TRAUMATIC EYE BALL DISPLACEMENT INTO THE ETHMOID SINUS

Kachemela, Jasmine[1]

[1] *Ophthalmologist, Ophthalmology Department, Iringa Regional Referral Hospital, Iringa, Tanzania*

ABSTRACT

Orbital wall fracture associated with traumatic eyeball displacement is rare, Displacement of the eyeball in the orbital wall fracture into the ethmoid sinus is even rarer. The present case report is focused on a 38years old lady who had a fracture of medial and floor of orbital walls with eyeball displacement into the ethmoid sinus following right eye trauma. She underwent surgical correction 9days after the injury. Good visual outcome was not achieved as expected due to severe optic nerve damage. Although visual acuity did not improve fully postoperatively, the patient was fully satisfied from the cosmetic point of view.

Keyword: - *Eyeball Displacement, Ethmoid sinus, Orbital bone fracture, Optic nerve*

1. INTRODUCTION

Traumatic globe dislocation to the paranasal sinuses is quite uncommon. This form of injury commonly occurs as a result of a high energy trauma and traffic are being reported as the main cause of the traumatic globe luxation [1]. Displacement of the globe into the paranasal sinuses can be explained by mechanism of blowout fracture. When strong blunt forces are applied to the globe fracturing, the thin orbital walls displace the globe. Direct orbital trauma with fractures of medial and floor walls displacing the globe into the paranasal sinuses proved to be the most common cause of traumatic globe luxation [1][2][3]. Saving the eye in these circumstances is very challenging. Visual prognosis is generally poor in such cases since the retina and optic nerve are at high risk of the injury and ischemia, although recovery of a normal vision has been reported in some cases complete loss of vision representing the most serious complication. [10][11][12][13]

The present case report aims to describe a rare case of traumatic eyeball displacement into the Ethmoid sinus, coupled with an orbital bone fracture, in a woman. The incidence occurred in Dar es Salaam, Tanzania in the year 2020 and the patient was attended at Muhimbili National Hospital (MNH). Although cases of displacement of the eyeball into the maxillary sinus has been reported, to the best of my knowledge, there has been no previous report of displacement of the eyeball into the ethmoid sinus reported at MNH.

2. CASE DISCRIPTION

A 38yrs old female presented at emergence department with history blunt right eye trauma after a branch of coconut tree fell on her face while she was seated under the tree. This was associated with eye pain, decreased vision, eyelid swelling and bleeding from the upper eyelid and nose.

Initial physical examination 4hrs after the injury the patient was fully conscious and had facial asymmetry. On Ocular examination, the visual acuity was light perception (LP) on the Right eye, the eyelids were swollen with ecchymosis and complete ptosis, full thickness vertical upper eyelid margin laceration extending about 8mm to the posterior lamella and it is located about 15mm from the medial canthus, with severe enophthalmos (**figure1**). There was no emphysema neither infraorbital hypoesthesia noted. The Left eye had normal findings.

Computerized tomography (CT) scan of the orbit and paranasal sinuses was done and revealed fracture of the medial and floor of the right orbit with partial displacement of the intact globe into the right ethmoid sinus. (**figure 2**)
The patient was taken to theatre 9days post trauma in collaboration of members from Otorynolaryngology. Endonasal Endoscopic eyeball repositioning was performed with an objective of restoring visual function and improving cosmetic appearance. After uncinectomy and maxillary anstrostomy the eyeball could gently be pulled up

using muscle hook and conjunctiva forceps and pushed up under nasal endoscopic guidance. The globe appeared to be intact with clear cornea and intact extraocular muscles. The maxillary and ethmoid sinuses were secured by a piece of plastic material like titanium mesh with a pressure pack of Vaseline gauze.

