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Periocular foreign body: Two clinical cases with different management

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Abstract

Background: *In many cases, the presence of periocular foreign bodies continues to be a diagnostic challenge and a dilemma regarding their management in most cases. The key lies in the type of material of the foreign body and its location in the orbit to determine its management.* **Clinical cases:** *We present two cases of periocular foreign body; a description of the clinical presentation and their treatment are given in each case. A review and discussion of treatment is also included.* **Conclusion:** *It is important to know the indications for the medical and surgical management for periocular foreign bodies to offer an individualized and direct treatment for each patient.* (Gac Med Mex. 2017;153:107-11)
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KEY WORDS: *Intraorbital foreign body. Orbital trauma. Penetrating trauma. Periocular foreign body.*

Introduction

Of all trauma lesions on the periocular region, orbital trauma accounts for 15% of cases, with 78% of them being fractures, and out of these, 24% being foreign body-associated lesions and 1% retrobulbar hemorrhages. Traumas involving intraorbital foreign bodies are more common in patients younger than 30 years and affect mainly the male gender (78%)[1,2].

In the event of any trauma at the periocular region, advanced trauma life support principles should be followed: most important is life, and then the eye (organ and function). Once the patient's vital signs are stabilized, hemorrhage is controlled and neurological assessment is made, making a good interrogatory and establishing the semiology of the trauma mechanism is essential. Particularly in children, the presence of an intraocular or orbital foreign body should be suspected, especially in cases with rapid evolution, associated infection or structural disruption of continuity on the skin[3,4]. Ophthalmologic examination should be comprehensive and complete, including visual acuity (VA), globe integrity, anterior and posterior segment assessment, pupillary reflexes and ocular mobility. If there is no evidence of rupture or ocular damage, palpation and examination of bone structures should be performed to, subsequently, and depending on the degree of suspicion, order complementary diagnostic studies if the case warrants it[5].

Importantly, not all periocular foreign bodies should be removed; it will depend on the characteristics of the material and its localization, which will determine if an expecting, conservative attitude is maintained of if the foreign body is removed[5,6]. In addition, the fact that visual result will depend on the characteristics of the

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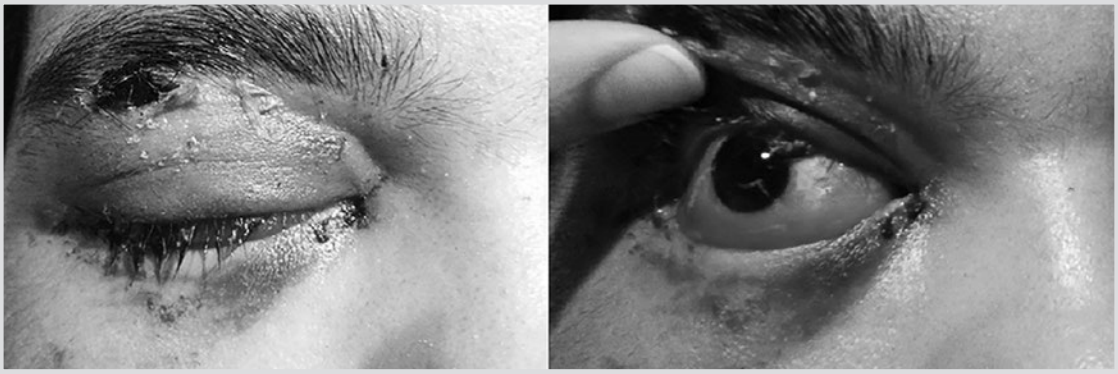

Figure 1. *On the right, a clinical image of the right periocular region is appreciated, showing the projectile entry site. On the left, right eye biomicroscopy is shown.*

foreign body and injury to other structures, as well as on the trauma mechanism and the provided medical or surgical treatment, should be taken into consideration.

Two cases are presented of patients with periocular trauma and foreign body, both with different management, according to the characteristics of each one of them.

Report of cases

Case 1

This is the case of a 31-year old male. He had received a gunshot to the right palpebral region during a robbery. He had been previously assessed and managed by the neurosurgery and maxillofacial surgery departments in another institution, which reported no hemodynamical or neurological involvement, and he was therefore referred to our institution for ophthalmologic management. The only important personal history findings were psychomotor retardation since childhood and epilepsy on treatment with carbamazepine.

