

Beyond the fracture: documenting a unique case of total globe dislocation in orbital trauma

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ABSTRACT

A 62-year-old woman presented to the emergency department following blunt trauma to the right orbital region caused by an impact from a cow horn. Ophthalmologic examination revealed the absence of the globe and no light perception. Computed tomography scans showed dislocation of the globe into the maxillary sinus and fracture of the upper orbital wall. A multidisciplinary surgical approach was used, during which the globe was manually repositioned into the orbit and the lower orbital wall was repaired with polyethylene mesh. Postoperative examination on the first postoperative day showed signs of early stage ocular ischemic syndrome. On long-term follow-up, ptosis and enophthalmos were observed and the absence of light perception, which was thought to be due to optic nerve damage, persisted. Anterior segment examination revealed cataract formation and diffuse iris atrophy. Eye movements were severely restricted in inferior and lateral gaze and esotropia was observed in primary position. This case highlights the rarity of severe globe dislocation as a complication and emphasizes the critical importance of early surgical intervention as timely diagnosis and immediate repositioning are essential for visual recovery in the absence of optic nerve damage.

Keywords: Orbital blow-out fracture, globe dislocation, anterior ischemic syndrome, optic nerve damage

INTRODUCTION

Traumatic orbital floor fractures are relatively common; however, the complete displacement of the globe into the maxillary sinus as a result of trauma is an exceedingly rare occurrence.¹ Although the visual prognosis for patients with globe dislocation into the paranasal sinuses is generally poor, it is imperative that the globe is repositioned as soon as possible.¹ Additionally, eyelid and orbital reconstruction should be planned during the postoperative period to mitigate the risk of further complications.

The literature describes two primary techniques for surgical repositioning of the globe. The first technique is the transmaxillary approach, while the second involves transposing the globe back into the orbital space.^{2,3}

Most complications reported in the literature, as documented through PubMed, include decreased vision, blurred vision, diplopia, and enophthalmos. In this case report, we present a patient whose globe was completely dislocated into the maxilla following trauma. The patient underwent emergency surgery, during which anterior segment ischemia was observed during the follow-up period.

CASE

A 62-year-old female patient was admitted to the emergency department after sustaining a blow to the right orbital region from a cow horn. Upon examination, a 2 cm incision was noted on the upper eyelid, accompanied by a hematoma. The ophthalmological examination of the left eye was unremarkable. Due to the patient's inability to voluntarily open her eyelids, manual intervention was required; however, no globe was visible within the orbit. Furthermore, no light perception was detected following bright light stimulation applied to the orbit and maxillary region.

Computed tomography (CT) imaging was performed, revealing a significant fracture line in the right orbital floor and complete displacement of the globe into the maxillary sinus. After obtaining informed consent from the patient, surgery was planned in collaboration with the ear, nose, and throat (ENT) Department. The maxillary sinus was accessed via the transmaxillary route using the Caldwell-Luc approach. There were no signs of perforation in the globe located in the maxillary sinus, and it was manually repositioned into the orbit. Polyethylene mesh was utilized for the reconstruction of the lower orbital wall. The surgery was concluded following

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the repair of the lower wall. Postoperative CT imaging was planned. The CT imaging confirmed that the globe was in the correct position. (Figure 1, 2).

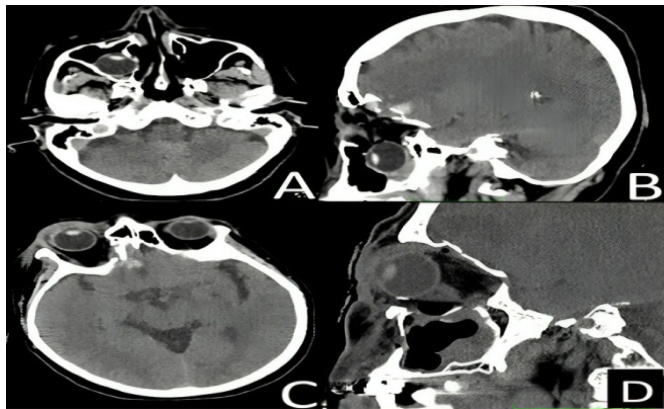


Figure 1. Preoperative and postoperative CT imaging of globe dislocation to the maxilla after trauma: A) Axial imaging shows intact globe dislocation to the maxilla as a result of orbital inferior wall fracture. B) Orbital inferior wall fracture and dislocation of the globe to the maxilla on sagittal imaging. C) In postoperative day 1 axial CT imaging, the globe was repositioned into the orbit. D) Inferior wall stability was achieved with the polyethylene mesh seen on the inferior wall in the sagittal CT examination on postoperative day 1

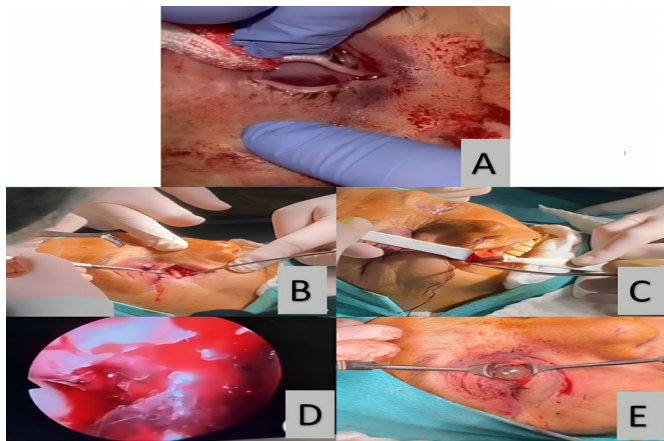


Figure 2. Empty orbit view and inferior wall repair via transmaxillary route: A) There was no evidence of the presence of a globe in the right orbit. B) Approach to the fracture line with a subciliary incision. C) Transmaxillary incision made for diagnosis and treatment. D) Visualization of the globe in the maxillary sinus with the help of an endoscope. E) Globe appearance within the orbit after globe reposition

