International Journal of Anatomy and Physiology Vol. 1 (1), pp. 001- 006, December, 2012. Available online at www.internationalscholarsjournals.org

Case Report

Transmaxilar access fortreatment of blow-out orbital fracture with titanium mesh - Case report

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Received 04 September, 2012; Accepted 23 December, 2012

Orbital fractures blow-out type result from traumatic force applied directly to the eye, often associated fracture of the medial orbital wall, without involvement of adjacent bones. This type of fracture results in prolapse of the orbital contents into the maxillary and/or ethmoid sinus. Diplopia, enophthalmos, hiposfagma, periorbital edema and ecchymosis are the major clinical findings. The Computerized Tomography (CT) scan of the orbits is the gold standard in accurate diagnosis of these fractures in order to determine the degree of prolapse orbital structuresinto thesinus, oriented their treatment. About the surgical access to these fractures is classically done by extra-oral way, through subciliar and transconjunctivalaccesses, which sometimes result in undesirable local complications such as scar, ectropion or entropion. This paper aims to report a case of blow-out fracture for which we chose to access via the maxillary sinus, by Caldwell-Luc access, with reduction of the fracture and deserniation of orbital content through titanium mesh fixed on the superior and medial walls of the maxillary sinus.

Key words: Orbital, trauma, fracture, maxillary sinus, titanium mesh.

INTRODUCTION

Orbital fractures type blow-out result from blunt trauma applied directly to the eye or surrounding bone, involving the great majority of cases the floor and medial wall of the orbit.

These fractures usually result in prolapse of the orbital contents into the maxillary sinus causing, ophthalmoplegia and diplopia, symptoms that require early surgical correction to avoid sequels.

The diagnosis of these fractures is based on clinical and iconological examination, being the Computadorized Tomography (CT) scan gold standard in precise location and extent of bone defects and dislocations resulting from these traumas, and provides excellent visualization of hemossinus, herniated content onto maxillary sinus and orbital incarcerations of extrinsic muscles of the eyeball.

Traditionally, orbital floor fractures are treated by extraoral access that is, subiciliar, subtarsal and transconjuntival. However, unwanted complications such as external scar, edema of the eye, ectropion or entropion are inherently associated with these techniques (Chen and Chen, 2001).

Transmaxilar access (trans-sinusal) to the orbital floor was first described by Walter in 1972, being adapted and improved over the years by various authors and is currently associated with the use of endoscopy and alloplastic materials for reconstruction.

This article aims to report a case of blow-out orbital fracture, treated satisfactorily via trans-sinus with complete fracture reduction and deserniação content orbital sinus with the aid of titanium mesh.

CASE REPORT

Patient, male, 34 years old, professional wrestler, leucoderma, ASA I, received a blunt trauma (finger) in the right orbit, during a fight training, seeking oral and

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Figure 1. Initial physical examination: infraorbital ecchymosis and edema with orbital hiposfagma, restriction of ocular movement in rightward and enophthalmos.

maxillofacial help a week after of the incident. Reported local pain, diplopia, visual blur with burning and tearing. Physical examination revealed mild infraorbital ecchymosis and edema with orbital hiposfagma, restriction of ocular movement in rightward and enophthalmos (Figures 1). The local palpation revealed no broken bones on orbital margins and maxillo-zygomatic complex. CT scan was requested, which showed isolated fracture of the orbital floor with herniation of the orbital contents into the right maxillary sinus and incarceration of the rectus-inferior muscle. Hemossinus was noted only the left maxillary sinus, justified by prior local traumas reported by patient (Figure 2). After ophthalmologic evaluation, we proposed surgical repair of the fracture under general anesthesia, with intra-oral surgical access by maxilar sinus, aiming reduction of the fracture and sinusal deserniation oforbital content with the aid of titanium mesh.

