

Timing of surgery in traumatic globe dislocation

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Traumatic globe dislocation into the maxillary sinus is a rare event and usually associated with a poor visual outcome if not managed appropriately. We report a 45-year-old female patient

who presented to the emergency after blunt injury to her face with a door. Initial evaluation revealed nil perception of light and an apparently anophthalmic socket. Neuroimaging revealed large floor and medial wall fracture with dislocation of the globe into the maxillary sinus. The patient underwent exploration with repositioning of the globe and fracture repair. She was also administered 1 g intravenous methylprednisolone along with tapering course of oral steroids for 3 days. Patient's final visual acuity at 18 months of follow-up improved to counting fingers at 1 m. A thorough review of the literature suggests immediate surgery might improve the final visual outcome in such cases.

Key words: Blunt trauma, globe dislocation, stretch optic neuropathy

Orbital fractures following blunt trauma are common, but concurrent globe dislocation is extremely rare. Usually, such an event is associated with profound visual loss. Review of the literature yielded 25 such cases with only eight patients reporting complete or partial visual recovery.^[1-8] We report a case of traumatic globe dislocation with partial visual recovery. We also reviewed the literature for the mechanism of injury,

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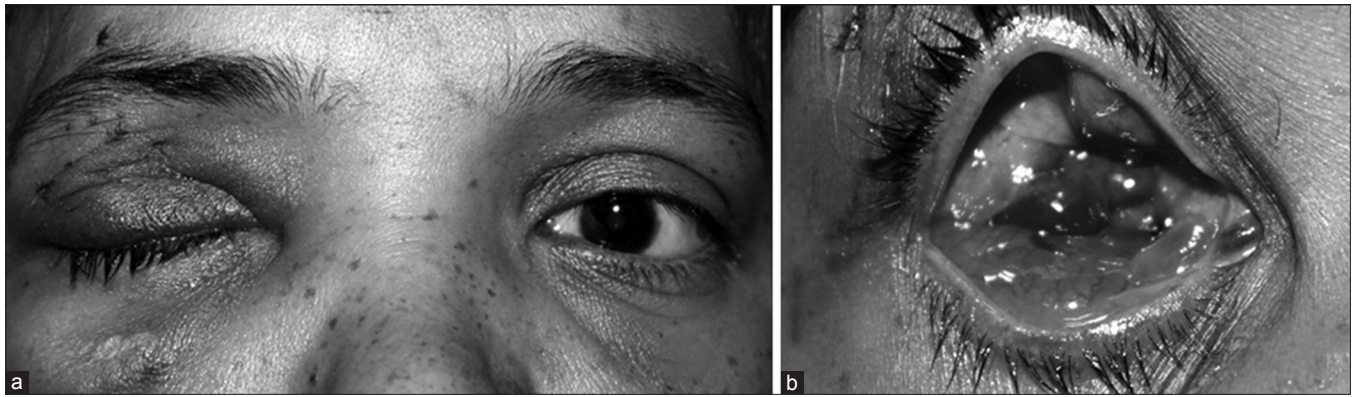


Figure 1: (a) Clinical photograph of patient at presentation showing complete right traumatic ptosis, (b) absence of globe in the right socket

timing of surgical intervention, and final visual outcome in cases of traumatic globe dislocation.