During the postoperative day 1 examination, the patient exhibited no light perception, and eye movements were restricted in all directions. Anterior segment ischemia was suspected when conjunctival hyperemia, significant corneal edema, and flare findings in the anterior chamber were observed during the anterior segment examination. Fundus imaging could not be performed due to the severe corneal edema. B-scan ultrasonography imaging did not detect any abnormalities in the retina and other intraocular structures.

At the 6-month follow-up examination, ptosis and enophthalmos were noted, and the patient continued to have no light perception. Additionally, cataract and diffuse iris atrophy, believed to be secondary to anterior segment ischemia, were observed. Eye movements remained restricted in all directions, and esotropia was present in the primary position. The anterior segment examination revealed a clear cornea, diffuse iris atrophy, a mature cataract, and iris pigment deposits in front of the anterior capsule (Figure 3).

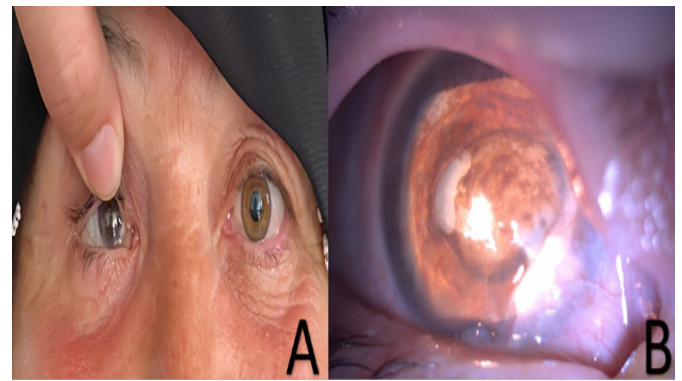


Figure 3. Postoperative 6th month examination: A) There is ptosis, enophthalmos, esotropia and limited gaze in the right eye. B) Anterior segment examination reveals diffuse iris atrophy and pigment loss in the right iris, as well as mature cataract and pigmented fibrous membrane residue covering the anterior capsule

DISCUSSION

Blunt trauma in the orbital region typically results in fractures of multiple walls. This condition can lead to complications such as enophthalmos and diplopia, as well as alterations in orbital volume.⁴ As a consequence of globe dislocation, enucleation, blindness, and orbito-facial deformities may occur. These traumatic dislocations are often associated with varying degrees of optic nerve damage, which can result in partial or complete blindness in the affected eye.⁴ In addition to these conditions, the rupture of vascular structures is a common mechanism contributing to vision loss.² Edema and tension in the surrounding tissues, resulting from the trauma, may disrupt the circulation of the retinal artery and the feeding vessels of the optic nerve and other intraorbital structures. Consequently, total globe ischemia becomes inevitable.⁵

In a study analyzing the literature on globe dislocation,⁴ 19 cases between 1981 and 2020 were examined. It was observed that partial optic nerve damage was reported in 3 cases,⁵ while total optic nerve damage was reported in another 3 cases.⁶ In our case, the absence of light perception at the time of admission and at the 6th postoperative month, along with the lack of light reflex in the postoperative period, suggests the possibility of total optic nerve damage. The rupture of vascular structures is one of the common mechanisms contributing to vision loss.^{2,5} In our case, the ocular ischemic syndrome that developed in the early postoperative period, along with the ischemic findings in the anterior segment observed later, supports this hypothesis. We found globe repositioning via the transmaxillary route to be appropriate in our case.

In our case, the globe was completely dislocated into the maxillary sinus following blunt trauma inflicted by a cow horn. Previous studies have demonstrated that animal-induced ocular injuries are often associated with a visual acuity of less than 0.1.⁷ Although the anatomical integrity of the globe was restored postoperatively, the final visual acuity remained poor due to optic nerve damage and ischemia resulting from injury to the intraocular vascular structures. A comprehensive review of the literature revealed that the association between severe globe dislocation and ocular ischemic syndrome has not been previously reported, underscoring its clearly negative impact on visual prognosis.

In addition, enophthalmos, complete ptosis attributable to a defect in the levator muscle, and esotropia resulting from traumatic injury to the rectus muscles were also observed due to damage to the rectus muscles as a consequence of trauma were also observed.

CONCLUSION

In conclusion, the present case underscores the critical importance of prompt diagnostic evaluation and timely intervention in managing severe orbital trauma, particularly in instances of complete globe dislocation. Although anatomical repositioning via the transmaxillary approach was successfully accomplished, subsequent ocular ischemia and optic nerve injury resulted in sustained visual impairment. These observations highlight the need for continuous refinement of treatment protocols to optimize both functional recovery and cosmetic outcomes in similarly complex orbital injuries.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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