CASE REPORT

Traumatic Globe Displacement Into Anterior Cranial Fossa

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ABSTRACT

A 64-year-old Malay gentleman alleged occupational injury when a malfunctioned metal hydraulic door hit on his face while unloading sand from his tipper-truck. Post-trauma, he complained of right eye (RE) pain and total loss of vision. On examination, noted RE visual acuity was unable to be assessed and left eye (LE) was 6/24 with pinhole 6/9. No eyeball could be seen in the right socket with superior orbital rim step deformity and left periorbital haematoma. Computed tomography scan of the brain and orbit confirmed displaced right eye globe into the right anterior cranial fossa with right and left multiple orbital wall fractures. He then underwent successful right eye globe repositioning. Traumatic orbital roof fracture is a rare condition. Repositioning of the eye globe was done to salvage the eye globe for a cosmetic reason and to avoid localised inflammatory reaction at the anterior cranial fossa.

Keywords: Head injury, Traumatic globe displacement, Orbital roof fracture

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INTRODUCTION

Traumatic dislocation of the eye globe into the anterior cranial fossa is an unusual condition and the need for immediate surgical intervention is indicated (1). Orbital floor fractures are seen quite commonly during trauma (2). Roof fractures are usually associated with other orbital wall fracture and result from craniofacial injuries (3). Several case studies reported that, males were presented with higher incidence (1). In the present study, we report a rare case of traumatic displacement of the eye globe into the anterior cranial fossa and its surgical approach.

CASE REPORT

A 64-year-old Malay gentleman with no comorbid, presented to the emergency department of Hospital Universiti Sains Malaysia due to alleged occupational injury. A malfunctioned heavy metal hydraulic door hit on his face while unloading sand from his tipper-truck at the workplace. He had no loss of consciousness. Post-trauma, he complained of right eye (RE) pain and total loss of vision. On examination noted RE visual acuity was unable to be assessed and left eye (LE) was 6/24 with pinhole 6/9. No eyeball could be seen in the right socket (Fig. 1) with superior orbital rim step deformity and left periorbital haematoma. The left eye globe

Figure 1: No eyeball could be seen in the right socket

was intact with subconjunctival haemorrhage. Other anterior and posterior segments examination of LE were unremarkable. The LE intraocular pressure was within a normal range. Diagnosis of right eye globe displacement with orbital wall fracture was suspected. Computed tomography scan of brain and orbit confirmed displaced right eye globe into the right anterior cranial fossa with right roof, lateral, medial and floor orbital wall fractures (Fig. 2a and Fig. 2b) and left floor, medial and lateral orbital wall fractures.

He then underwent surgery with a multidisciplinary approach with the involvement of the neurosurgical, oral maxillofacial (OMF) and ophthalmology teams. He underwent frontal bone craniotomy performed by the neurosurgical team. The right frontal lobe of the brain was displaced posteriorly for better exposure of the eyeball. The eyeball was identified and its surrounding

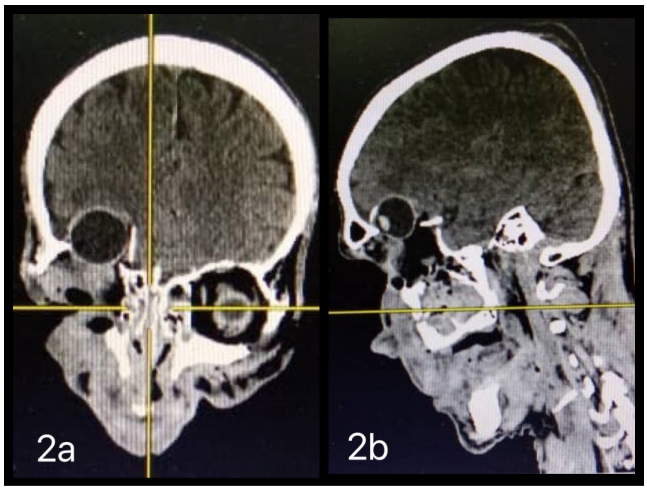

Figure 2: (a) Coronal view of computed tomography scan of the brain and orbit noted displaced right eye globe into the right anterior cranial fossa with orbital wall fractures. (b) Sagittal view of computed tomography scan of the brain and orbit noted displaced right eye globe.

extraocular muscle, optic nerve and other soft tissue. The opening on the fractured roof of orbit was identified and the surrounding opening was protected using malleable metal protectors. At the same time with the help of OMF team, the bony deformity on the right lateral orbital wall was reduced to increase the orbital volume. Only then the right eyeball was able to be pushed back into the orbital cavity from the anterior cranial fossa gently using fingers.

