CASE REPORT

DELAYED REPAIR OF ORBITAL FLOOR IN A CASE OF DIPLOPIA IN ORBITAL BLOW-OUT FRACTURE : REPORT OF A CASE

Dr. Arif Hossain*, Dr. Aritra Chatterjee, Dr. Abira Chatterjee***, Dr. Tirthankar Debnath****, Dr. Nayana De**, Dr. Purbalee Barman*****

ABSTRACT

A pure orbital blowout fracture is one that only affects one internal orbit wall and does not compromise the orbital rim or any other area. The most often affected locations are the inferior and medial walls. Diplopia, infraorbital nerve paresthesia, and soft tissue entrapment in the maxillary sinus are typical symptoms, which may limit ocular movements and cause enophthalmos. Surgical intervention is the gold standard in correction of diplopia. There are both natural and synthetic materials accessible, regardless of whether orbit reconstruction is necessary. This report will describe a case of a 50 yearold female who was diagnosed with a pure orbital blowout fracture, after a trauma to the left eye. The surgical treatment procedure involveda titanium mesh used to rebuild the orbital floor under general anesthesia. The result was satisfactory and the patient has been kept on follow up.

KEY WORDS

Orbital Floor, blowout fracture, diplopia, titanium mesh

ABOUT THE AUTHORS

*Resident Surgeon of Department of Oral & Maxillofacial surgery, Dr. R. Ahmed Dental College & Hospital

**Assistant Professor of Department of Oral & Maxillofacial surgery, Dr. R. Ahmed Dental College & Hospital

***Associate Professor of Department of Oral & Maxillofacial Surgery, Dr. R. Ahmed Dental College & Hospital

****Associate Professor of Department of Periodontics & Implantology, Dr. R. Ahmed Dental College & Hospital

*****PGT 2nd Year, Department of Oral and Maxillofacial Surgery, Dr. R. Ahmed Dental College & Hospital

CORRESPONDING AUTHOR

Dr. Purbalee Barman

PGT 2nd Year

Department of Oral and Maxillofacial Surgery

Dr. R. Ahmed Dental College and Hospital, Kolkata.

email- purb33@gmail.com

INTRODUCTION

The term blowout fracture was first described in 19571 and describes a situation when an orbital wall is displaced but the orbital rim is not damaged. Blow-out fracture of the orbit is a common type of injurythat can have functional and cosmetic consequences if left untreated. Both the buckling theory and the hydraulic theory describe how the orbital blow-out fracture occurs: In the former, force applied to the orbital rim is passed through the bone to the weaker portions of the orbit, producing fracture; in the latter, blunt trauma pulls the globe backwards in orbit, resulting in an outward fracture of the thin floor, ormedial wall.[2]

The gold standard for assessing orbital trauma is a computed tomography (CT) scan without contrast[3] which aids the surgeon in determining whether any soft tissue associated with the orbit is incarcerated or trapped within the neighboring sinus. In any periocular trauma, the emergent examination must first confirm that the globe is undamaged and that the intraocular contents are unharmed. Soft tissue imprisonment or entrapment, which restricts ocular motions, diplopia, enophthalmos, dystopia, and paresthesia of the infraorbital nerve are common signs of this fracture. Surgical treatment aims to release entrapped tissue, cover the bony defect, and restore orbital volume. Because of the limitations of the reconstruction materials and technical mistakes, including misdiagnosis, treatment timing, and accuracy during soft tissue repositioning and reconstruction material adaptation, orbital wall fracture repair remains a surgical issue. In order to achieve a functional and aesthetically pleasing outcome when treating blowout fractures, it is critical to restore and preserve the orbit's precise anatomical structural support against herniation forces throughout the early stages of recovery. Small, thin, and delicate bone pieces are typically unable to join and stabilize. As a result, both natural and artificial materials, such as titanium mesh and autogenous bone, can be used to rebuild the orbital walls when needed. We present a clinical example of delayed orbital floor reconstruction using titanium mesh as a pure blowout fracture treatment option.

