Injury Extra (2008) **39**, 356–358

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CASE REPORT

Traumatic globe dislocations—Significance of early intervention

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Accepted 23 June 2008

Background

'Time' is a major modifiable factor in the management of traumatic globe dislocations. An eye dislocated out of the orbital socket is under serious vascular compromise and sustains severe mechanical damage. Often these patients have associated facial injuries or polytrauma. Salvaging the eye in this situation is a surgical challenge. Visual prognosis is generally poor in such cases since the retina and optic nerve (ON) are very sensitive to the injury and ischaemia. But ocular movements can be restored with an early intervention.

Very few cases of globe dislocations into the ethmoid sinuses have been reported.[1–4] They were mostly noted in the male patients involved in outdoor activities. We describe the experience of an unusual case of domestic trauma leading to orbital fractures and globe luxation into the ethmoid sinuses in a young woman. This report emphasises the importance of early surgical repair of orbital fractures and globe retrieval to regain the maximum amount of ocular functions.

Case report

A 30-year-old Afro-Caribbean woman was presented with visual loss, pain and bleeding from the right eye following a fall in the bathtub and hit on the metallic tap. On examination the right eyeball was absent from the socket, which was filled with blood clots and conjunctival tissue (Fig. 1). Only a superficial skin laceration was noted on the upper lid. A CT scan confirmed wide fractures of the floor and medial wall and globe dislodgment into the ethmoid sinuses. (Figs. 2–3)

The ophthalmology and maxillofacial teams have carried out the joint surgical repair. The eyeball was retrieved by

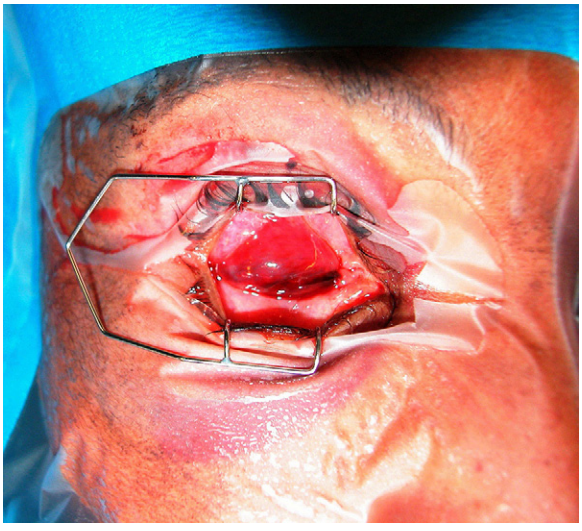

Figure 1 The missing globe: the right anterior orbit showing boggy conjunctiva and blood clot.

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1572-3461
doi:10.1016/j.injury.2008.06.020

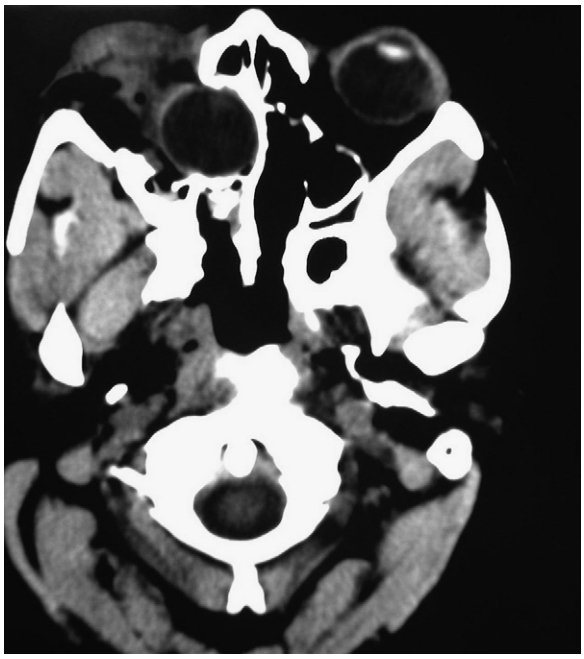

Figure 2 Axial CT scan showing right globe dislocation into the ethmoids sinuses.

gentle traction through the conjunctival sac and easily repositioned into the socket. A corneal abrasion and small conjunctival tear were noted during the operation but the remaining eyeball coats were intact. Medial wall and floor were approached through the Lynch and subciliary incisions respectively and the large bony windows were sealed with titanium meshes. Systemic steroids (30 mg prednisolone p.o.) and antibiotics (co-amoxyclav 625 mg. TDS. po.) were administered in the pre and postoperative periods. Post-op CT scan confirmed the safe globe position after the repair (Fig. 4). On later follow up examinations the affected pupil was noted middilated and light insensitive, and fundoscopy revealed extensive retinal oedema with ON swelling. Four months later, the eye has regained good motility in all directions but remained divergent.

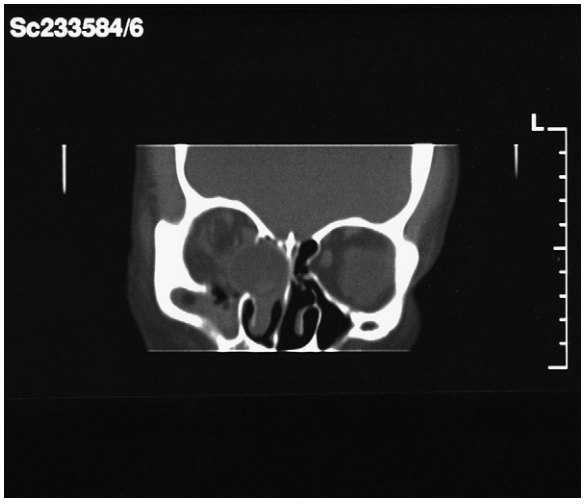

Figure 3 Coronal CT view showing medial wall and floor fractures.