Case Report

A 45-year-old school teacher presented to our emergency services 3 h after a door accidentally fell on the right side of her face. She had an episode of bleeding from the nose and few episodes of vomiting. On examination, the patient was conscious and responsive but mildly disoriented. There were multiple superficial abrasions over the right side of her face. Examination of the right eye showed complete ptosis with no evidence of the globe [Fig. 1a and b]. The patient denied any perception of light in the right eye. Computerized tomography and Magnetic resonance imaging scan revealed a fracture of the floor and medial wall of the right orbit and a herniated right globe into the maxillary sinus with no major intracranial injuries [Fig. 2a-d]. The left eye was within normal limits. The patient was taken up for exploration and globe repositioning along with fracture repair 3 days after stabilization of neurological status. The floor was approached through a transconjunctival inferior forniceal (swinging eyelid) incision, and the fracture site, as well as the herniated globe, were identified. The globe appeared to be intact with the clear cornea and intact extraocular muscles. The eyeball was gently lifted and supported by a blunt spatula, then repositioned in the socket. The fracture site (floor + medial wall) was repaired with a prefabricated titanium plate. Forced duction test was negative at the end of surgery. The patient could perceive light in the immediate postoperative period. Right eye showed relative afferent pupillary defect and extraocular movements were grossly restricted in all directions of the gaze. Visual evoked potential showed nonrecordable wave form. The patient was administered 1 g intravenous methylprednisolone (IVMP) daily for 3 days and discharged on a tapering dose of oral steroids (starting at 1 mg/kg body weight). At 1 month of follow-up, the patient could discern hand movements with her right eye. The patient was reviewed periodically and at her last follow-up 18 months after the accident, visual acuity had improved to counting fingers at 1 m. Her extraocular movements had markedly improved in all directions of gaze with minimal restriction, with a small right exodeviation. There was no residual enophthalmos [Fig. 3]. Fundus examination revealed right optic disc pallor. The patient was satisfied with the final cosmetic outcome.



Figure 2: (a) Axial computerized tomography scan showing right medial wall fracture, (b) coronal computerized tomography showing floor and medial wall fracture with dislocated right globe, (c) axial magnetic resonance imaging image showing the globe in the maxillary sinus, (d) coronal magnetic resonance imaging showing dislocated globe into the maxillary sinus

Discussion

The globe 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. Severe injuries with sufficient force can disrupt this soft tissue protection and cause the globe to herniate or subluxate.^[1-8] Review of the literature revealed 25 cases of traumatic globe dislocation into the sinuses, only eight of whom regained complete or partial vision^[1-8] [Table 1].

Of the eight, six patients had no record of pre operative visual acuity; two had no perception of light, whereas one