Examination under anaesthesia was done and ointment chloramphenicol was applied. Intraoperatively, the eye globe was still outside the dura layer of the brain and the eye globe was intact with no cornea scleral laceration wound seen. However, the extraocular muscle and optic nerve were unable to be visualised (Fig. 3) . Postoperative day one, the right eye visual acuity was no perception to light, generalised corneal oedema and very minimal extraocular movement (Fig. 4a) . B scan findings showed flat retina with no vitreous opacities. The patient was discharged well after several days of monitoring. The patient was seen in the clinic after two weeks of surgery. The patient had RE complete ptosis and there was no improvement in extraocular

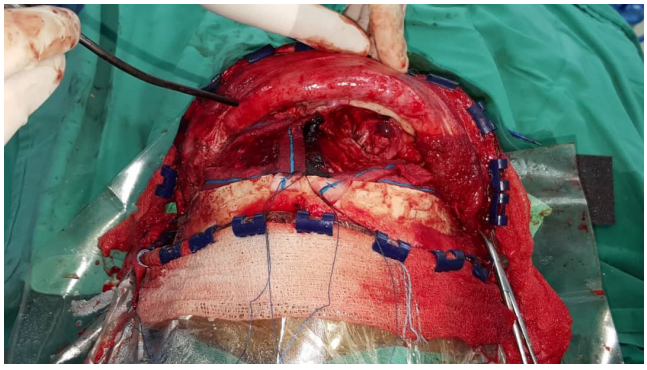

Figure 3: Intraoperative findings of right eye globe in the anterior cranial fossa.

Figure 4: (a) Post-operative day 1 showing generalised corneal oedema. (b) Complete ptosis of the right eye.

movement (Fig. 4b) . There was no sagging of eyeball and remained stable in the orbital cavity. The anterior segment showed improvement in corneal oedema and lens appeared cataractous.

DISCUSSION

There were very few case reports reported on traumatic globe displacement into anterior cranial fossa. Anatomically, the orbital roof partitions the anterior cranial fossa from the orbit (4). It is constructed by the orbital plate of the frontal bone and the lesser wing of the sphenoid (4). The orbital roof is hairline at the frontal sinus (3). Orbital roof fractures occur as a part of severe craniofacial injuries. During trauma, the thin bone between the frontal sinus and the orbit offers a line of mechanical weakness to the sudden increase in intraorbital pressure leading to the displacement of the globe (5).

Diagnosis of displaced eye globe can be evaluated clinically by inspection and palpation. Radiographs may contribute to the detection of orbital wall fracture and extent (4). However, X- rays do not assist in seeing soft tissue structures in detail. The gold standard investigation for this condition is coronal CT scanning of the face and orbit (3). Proper assessment of the extent of damage is essential to plan the surgical approach. Nonetheless,

the best way to assess is during full surgical exploration (4). Immediate surgical treatment is indicated to avoid ischemia of the herniated structure. Vision did not improve in this case, but we could salvage the eye globe and prevent the disfigurement. This condition is often managed via a multi-disciplinary approach with neurosurgery and OMF expertise (3).

Several complications have been encountered in this case. The early complications were a total loss of vision and limited extraocular muscle movement, which may be due to total optic nerve cut and disinsertion of the extraocular muscle from the eye globe. Besides that, there was hyphaema which in this case the blunt trauma caused injury to the uveal vasculature. Corneal oedema and cataract occurred possibly due to disruption in the transparency physiology secondary to trauma. Complete ptosis of the right eye occurred possibly due to injury to the levator palpebra muscle. The late complications as last seen on follow-up 3 months postoperative were right eye esotropia.

CONCLUSION

Traumatic orbital roof fracture is a rare condition, as it is one of the strongest bone in the orbit. Significant force may cause eye globe displacement to the adjacent space. Repositioning of the eye globe was done for a cosmetic reason and to avoid localised inflammatory reaction at the anterior cranial fossa. Therefore, it is crucial to be aware of all clinical findings and an appropriate individualised approach should be applied.

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