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RESEARCH ARTICLE

PENETRATING FOREIGN BODY IN MIDDLE FACIAL SEGMENT

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ABSTRACT

Introduction: We present our clinical experience in a case of orbital fracture occurred as a result of a penetrating foreign body in left midfacial segment causing orbital floor fracture and a fracture of median wall of the left maxillary sinus.

Case presentation: We report an unusual clinical case of a 66-year-old Caucasian man, received emergency in the ENT clinic at the University Hospital "Tzaritza Joanna - ISUL" with work-related blunt orbital and facial trauma. A clinical examination and a computed tomography revealed a penetrating foreign body (tree branch split into three parts) from orbit in the left maxillary sinus, which is traversed the medial wall of the left maxillary sinus and penetrated the lower turbinate.

Conclusion: In indicated case, attached combined access allowed us to achieve an adequate exposure to remove the foreign body and perform reconstruction of the injured regions, leading to very good results if the anatomical and functional properties of the orbit and its contents are respected.

Careful consideration of detailed clinical history as well as choosing an appropriate medical imaging modality as computed tomography should always be kept in mind in order to have a prompt and adequate diagnosis and start early treatment to reduce complications.

cardio-vascular endurance in patients with COPD as it is less stressful and easier to apply compared to SMWT.

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INTRODUCTION

Because of its openness, the face is among the most exposed areas of various injuries. Due to technical progress and the rising intensity of modern life tends to a steady increase in injuries and fractures of the facial portion of the skull. According to the cause of getting the most common are those due to the assault, followed by road traffic accidents, falls, sports injuries, work accidents and etc. In frequency, the most common fractures in the middle facial segment are those of the Nasal bones, followed by those of Zygomaticomaxillary complex (ZMC) fractures, Lefort II fractures, multiple fractures and Lefort I fractures, Lefort III fractures and Naso-ethmoidal fractures and etc. Male patients outnumbered female patients by a 2:1 ratio. Their incidence is higher in adult males 20-30 years of age (Dell'Aversana *et al*., 2016; Gacto and De Espinosa, 2009; Septa *et al*., 2014; Sugamata and Yoshizawa, 2012; Sun *et al*., 2015). Burst type fractures were most often found than punched-out fractures. The surgeon inspects facial contour, palpates for bony step-offs and compares all fracture sistes with direct exposure. These methods are often limited by soft tussies edema and some times needs for additional to expose fracture sistes. Used diagnostic methods for pre- and postoperative evaluation of fracture management are clinical assessment and pre- and postoperative CT scan. In some clinics is used intraoperative CT scan justification. The management of isolated orbital blowout fractures is directed toward the two main treatable complication – change in globe position (enophthalmos and hypoglobus) and restrictive strabismus.

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Orbital floor fractures are usually the result of mechanical trauma. Decisions are based on the clinical examination and an orbital imaging studies. With subsequented examination we looked for signs and symptoms, consistent with orbital fracture. These include gross bony deformity, limitation of gaze, diplopia and malposition of the globe. The presence of any of the aforementioned symptoms should prompt further investigation using computed tomography to corroborate or refute clinical suspicion (Betts *et al*., 2014; De Marcos *et al*., 2008). Orbital fracture mandates referral to an ophthalmologist; initial management is dictated by the severity of functional symptoms, and may necessitate early surgical intervention. The most common symptoms associated with orbital floor fractures were ecchymosis and diplopia. Corneal abrasion was the most frequent positive ocular finding (Gacto and De Espinosa, 2009). Orbital emphysema tends to develop in fracture afferring the paranasal sinuses and walls of the orbit (De Marcos *et al*., 2008). The surgeons must be aggressive in identifying and treatining expansion of orbital volume. Patients usually difficult take 2 or 3 millimeters of post-traumatic enophthalmos and related hypoglobus. In any case when orbital imaging identifies significant expansion, greater than 2 cm^2 - large floor fractures or fractures that involve more than one half of the orbital floor our intervention will minimize the risk of late enophthalmos. Mid lower eyelid incision was the most common surgical approach to the orbital floor. (Gosau *et al*., 2011) Surgery must restore the orbital volume and requires careful isolation of stable bone on all sides of fracture and adequate fixation. Must in any case with a delicate handling and precise dissection to visualize soft tissues and fractures edges and restore the orbitl shape and volume. The inferiormedial orbit must be concave away. When orbital imaging studies identifyed of unadequate stable bone the use of rigid fixation must provide. The small fractures are well repaired with alloplastic or absorbable materials, but for larger fixation is required. In that case may use rigid materials such metal alloys, calvarial bone grafts and thick porous polyethylene. Mid lower eyelid incision was the most common surgical approach to the orbital floor. For orbital floor reconstruction, polydioxanone sheets – foil (0,15 and 0,25 mm.) were mainly used, followed by Ethisorb Dura in smaller fractures and titanium mesh in larger fractures in most cases. The resorbable polymers generate best results refferring to orbital floor fractures with size 200-300 mm^2 seem to generate best results. The titanium mesh generate best results refferring to orbital floor defects with size of 300-600 mm^2 (Dedhia and Tollefson, 2015; Foresta *et al*., 2015; Gacto and De Espinosa, 2009; Gosau *et al*., 2011; Krisha and Soumadip, 2015; Poeschl *et al*., 2012). In all cases in which we have infection, the autogenous materials will be more resistant to infection (Bande *et al*., 2015). There were some part of patients who showed postoperative complications: persisting motility impairment, enophthalmos, diplopia, ectropion, and orbital infection. Intraorbital hematoma represented the most severe complications, one patient suffered lasting impairment of sight and another one, complete blindness of the affected eye. If postoperative impairment of vision becomes evident, immediate surgical intervention is mandatory. Retrobulbar hematoma is more likely to occur in heavily traumatized patients with comminuted fractures and also in patients taking anticoagulative medication. The subciliary approach to the orbit and repeated operations by the same approach are associated with a higher risk of developing ectropion (Holtmann *et al*., 2016; Vasudev and Reddy, 2015). The goal of surgical treatment is the restoration of premorbid function and aesthetics for a complete functional rehabilitation.