SURGICAL TECHNIQUE

After procedure of general anesthesia via nasotracheal was made local infiltration in the right maxillary vestibule with bupivacaine 0.5% diluted 1:1 in distilled water. The incision was carried out by planes, including the periosteum, in the bottom of the right maxillary vestibule, 5 mm above the mucogingival junction, extending lateral incisor to the first molar with mucoperiosteal detachment and complete exposure of the anterior wall of the maxillary sinus. After detachment, Calldwel-Luc Osteotomy technique was used to access the right maxillary sinus and was made above the premolars, with enlargement of the opening enough for the insertion of titanium mesh and use of instrumentals. By direct vision and with the help of fibroscopic light we noted the herniation of orbital contents into the maxillary sinus and orbital floor bone fragments (Figure 3), which were removed. Through digital pressure, the herniated content was again seated in the orbital cavity, along its entire length. The positioning of the globe was checked after the maneuver, being compared with the contralateral. After correct positioning of the eyeball, a preformed titanium mesh was inserted via trans-sinus access, and finally adapted and accommodated in situ, reducing the fracture and correcting the position of the eyeball, and then fixed with 3 mm titanium screws, 2.0 system in superior and medial walls of the right maxillary sinus (Figure 4). After setting the mesh, its stability was confirmed by digital pressure on the eyeball and direct visualization of the right globe. Duction forced test was also carried out. Copious irrigation with saline solution in the right maxillary sinus and suture of the incision in continuous stitches with Vycril 4.0 was performed. Postoperative control CT scan showed perfect symmetry on the orbital floors (Figure 5), absence of loose bone

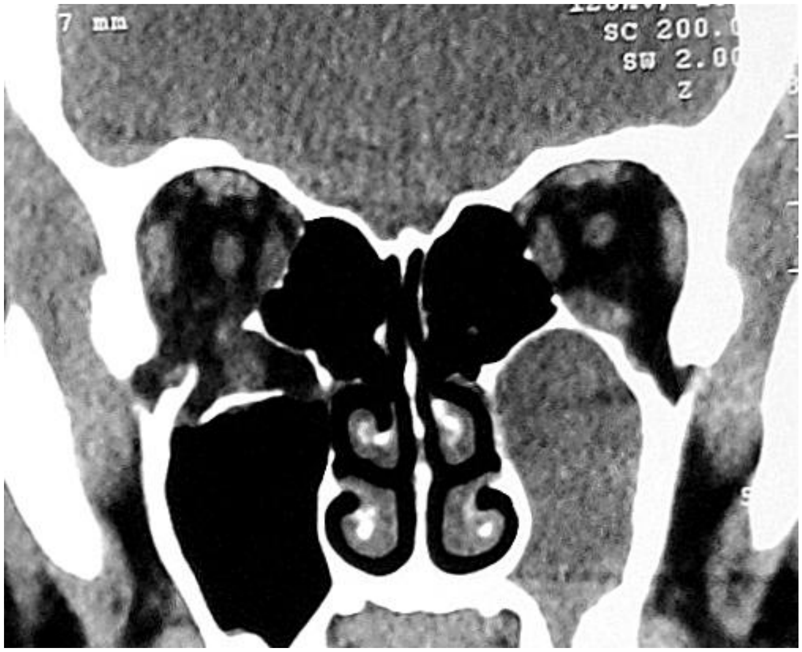

Figure 2. Preoperative CT scan: show isolated fracture of the orbital floor with herniation of the orbital contents into the right maxillary sinus and incarceration of the rectus-inferior muscle. Hemossinus was noted only the left maxillary sinus, justified by prior local traumas reported by patient.