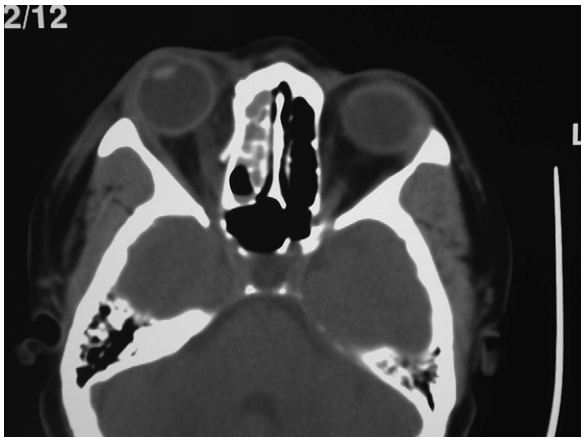

Figure 4 Post-op CT scan showing globe in normal position.

Discussion

In a severe blunt eye trauma, the rigid orbital walls take the brunt of the injury and fracture to disperse the forces so that the globe and soft tissues are spared. The periglobal structures such as the vessels, muscle cone and orbital fat cover and cushion the globe and ON, rather, ''*bubble-wrap*'' them. The coats of the eyeball and its contents are elastic hence they normally regain their shape and function when deformed. This arrangement protects these soft tissue structures in orbital fractures. The ON has an excess 'reserve' length of 8 mm inside the orbit, which saves it in the event of huge proptosis and globe displacements. But the orbital vessels are relatively inelastic and easily rupture leading to orbital haemorrhage and secondary increase in tissue pressure.

The CT images of our case have showed the axis of the displaced globe making an angle of approximately 30° with the mid-axial line. This position denotes that the ON is under tension due to its altered course. The broken medial wall spurs were seen impinging on the nerve just below the globe. Its retrobulbar part was found squashed between the globe and medial wall spurs (Fig. 2). The possible mechanisms of ON injury in our case were:

1. Sectioning of the nerve fibres by the bony spurs.
2. Stretching, rotation and kinking causing mechanical damage.
3. Ischaemia due to shearing of vessels and vascular compression secondary to the increased intraorbital pressure.

The ON is a portion of the central nervous system. Its injury is the main reason for the loss of vision in traumatic globe displacements, other important reasons being concomitant retinal ischaemia and oedema. Being a sensory tract it is not covered by the neurilemma, therefore, there is no regenerative potential when severed and any resulting visual loss will be permanent. The major nerve damage '*primarily*' happens in the initial event of injury probably due to the mechanical fragmentation of nerve fibres. Ischaemia and raised tissue pressure secondary to oedema and haemorrhage produce '*secondary*' damage, which is reversible with prompt surgical relief to a certain extent. This is critical for the viability of the remaining fibres.

Our patient underwent surgery 14 h following the incident. The Primary injury has produced extensive nerve damage and retinal ischaemia, and the delayed surgical relief made it irreversible. Nevertheless, the eye has regained significant motility in the first few months. This resumption could be due to the recovery of orbital nerves from the neuropraxia that is attributed to the globe restoration within 24 h. Early surgical repair also prevents excessive adnexal tissue scarring, which can prevent later enophthalmos and motility disturbances that can cause significant cosmetic disfigurement. The disparity in the sustainability of the ON and the other orbital nerves is thought to be due to the variations in the type of the fibres, their structures, position, course, soft tissue cover and blood supply. The late divergent position of the eye is due to the visual loss.

From the study of previous similar (ethmoidal globe diplacements) published reports, it seems that an early surgical intervention appears to play a critical role in restoring ocular functions. Of the four reviewed cases, three had total visual loss, which was apparently due to the delay in presentation and subsequent repair.[1,2,4] Interestingly one case demonstrated good visual revival that was attributed to the prompt globe restoration performed within the first 6 h.[3] This finding also highlights the importance of early surgical correction in traumatic globe dislocations.

When dealing with the eye injuries in a busy A&E set up there is a natural focus on the associated head and facial trauma, as a result precise orbital scanning is often ignored. Specific requests made for the orbital sequences of CT imaging in the first chance will minimise the need for further scans and avoid undue delays before surgery. Early involvement of the ophthalmologists in the management of ocular trauma can hasten the care pathway and may uphold the visual potential of the eye. An organised, perhaps protocol driven, multidisciplinary team approach comprising of the maxillo—facial and ENT specialists will optimise the results.

Conclusion

Traumatic globe luxation usually results in a profound visual loss and restriction of ocular movements. An early surgical intervention significantly reduces the ocular morbidity. Restoration of the eye movements and orbital volume could be aesthetically and emotionally acceptable to the patient as a minimum, if function could not be restored with the best possible efforts.

Acknowledgements

Our sincere thanks to Dr. Omar Yaqoob and Dr. Pavan Kumar Avadhanam for their valuable help in preparing this manuscript.

Financial support: None.
Proprietary interest: None.
Meeting presentations: None.

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