On ophthalmologic examination VA was found to be lacking light perception on the right eye (RE), and 20/60 on left eye (LE), which corrected to 20/20. RE showed palpebral ecchimosis with periorbital edema, sutured wound on the ciliary region at the superior external level corresponding to the bullet entry orifice, eyelashes stuck together by dry secretions and some blood traces (Fig. 1). Bulbar conjunctiva showed 3+ chemosis and 360-degree hyposphagma, without scleral injury; clear cornea, without Descemet membrane folds. The anterior chamber was found with hyphema of less than 1 mm, flare 2+, presence of a pigmented inflammatory membrane, intact iris, arreflexic pupil with moderate mydriasis and clear crystalline (Fig. 1). Intraocular pressure was 18 mmHg on both eyes (BO). RE funduscopy showed attached retina, pale optic disc, splinter hemorrhages along the temporal arcades, subhyaloid hemorrhages on the temporal arcades trajectory, hole of approximately half the disc diameter at the foveal region and beneath the inferior temporal arcades on the posterior pole, and LE without alterations. Ocular movements were abolished on RE.

An orbital CT-scan was requested with bone and soft tissue window, with axial and coronal sections. Right orbit floor fracture with fat herniation and maxillary hemosinus was revealed on posterior coronal section (Fig. 2), in addition to an artifact corresponding to the metal foreign body (bullet) lodged in the ethmoid sinus, with some anterior and posterior shards. Optic and medial rectus nerves section is observed in the axial view (Fig. 3).

Considering the clinical findings, right eye nonexistent prognosis and CT scan findings revealing the metal foreign body location, the decision was made not to remove it and maintain the patient on close surveillance.

Case 2

This was the case of a 9-year old girl. Her mother referred growth of a RE mass over the 2 previous months. On previous history, the only detail standing out was the fall of a crystal glass near the girl 2 months prior to consultation, with the girl referring the sensation of a foreign body at that moment.

Figure 2. *Orbital CT scan, coronal section, bone window, where a metal foreign body (bullet) lodged in the right ethmoid sinus is observed.*

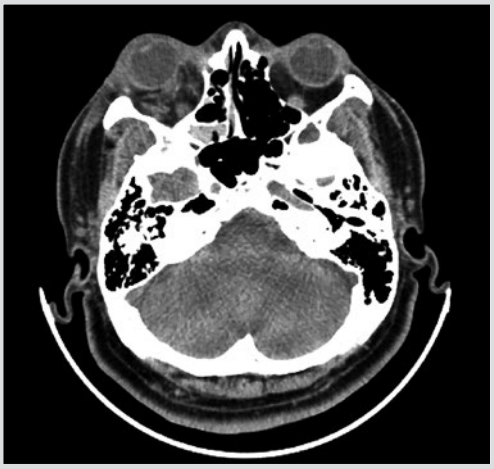

Figure 3. *Orbital CT scan, axial section, soft tissue window, where optic and medial rectus nerves section is observed.*

On ophthalmologic examination, 20/20 VA was found on BE. In RE, a conjunctival lesion was observed at the lateral superior sac bottom, mobile and with hard consistency, associated with hyperplasia of the conjunctiva (Fig. 4). Ocular mobility was normal. Intraocular pressure was 13 mmHg on BO, and funduscopy showed no abnormalities.

Orbital CT scan was ordered with axial and coronal sections, as well as soft tissue window, and in both sections, a hyperdense image was observed on anterior and right lateral orbit, close to the lacrimal gland, of similar density to the bone, without globe or extraocular muscle involvement (Fig. 5).

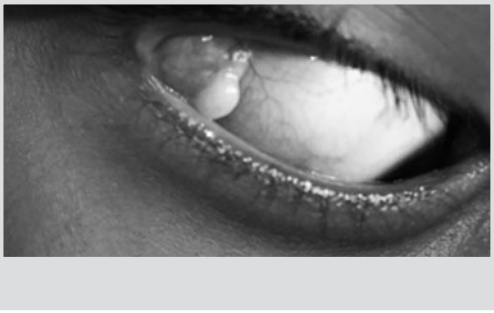

Figure 4. *Clinical photograph of right eye at infraduction. A foreign body is observed at the bottom of the temporal superior sac, inferior to the lacrimal gland.*