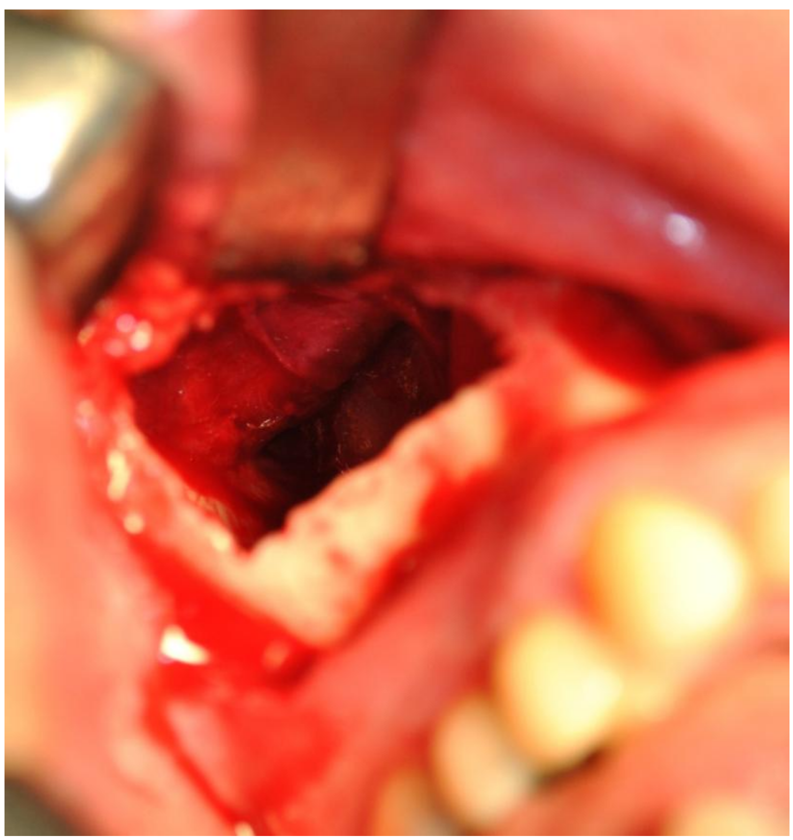

Figure 3. Note the herniation of orbital contents into the maxillary sinus and orbital floor bone fragments.

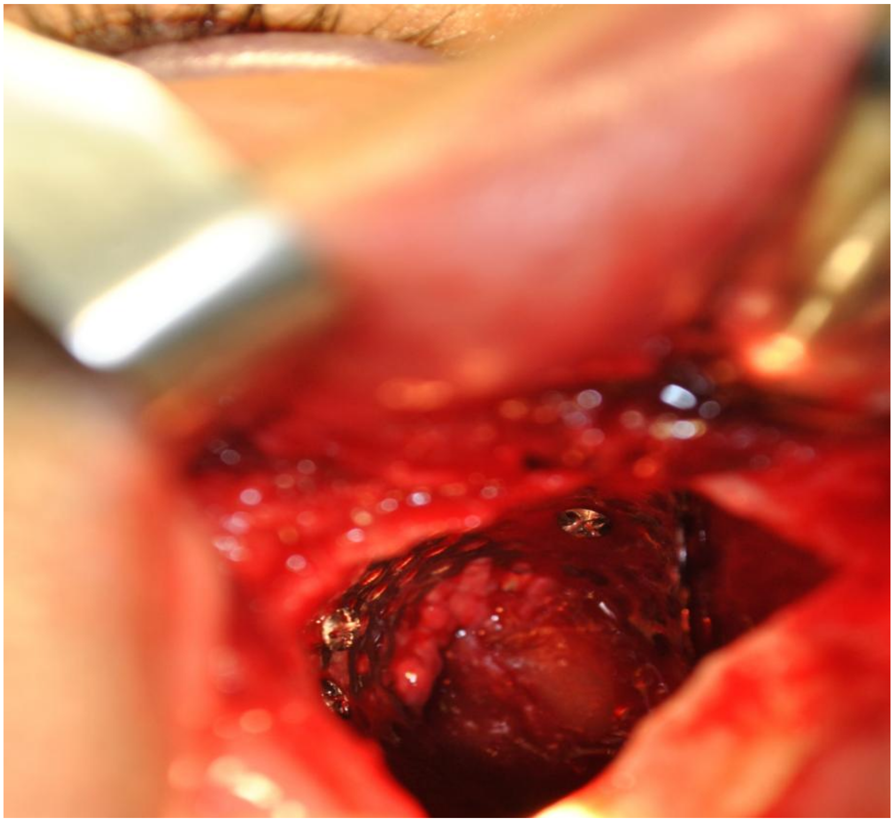

Figure 4. A titanium mesh was inserted via trans-sinus access, and adapted and accommodated in situ, and then fixed with 3 mm titanium screws, 2.0 system in superior and medial walls of the right maxillary sinus.

