Multiple Intraorbital Glass Foreign Bodies

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ABSTRACT

It is frequently difficult to identify and localize intraorbital foreign bodies despite modern-day high-resolution imaging studies. Although there can be grave complications associated with retention of organic intraorbital foreign bodies, many believe that removal of such bodies in most cases is unwarranted. A high clinical suspicion, proper choice of imaging studies, and removal by a skilled orbital surgeon probably make the risk of surgical exploration and foreign body removal less than the risk of foreign body retention. We present a case of extracranal foreign bodies (11 glass particles), which required exploration for retrieval. An initial bedside exploration led to locating two foreign bodies (glass particles of 2×2 cm and 1×1 cm size respectively). A second exploration in the ophthalmology operating theater yielded 11 foreign bodies (glass particles of various sizes) in the superior area of extracranal space.

Keywords: Computed tomography scan, Foreign body, Intraorbital, Tarsorrhaphy.

How to cite this article: Deshpande S, Israni NA, Narayanam S, Dhiware N. Multiple Intraorbital Glass Foreign Bodies. MGM J Med Sci 2016;3(2):96-99.

Source of support: MGIIMS

Conflict of interest: None

INTRODUCTION

Recent years have been witnessing an increasing amount of traffic on the roads leading to increased risks for road traffic accidents (RTAs) to occur. India accounts for as high as 6% of the world’s RTAs, although it has 1% of the world’s vehicles. The RTA rate1 of 35 per 1,000 vehicles in India is one of the highest in the world and so is the RTA fatality rate2 of 25.3 per 10,000 vehicles. Traffic accidents were the cause of maximum number of maxillofacial injuries; most of the patients had injuries to the soft tissues of the face.3

Intraorbital foreign bodies usually occur after a high-velocity injury, such as gunshot or industrial accidents; more rarely they occur following trivial trauma. A retained foreign body can give rise to serious complications, the most devastating of which is loss of the eye. They can be classified according to their composition into (a) metallic, such as steel; (b) nonmetallic, which may be inorganic such as glass; and (c) organic, such as wood or vegetable matter. In general, metal and glass are well tolerated, and if not causing any symptoms or signs, may be left in situ, while organic matter like wood and vegetable matters are poorly tolerated, elicits an intense inflammatory reaction, and need to be removed urgently.4

A computed tomographic (CT) scan of orbit is the modality of choice for orbital foreign body detection and localization. Early surgical exploration and foreign body extraction greatly influence the visual prognosis and final outcome. Assessment through radiological images assists in the proper localization of the foreign body, estimation of its consistency and size, and evaluation of the response of surrounding orbital tissue. Additionally, it is useful in determining the integrity of the globe. The choice of imaging modality chiefly depends on the nature of the suspected foreign body. Plain film radiography is useful to localize radiopaque objects.5,6 However, plain films lack the capacity to demonstrate the object details, their exact location in relation to surrounding structures, and tissue response or damage. Computed tomographic scanning has therefore been recommended as the imaging modality of choice in this situation.7 Thin axial and coronal views of 1.0 to 1.5 mm cuts of the orbit are extremely useful to delineate the shape and for determining the composition of the foreign body.7 However, despite being highly sensitive and specific for detection of foreign bodies, CT scans may produce false-negative results, particularly if the size of the foreign body is less than 0.5 mm, and especially in the case of wooden objects. These are better seen with magnetic resonance imaging (MRI). However, an MRI is contraindicated if the suspected foreign body is ferromagnetic.

A full thickness loss of eyelid tissue leads to lagophthalmos and corneal exposure; aggressive lubrication with antibiotic ointments is instituted or a temporary tarsorrhaphy placed until definitive repair can be accomplished.8

CASE REPORT

A 29-year-old female presented to the emergency room after being involved in an RTA that resulted due to brake failure after which the car in which she was traveling crashed. Patient came with facial trauma along with head injury. Patient had a spell of loss of consciousness for...
2 to 3 minutes after the accident took place. There was no history of trauma elsewhere. On examination, patient was conscious, well oriented to time, place, and person. The vitals of the patient were stable.

On inspection, injury over the temporal area measuring 10×8×4 cm was noted along with exposed bone from the temporal region of the right side. Gross facial asymmetry was noticed. The temporalis tendon was exposed. There was compressed appearance of the right temporal part of the face toward midline. Orbicularis oculi loss was noted temporally. Bone deformity could not be assessed (Fig. 1).

Systemic Examination

Central nervous system – No focal neurological deficits were noted.

Respiratory sound – Normal vesicular breath sounds heard with bilateral equal air entry.

Cardiovascular system – S₁ S₂ sounds heard, no adventitious sounds heard.

Per Abdomen – Soft, nontender, no organomegaly, no guarding or rigidity.

Ocular Examination

Vision was finger counting at 3 m of both the eyes at bedside. Extraocular movements were full in all gazes without any pain or restriction for both eyes with good Bell’s phenomenon.

Anterior segment examination: Periorbital edema seen in both upper and lower eyelids of both the eyes, right eye more than left eye. Tissue loss noted on the lateral 1/3rd of both upper and lower eyelid of the right eye. Chemosis and subconjunctival hemorrhage present bilaterally. Pupillary reaction was normal with no afferent or efferent pupillary defects. Cornea appeared clear and corneal sensations present in all quadrants for both eyes, anterior chamber of normal depth and is quiet.