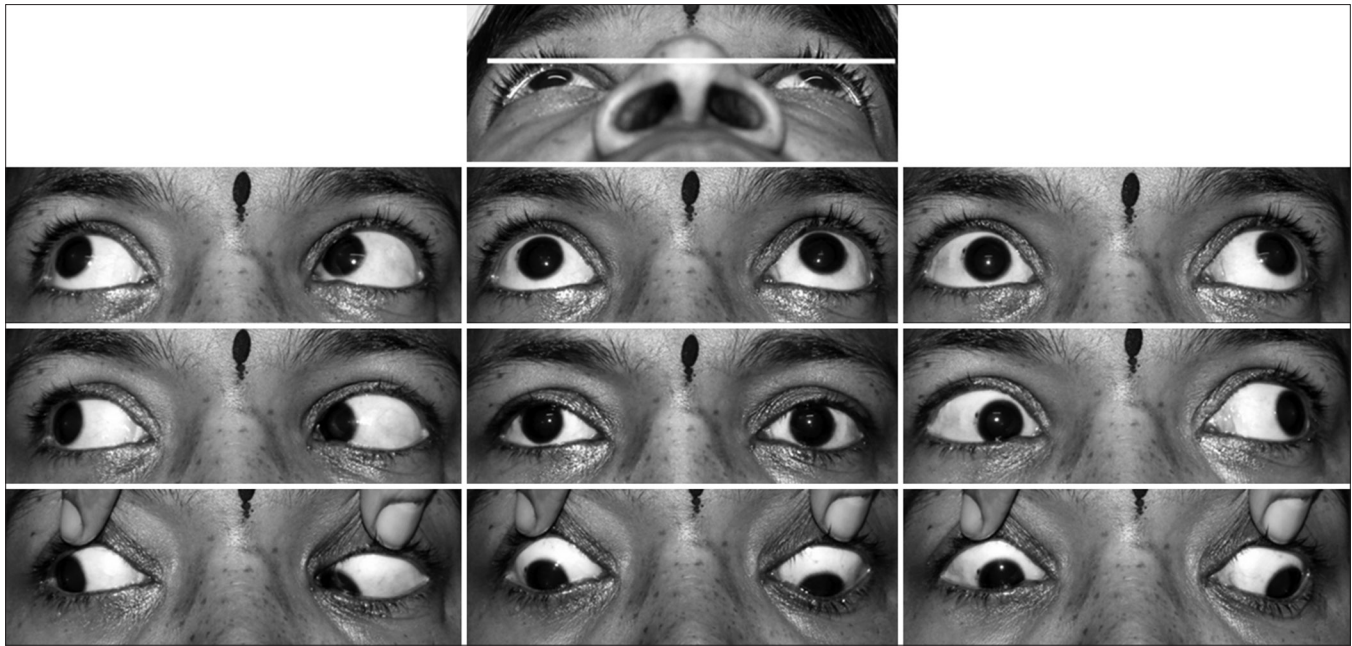


Figure 3: Postoperative clinical picture: Composite photograph showing ocular movements of the patient with mild limitation of adduction and right exodeviation. Upper central (worm’s hole view) photograph demonstrates lack of enophthalmos

Table 1: Case studies with documented partial or complete visual recovery following traumatic globe dislocation

Author	Year	Mechanism of injury	Time interval between presentation and surgery	Preoperative vision	Final visual acuity	Pulse IVMP
Amaral and Nery ^[1]	2016	Blunt trauma by gym weight	4 days	NA	20/50	High dose steroids
Zhang-Nunes <i>et al.</i> ^[2]	2012	Blunt trauma with bike handle bar	Immediate	No PL	20/20	250 mg, every 6 h for 3 days
Damasceno and Damasceno ^[3]	2010	Contusion, profession related injury	Immediate	NA	20/20	NA
Ramstead <i>et al.</i> ^[4]	2008	Injury during bull fight	Immediate	NA	20/200	NA
Muller-Richter <i>et al.</i> ^[5]	2007	Injury by a farming machine	Immediate	PL	20/20	NA
Ziccardi <i>et al.</i> ^[6]	1993	Road traffic accident	NA	NA	20/40	NA
Berkowitz <i>et al.</i> ^[7]	1981	Fist injury	1 day	PL	20/20	NA
Stasio ^[8]	1976	Fire hose injury	NA	NA	20/60	NA
Present report	2017	Blunt trauma by door	3 days	No PL	CF at 1 m	1 g daily for 3 days

NA: Not available, PL: Perception of light, CF: Counting finger, IVMP: Intravenous methyl prednisolone

patient could perceive light at presentation. Six of these patients were taken up for surgery for globe repositioning the same day, and three of them regained a visual acuity of 20/20. Only one report mentioned the use of pulse IVMP, 250 mg every 6 h for 3 days. Our case presented to us with no perception of light and was taken up for surgery after 3 days due to neurological compromise. She was treated with 1 g IVMP for 3 days followed by tapering dose of oral steroids and regained a vision of counting fingers at 1 m at her final follow-up.

Traumatic optic neuropathy associated with traumatic globe dislocation can be either direct (avulsion, transaction, optic nerve sheath hemorrhage, orbital hemorrhage, and orbital emphysema) or indirect (crush or stretch).^[9] None of the cases discussed above had any evidence of direct

optic nerve trauma, and stretch optic neuropathy appears to be the most probable cause responsible for visual loss at presentation. Soni and Johnson have demonstrated the effects of stretch optic neuropathy in thyroid eye disease (TED) and have concluded that it initially presents as neuropraxia with temporary visual loss and can lead to blindness if left untreated.^[10] The time duration they calculated for stretch optic neuropathy to cause complete blindness was 785 days from onset of visual symptoms. The same may not hold true for traumatic globe dislocation since the amount of stretch is quite sudden and severe in these cases when compared to the gradual stretch caused by exophthalmos in TED. Hence, immediate repositioning of the globe following trauma might be advantageous for visual recovery. The role of mega dose steroids in such cases is controversial, but they are often

employed in the last ditch effort.^[2,3] High dose steroids might restrict cell-mediated inflammation and limit free radical amplification of the injury response.^[9]

Conclusion

We report a rare case of traumatic globe dislocation in which the patient regained satisfactory cosmesis and partial vision after undergoing globe repositioning. We recommend that traumatic globe dislocations be treated as an emergency and patients be taken up for repositioning immediately to increase chances of visual recovery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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