Fig -1: Absence of the eyeball in the right socket

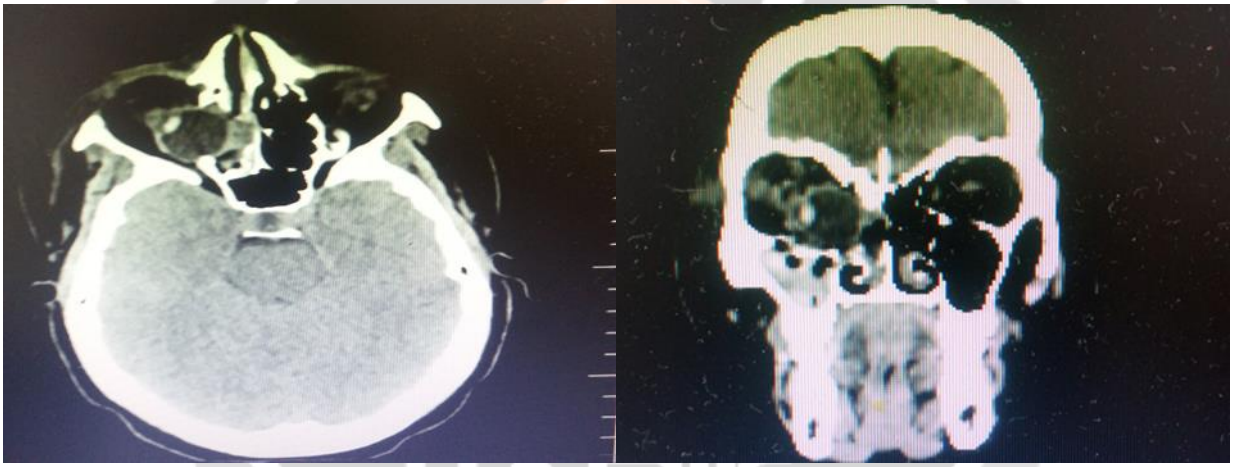

Fig -2: a) Axial CT scan showing right medial wall fracture with globe in the ethmoid sinus b) Coronal CT scan showing floor and medial wall fracture with right maxillary sinus effusion and dislocated right globe into the orbit

Post operatively the patient was prescribed with Injection Dexamethasone for 48hrs then to continue with prednisolone tabs in a tapering dose for 4weeks, injection Augumentin, chloramphenicol eye ointment and Dexamethasone-chloramphenicol eye drop and analgesics for pain relief, with an addition of Zincovit.

After 24hrs the VA was Hand movement (HM), right eye showed RAPD with extraocular muscle movement being fully restricted in all direction of gaze. Corneal sensation was normal and there was no infraorbital hyposthesia noted.

7days later the VA improved to CF at 2metres, there was no extraocular muscle movement in all direction of gaze, the fundoscopic findings revealed moderatel optic disc pallor indicating optic nerve damage. The control CT scan of the orbit and paranasal sinuses was also done and showed thickening of the right optic nerve and recti muscles.

One month later the patient was seen at outpatient ophthalmology clinic the VA was still CF at 2metres but there was quite improvement where the patient could at least control the opening and closing of the eyelids, however the extraocular movement was minimally appreciated. She was scheduled for another follow-up in 3month.

3. DISCUSSION

The eyeball is suspended within the orbit by the suspensory ligament of Lockwood, lateral and medial check ligaments, and supported by a bed of orbital fat. Even in large orbital fractures, the resultant enophthalmos is caused by the prolapse of orbital tissue and extraocular muscles into the adjacent sinuses; the globe remains in its normal position but in cases of severe injuries with sufficient force can disrupt this soft tissue protection and cause the globe to herniate or subluxate.

Several mechanisms of orbital fracture have been suggested to result in eyeball displacement into the sinuses. These include the hydraulic mechanism, in which the fracture is caused by elevated intra orbital pressure, the buckling mechanism, in which the fracture occurs when the force is applied in the inferior orbital rim, and the globe-to-wall contact mechanism, in which the fracture occurs when the eyeball makes direct contact with the orbital wall. [1][2][3].

In the present case the most likely mechanism of orbital floor and medial wall fracture is the hydraulic mechanism. However, it is very difficult to identify the precise mechanism(s) involved in individual clinical cases. Therefore, almost all orbital blowout fractures may be due to a combination of these three mechanisms.

However, there are some reports of cases of orbital blowout fractures which appear to have arisen via a pure, single mechanism, although they are very rare. [4][5].

In this case the possibilities of poor visual prognosis are very high due to severe optic nerve injury and late eyeball repositioning that could also contribute to the optic nerve injury, although recovery of a normal vision has been reported in some cases [6][7][8].The possible mechanism of the optic nerve injury is assumed to be stretching, rotation, and kinking of the nerve fibers causing mechanical damage to the nerve and a possible ischemia due to shearing of vessels and vascular compression.

Additionally, in the present case, whether or not the eyeball should be removed was also discussed, but since CT scan findings were not suggestive of damage to the eyeball itself, it was judged that there was still the possibility of recovery of sight. Since it also appeared from intraoperative findings that the extraocular muscles were preserved, the decision was made to preserve the eyeball. Ultimately, ocular movement was not restored, and this may have been due either to damage to the nerves governing the extraocular muscles, as identified by Kang et al. [9] or damage to the extraocular muscles themselves as a result of hyperextension.

4. CONCLUSIONS

This is a rare case of traumatic globe dislocation into the ethmoid sinus in which the patient regained satisfactory cosmesis and partial visual recovery after undergoing globe repositioning. This is to stress that traumatic globe dislocations should be treated as an emergency and patients be taken up for repositioning immediately to increase chances of good visual recovery. Cases such as this are encountered extremely rarely, but carrying out simulations under normal circumstances may be helpful for their appropriate management.

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