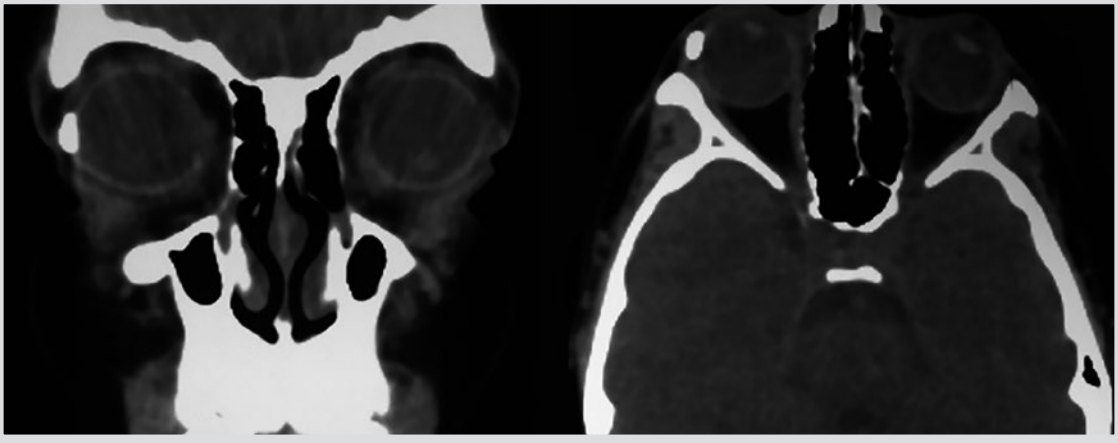

Figure 5. *CT scan, coronal section (right) and axial section (left), showing a foreign body (glass) lateral to the right globe.*

Table 1. Eye trauma classification

Type of injury	
Open globe	**Closed globe**
Rupture	Contusion
Penetrating injury	Partial thickness injury
Perforating injury	Superficial foreign body
Intraocular foreign body	Mixed
Mixed	
Zones	
Open globe	**Closed globe**
Zone I: cornea to limbus	Zone I: external; conjunctiva, cornea and sclera.
Zone II: from limbus to 5 mm behind	Zone II: anterior chamber to posterior capsule
Zone III: more than 5 mm posterior to the limbus	Zone III: behind the posterior capsule

(adapted from Birmingham Eye Trauma Terminology System)[12].

In this case, owing to the history, symptoms and clinical and CT findings indicating the presence of a periocular foreign body of inert origin, surgical extraction was decided.

Discussion

Periocular foreign bodies are the consequence of penetrating or perforating trauma, either high or low-energy lesions. They can produce considerable deformations to the orbit and its contents, or be innocuous and cause little damage, depending on the trauma mechanism[7-10]. Assessment for the presence of a foreign body must include detailed history taking, full ophthalmologic examination and imaging studies, either CT scan or magnetic resonance, always remembering that the latter is contraindicated in patients with suspected metal foreign body[7,9,11]. The ocular trauma classification must be borne in mind, since it may be associated[12] (Table 1). Once the suspicion of periocular foreign body is verified, the therapeutic decision to extract or observe it depends on a variety of factors such as its position, origin of the material, the likelihood of infection and clinical symptoms it produces[13].

As for the periocular foreign body type of material, it can determine if surgical treatment is required or not[14]. Since bullets and shard are inert inorganic material, they can remain in the orbit, whereas copper, iron, wood and vegetal materials should be extracted as they cause serious inflammatory reactions or toxicity that put eyesight at risk[15].

Retained foreign bodies have been associated with pyogenic infections, periostitis and fistula formation; cases of gas gangrene formation, development of tetanus, chronic sinusitis, meningeal infection or brain abscess if the cranial cavity is involved have also been described. In general, infectious complications can appear some time after the injury[10].

Another important point to decide if surgical extraction is requied is the foreign body localization: those protruding through the skin or located on structures adjacent to the orbit, such as the paranasal sinuses and cranial cavity (anterior and middle cranial fossa), in addition to those that may cause damage to the globe or optic nerve should also be extracted[12,13,16]. The possibility of metal foreign bodies migrating into the orbit should be taken into consideration; therefore, a patient may require extraction of a foreign body after many years[4].

In the presence of a foreign body it is always important assessing the risk of the surgical procedure at the moment of extraction, and practicing it in an operation room to achieve complete extraction. Surgical approach depends on the object's localization, with the most common being the entry wound. Markings on the wound trajectory should be profusely irrigated and devitalized tissues debrided[10]. During the surgery, electromagnets can be used to more easily locate metal

fragments[4]. Peralta et al.[14] summarized an algorithm for the management of patients with intraorbital foreign body, which starts with full systemic assessment and ruling out ophthalmologic emergency, such as globe rupture. Other important aspects include broad spectrum antibiotics administration and appropriate imaging study for identification of the foreign body[14].

Surgical management is not always required in these patients. Fulcher et al.[2] concluded that inorganic foreign objects located at the posterior level of the orbit should be conservatively teated unless they cause major orbital complications. Ho et al.[7] analyzed 43 patients treated over a period of 6 years with retained metal foreign body, out of which 37 had posterior localization, with a mean retention time of 2 years and without foreign body-related complications in 95% of cases where the eye remained intact[7].

Conclusion

The presence of a periorbital foreign body should be ruled out in all orbital traumas, owing to the possibility of serious inflammatory reaction, important visual loss or adjacent structures injury. However, depending on the foreign body material and localization, it can be well tolerated, without visual deterioration, and be conservatively treated with observation and periodic control, avoiding surgery and preventing the risk for iatrogenic eye injury. Therefore, it is important to know the clinical and surgical management indications when the presence of a foreign body is suspected, in order to offer individualized and directed treatment to each patient.

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