraorbital ridges, bilaterally.

The tomographic examination showed FNOE fracture associated with a Le Fort I fracture with a large posterosuperior impact (Figure 1). After stabilization of the general condition, he was released to perform facial osteosynthesis by the Oral and Maxillofacial Surgery and Traumatology team. Procedure performed in a surgical center under general anesthesia and orotracheal intubation. We proceeded with coronal access to expose the

FNOE fracture and intraoral access at the bottom of the maxillary vestibule, showing the telescopic position of the maxilla resulting from the traumatic vector that originated the Le Fort I line. We proceeded with the "top to bottom" sequence for better anatomical fixation. The FNOE region was reconstructed with straight, orbital and rectangular titanium plates and fixed with monocortical screws. Then, the orbital contours were redone with plates and screws. Finally, a vigorous manipulation for maxillary disimpaction was necessary, in order to achieve the anterior-inferior repositioning, finalizing the rigid internal fixation with 04 L-shaped plates (Figure 2 and Figure 3).

Figure 1 - 3d tomography showing FNOE fracture associated with Le Fort I.

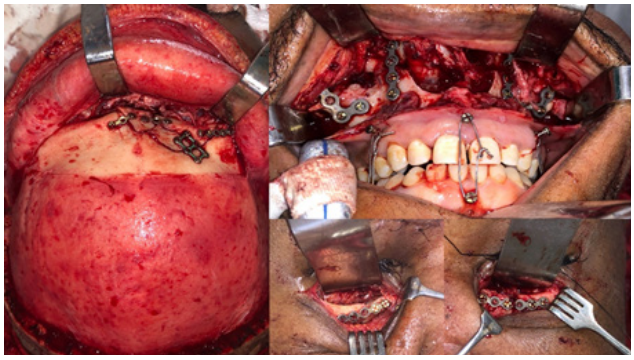

Figure 2 - Surgical approaches + osteosynthesis of facial fractures.

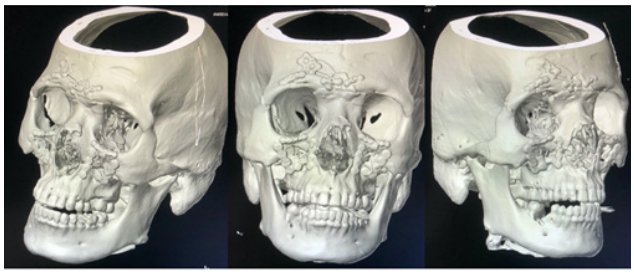

Figure 3 - Post-operative 3D tomography showing osteosynthesis of facial fractures.

After the osteosynthesis of the fractures, abundant irrigation with 0.9% saline solution was performed, hemostasis with electrocautery, proceeding with the synthesis by planes with vicryl 4.0 in the muscles and in the intra-oral access. Synthesis of the coronal access performed with nylon 2.0 and nylon 5.0 was used in the subciliary accesses. A compressive dressing with gauze, micropore, and bandage was applied, and maintained for 48 hours.

The patient remained hospitalized in the unit until the 2nd POD. During this period, he was using antibiotics with Ceftriaxone 1g 12/12, analgesia, and venous anti-inflammatory drugs, being discharged on the third POD, with an oral prescription. On the 10th postoperative day, all skin sutures were removed, with no phlogistic signs. After 01 year of follow-up, the patient evolved without complications, with total regression of the edema, good mouth opening, maintained visual acuity, and preserved visual motricity, without sequelae of the trauma in the aesthetic and functional scope (Figure 4).

Figure 4 - Follow-up 01 year post-operatively.

DISCUSSION

For Baril & Yoon[7], the etiology of the FNOE fracture is associated with high-energy trauma, such as blunt trauma in the middle region of the face during motor vehicle accidents. Along the same lines, Etemadi et al[8] states that at the moment of trauma, the nasal bones are unable to contain the pressure and force that are directed to the ethmoidal sinuses and the eye socket. The ethmoid sinuses function as a "deformation zone", allowing the dissipation of force and diverting it, as far as possible, from critical structures.

With regard to the physical examination, Etemadi et al[8] states that signs of FNOE fractures include swelling in the medial inner canthus, diplopia, anosmia, palpable mobility of the intercanthal region, curvature of the medial canthus, widening of the nasal bridge, and traumatic telecanthus. In cases of suspected NOE fractures, telecanthus and decreased nasal projection are considered pathognomonic clinical findings. In the present case, the patient had diplopia, crepitation in the nasal region, in addition to facial asymmetry.

For Navaneetham et al[9], considering the mechanisms that can result in an impact on the head, it is clear that patients referred to maxillofacial surgery services due to maxillofacial fractures are at risk of consequently suffering traumatic brain injury

ISSN 1808-5210 (Online)
ISSN 1679-5458 (Linking)

(TBI). In addition, Morris & Kellman[10] add that in the presence of fractures of the frontal bone, leakage of cerebrospinal fluid points to the risk of infectious complications, such as meningitis and brain abscess. In the case presented, the patient had TBI, and was under neurological surveillance in the ICU awaiting clinical improvement for surgical treatment by the Oral and Maxillofacial Surgery team.

Regarding the surgical approach, Navaneetham et al[9] state that the coronal access is the most adequate to provide adequate exposure for repairing fractures. Etemadi et al[8] add that other commonly used surgical approaches include lower eyelid incisions, such as the subciliary and transconjunctival approaches, and in cases where FNOE fractures occur simultaneously with midface fractures, these incisions can be combined with a Caldwell-Luc acess. In the case presented, coronal and subciliary accesses were used bilaterally to repair the FNOE and Caldwell-Luc fractures to fix the zygomatic pillar and maxilla.

According to Morris & Kellman[10], the most common long-term complications observed include telecanthus, giving the appearance of hypertelorism, and nasal dorsum collapse. The displacement of the frontal bone fragments can cause diplopia, limitation in ocular movement, and cerebrospinal fluid leak, in addition to infectious complications such as meningitis[4]. In the present case, the patient evolved with ocular diplopia, ophthalmoplegia, and occlusal dystopia, due to the Le Fort I fracture. In his postoperative follow-up of 01 year, the patient evolved without complaints, presenting an excellent prognosis.

CONCLUSION

Complex fractures of the face are challenging due to the need to maintain the transverse dimension of the face and the patient's occlusion. When performing an early diagnosis, associated with good surgical planning, the chances of the patient developing associated sequelae are minimized, thus presenting a good prognosis.

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