Figure 5. Postoperative control CT scan showed perfect symmetry on the orbital floors.

Figure 6. 1 year of follow up. Note the simetry between the eyeballs and no restriction of orbital moviments.

fragments and excellent positioning of the mesh. The patient had complete remission of diplopia, ophthalmoplegia and enoftlamo in about 2 months, but evolved with muscular incoordination in lateral-right toward, requiring aided ocular physiotherapy by an ophthalmologist, with correct movement and coordination after 8 sessions. After 1 year of follow up, the patient developed no clinical complaints in the maxilofacias sinus (Figure 6).

DISCUSSION

The blow-out fracture term was coined by Smith and Regan (1957), who described their trauma mechanism.

Since then, controversies still exist in the literature regarding the management and treatment of fractures of the orbital floor. The nonsurgical treatment has long been advocated by many authors, however due to the high incidence of late sequelae such as enoftlamo, diplopia and ophthalmoplegia, the surgical treatment of these fractures has become widespread and well made, in specified situations.

The time of surgical repair is also a matter of discussion, but most authors recommend treatment as early as possible. In the '60s and '70s, when the diagnosis was based on plain radiographs and linear CT, surgical therapy was proposed only for cases in which the patient had late enophthalmos and diplopia (Converse et al., 1967). With the advent of CT scans, which provide accurate and precise location of the fractures, the treatment will depend on the degree and extent of the defect. According to Haris (2006), if the fracture is large and enoftlamo immediately evident, surgery should preferably be done in a maximum of 2 weeks. However, our experience advocating for earlier treatment, in up to 7 days.

Since CT sacn is ideal for the initial diagnosis of these fractures, Ellis and Tan (2003) also recommend the realization of a new tomography after surgery in order to assess the positioning of reduced bone fragments and used for such matters.

Traditionally it is used extra-oral access torepair orbital fracture blow-out type, which are known complications that include external scar, ectropion and the frequent need for biocompatible materials to support the fractured floor. Moreover, these accesses result in great handling to the eyeball, especially in more posterior fractures, at great risk of injury to the orbital contents and its vascular-nervous bundle.

In this case, we choose trans-sinus access, taking into consideration the type of fracture present with exclusive involvement of the orbital floor mainly on its posterior area. The access allowed visualization of the fracture in its entire length and the presence of periorbital contents herniated into the maxillary sinus. Since the reduction was accomplished via the maxillary sinus, minimal direct handling to eyeball was required, reducing the risks. The trans-sinus access has the advantage of allowing direct visualization of the fractured area, mainly in later orbital fractures (Kwon et al., 2008), herniated orbital contents and the absence of visible scarring (Kim et al., 2008). This access is contraindicated in orbital fractures associated with zygomatic-facial complex fractures.

There are various materials to be used to reconstruct defects in orbital floor, that is, autogenous bone (iliac crest, lyophilized bone, costal cartilage), aloplastic (Medpor) or metal (titanium mesh). We utilize a 2mm titanium mesh, pre-molded and fixed in position at the expense of the infraorbital margin and medial wall of the right orbit. Recent studies have invested in the use of alloplastic materials (Chen and Chen 2004; Strong, 2004; Strong et al., 2004, Harris, 2006; Jin et al., 2007; Kim et al., 2008), but with results significantly similar of the use of titanium mesh, a fact corroborated by Son et al. (2005) and Oliveira et al. (2005). Already Mintz et al. (1998) claim that autografts are the gold-standard materials for reconstruction. We used titanium mesh for reconstruction of the fracture by the availability of the material, together with the easy modeling and adaptation in the orbital walls, ideal for primary orbital reconstructions.

However, Oliveira et al. (2005) have reported satisfactory aesthetics and function results and without any complications with the use of six different types of materials for reconstruction of the orbital floor.

CONCLUSION

This procedure was effective and satisfactory for reconstruction of orbital floor fracture, minimizing direct manipulation to eyeball and eliminating a possible scar skin. It offers easy access to the fracture, providing satisfactory reduction of the herniated orbital contents, and maintenance in the same position with minimal complications.

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