Posterior segment examination: Healthy optic disk with well-defined margins, cup disc ratio 0.3:1. Macula background and periphery were normal.

On palpation: Foreign bodies felt at the superior orbital margins. Two glass particles, one measuring 2×2×1 cm and the other measuring 1×0.5×0.5 cm, were retrieved. On further palpation, no foreign body could be felt. All bony margins felt intact.

Radiological Examination (Fig. 2)

Computed tomographic brain scan and orbit plain study showed the following:

- Four foreign bodies in the right parietotemporal soft tissue and within right orbit, anterosuperiorly in the extraconal compartments.
- Extraconal muscles and optic nerve appeared normal. It was found that the foreign bodies had high density values of 2000 HU (Hounsfield units).
- They are located superolaterally to the right globe.
- Significant loss of soft tissue lateral to the right orbit.

Hematological Investigations

Routine blood investigations are within normal limits.

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**Fig. 1:** Preoperative status. Note the loss of soft tissue and involvement of eyelids

**Fig. 2:** Computed tomographic scan of orbit (3 × 3 mm cut) showing four inert foreign bodies in the extraconal space right eye. Note the soft tissue swelling over the right temporal region
Treatment

Patient was started on Inj. Taxim 1 gm BD, Inj. Metrogel 100 cc TDS, Inj. Emeset 4 mg SOS, Inj. Dynapar 1 cc TDS, Inj. Pan 40 mg BD. IVF 1 pint DNS and 1 pint RL.

Daily dressing with saline-soaked gauze and bactigras.

Eye drop Vigamox 6 times/day, eye drops Soft drops 4 times/day, eye ointment Moxicip BD.

Plan of Action

- Exploration of the right extraconal space for foreign bodies.
- Temporary lateral tarsorrhaphy to prevent contracture after healing/granulation tissue formation.

Procedure

The patient was stabilized and was taken up for surgery as CT scan showed foreign bodies in the extraconal space of the right orbit. Exploration along with temporary lateral tarsorrhaphy was planned. On taking the patient for the exploration, no incision was required as the tissues targeted were easily accessible through the wound at the superior temporal region. As shown in Figure 3 we found three glass pieces. However, when we explored further deep below the orbicularis muscle, the forceps made a clinking noise indicating presence of more foreign bodies. On careful attempt, we were able to retrieve as many as seven glass pieces. When we made sure that no more foreign bodies were present, we closed the wound. As the posterior lamella and most of the anterior lamella was spared, we applied bolsters at the gray line after freshening the edges and performed lateral tarsorrhaphy with mersilk.

DISCUSSION

The clinical course of orbital foreign bodies differs depending on their composition. In our case, a piece of the foreign body had been removed after the initial trauma. Imaging and prompt exploration of the sinus may help in localizing and removing the foreign body. Computed tomographic scan showed foreign bodies in the extraconal space; however, CT imaging relies on the differing radiodensities of tissues for their differentiation. The radiodensity of glass is variable and may be similar to that of the orbital tissues, which may account for the potential difficulty of recognition. The CT appearances seem related to the interval between injury and examination. The MRI scans are better at demonstrating wooden foreign bodies. However, an MRI is contraindicated if the suspected foreign body is ferromagnetic. As we do not know the nature of foreign body in the extraconal space, MRI was not performed.

In conclusion, we would like to emphasize that intraorbital foreign bodies may often present a confusing clinical picture. It is important for the ophthalmologist, radiologist, and pathologist to include foreign body granuloma among the differentials of an intraorbital mass. It is imperative to seek past and recent history of trauma and maintain a high index of suspicion in all such cases, regardless of the interval between the trauma and current presentation.

The use of tarsorrhaphies to protect the eye in any injuries with extensive tissue loss is extremely controversial. Some surgeons believe that early tarsorrhaphies do not appear to prevent or decrease wound contracture and tissue replacement is the treatment of choice. Some surgeons perform a tarsorrhaphy early after trauma and leave it in place until the facial scars are matured believing it would prevent recurrent ectropion. It is uncertain whether combined tarsorrhaphy with skin grafting may help reduce the need for further skin grafting or recurrent ectropion. In certain circumstances, performing a small lateral tarsorrhaphy is advisable. This maintains lateral elevation and provides further blood supply to the lower eyelid.

CONCLUSION

On exploration, 11 glass particles of various sizes were identified and removed from the extraconal space (as in Fig. 4 inferring that the number of CT scans can be quite deceptive in judging the number of foreign bodies). The surgeon must always thoroughly explore the concerned area owing to this fact. Although in our case the foreign bodies were glass pieces, which are inert and can be left alone, meticulous exploration is demanded as noninert foreign bodies are dangerous when left inside orbit.
The distance between foreign bodies cannot be assessed through 3 mm axial and coronal cuts.

Removal of a foreign body will reduce chances of infection or an allergic reaction. Prompt removal of the foreign body will ensure that it does not migrate to other areas of the body, or enter blood vessels. A temporary lateral tarsorraphy will prevent skin contracture maintaining the contour and length of the eyelid until the time where definitive correction is due.

REFERENCES