Case presentation

A 66-year-old Caucasian man was examined in another health care center at first and then was referred to our hospital on the occasion of work-related blunt orbital and facial trauma. The incident happened at work - cutting wood 6 hours ago. The patient was brought conscious and in slightly impaired general condition. On initial review a wedged foreign body is seen near the inner eye angle stuck in the lower eyelid to left orbit and maxillary sinus and limited edema of the soft tissues in the area of the left orbit, and pain when trying to move the eyeball (Fig.1). Our clinical examination revealed no abnormalities of the facial contours and not palpate any bony step-offs. Ophtalmological examination was conducted and showed: right eye without pathological changes, left eye - swelling of the eyelids, no abnormalities in his left eye ball, eye movement and no evidence of diplopia and malposition of the globe. VOS=0.6, TOS=18, incipient cataract without any other abnormalities in the anterior and posterior segment. A conjunctival wound and a wound in the nasal part of the lower left eyelid were present, through which the wooden foreign body had entered into the maxilla. The wooden piece was protruding through the entry wound.

His pulse rate was 77 beats per minute, regular and blood pressure was 135/90 Hg. His body temperature was 36.9 C. He had sinus rhythm in electrocardiography (ECG). A hemogram and biochemical test results were follows: white blood cell count 15.3 g/l (3.5 to 10.5g/l), Glucosa 6.25 mmol/l (3.3-6.00 mmol/l). Computed tomography scan was performed and revealed a left orbital fracture which extended from anterior portion of the floor to the orbital apex with insignificant periorbital tissue herniation and muscular entrapment in left maxillary sinus hemosinus were observed (Fig. 2 A, B, C, D). A dense 7,5 cm long penetrating foreign body (tree branch) from orbit in the left maxillary sinus, which is traversed the medial wall of the left maxillary sinus and penetrated the lower turbinate. These findings showed a isolated orbital floor facture with a penetrating foreign body in a left maxillar sinus, and the patient underwent urgent combined access –a transmaxillary operation (trepanation maxillary sinus a modo Caldwell-Luc) and transconjunctival approach (expanding of inlet), allowed us to achieve an adequate exposure to remove foreign body and reconstruction of the injured regions. After removal of anterior wall of the left maxillary sinus were observed the foreign body and the floor bone fragments with torn periosteum pushed outside of the original bone orbit. There was no pus in his left orbit and maxillary sinus. A tree branch split into three parts was found. First dissection and we removed the thickest piece wedged in the back wall of the sinus. Then successively the pieces in a medial wall and a lower turbinate. Through this approach were reduced manually and accurately elevated all orbital soft tissues from the fracture site and that the bone segments are placed in proper position after abundant serum plus braunol® (ratio 2:1) lavage. Then on the lower wall of the orbit put at first SURGICEL® NU-KNIT (2,5x2,5 cm) and

spread on it CUTANPLAST® 30x20x10 mm. The left maxillary sinus wicking with cubes CUTANPLAST® DENTAL 10x10x10 mm. After revising the floor of the orbit reconstruction on the lower eyelid was performed. The skin flap was sutured with 6/0 silk and the conjunctiva with 8/0 coated Vicryl® (Ethicon). Parenteral double broad spectrum antibiotic therapy was started. On the second day of the surgery was performed postoperative computed tomography scan and hemosinus is showed on the left and correct shape of the orbital floor (Fig. 3). No postoperative complications were observed and patient was discharged from our hospital on the 7th day. The patient was clinically examined 10 days after surgery at the time of suture removal - swelling of the periorbital region was observed. At the second month after the surgery the swelling was resolved.

Conclusion

In indicated case, the surgical repair leads to very good results if the anatomical and functional properties of the orbit and its contents are respected. The applied strategy and means presented in our case report proved of value and can therefore be recommended. Diagnosis can be made only by detailed clinical history, physical examination CT scan. Early intervention performed in the first 12 hours of injury offers favorable outcomes. CT scan is important for the evaluation of periorbital injures. The foreign body can be observed distinctly on CT scan, which remains the most sensitive examination technique and should be the first imaging modality in such cases.

Conflict of interest

The authors declared no conflict of interest.

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