Fig. 1

Fig. 2

CASE REPORT:

A 50-year-old female was examined at Oral and Maxillofacial Surgery Department after a trauma to her left eye. She had no episodes of unconsciousness or vomiting. However she had bleeding from left nostril. Immediate post-injury she was taken to an emergency department in a nearby hospital and preliminary care was given there. Initially, there was no functional or aesthetic discrepency. Gradually, the patient develop double vision in upward and downward gaze and referred to our department. She was advised Computed tomography scan of face, which revealed fracture in inferior wall of left orbit (Figs. 1 and 2), with bony fragments dislocation, fat prolapse and adjacent orbital content is herniating into left maxillary antrum, suggestive of orbital blowout fracture.

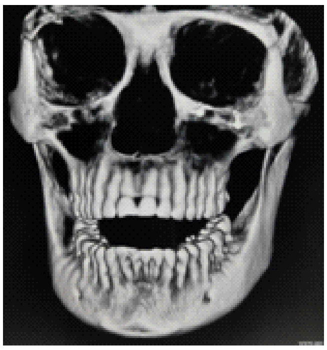
Surgical approach

Reconstruction of the orbital floor was done under general anesthesia after two months of trauma. After intubation, incision line was marked with a surgical marker. Tarsorrhaphy was done using 6-0 proline suture to protect the cornea during the operative procedure. Sub tarsal incision was placed. Orbicular oculi muscle was identified and dissection was done to create a pocket between the muscle and underlying orbital septum. Incision was given to transect the orbicular oculi muscle and expose the underlying septum. Sub-periosteal dissection was done superiorly towards the infra-orbital rim and thereafter along the orbital floor. The herniated orbital contents were identified and repositioned into the orbital cavity. Reconstruction of the orbital floor was performed using a trapezoidal titanium orbital floor mesh (Fig. 3), which was fixed on the orbital rim with 1 screw of 1.7*4 mm and 1 screw of 1.7*5 mm.

Fig. 3

Fig. 4

Fig. 5



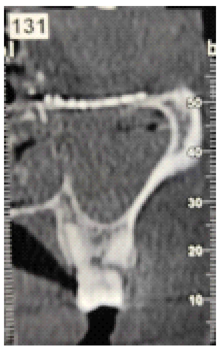


Fig. 6

Forced suction test was performed with a negative result to check ocular mobility (Fig. 4). Closure was done in layers using 3-0 vicryl and 6-0 proline suture. Lower eyelid suspension suture was applied using 3-0 vicryl suture. No eye patch was placed, in order to facilitate continued monitoring of the globe in the postoperative period. A short duration of corticosteroids (IV dexamethasone) along with antibiotics was administered. The patient was on regular follow-upconsultations. The visual acuity was restored bythe end of[3] weeks postoperatively (Figs. 5 and 6).

DISCUSSION

The timing of orbital floor repair is always a matter of discussion. Mostly a 2-week delay is provided for the swelling and accompanying diplopia to spontaneously resolve[4] Immediate repair is indicated if there is a large fracture, oculocardiac reflex, muscle entrapment with persistent restrictive strabismus and diplopia or significant hypoglobus or enophthalmos (>2 mm), and progressive infraorbital hypoesthesia. Ocular movement restriction and visual problems may result from a contracture of the herniated or trapped soft tissue, which can start the healing process if the orbital floor restoration is not done or is delayed. Our patient underwent surgery since he not only had a soft tissue herniation but also had diplopia and paresthetic sia of the infraorbital nerve during both horizontal and vertical eye movements. Even though surgically more challenging, late approach was still described as successful[5].

Numerous studies have focused on the processes that cause blowout fractures. But as of yet, no agreement has been reached. In 1999, a group of researchers[6] showed that both, the “hydraulic” and the “buckling” mechanisms can be validated and concluded that the fracture patterns differed between impact on the orbital rim, versus directly on the globe. The “hydraulic” mechanism produced larger fractures with the involvement of the floor and medial wall, where the herniation of orbital contents was frequent. The “buckling mechanism” produced smaller fractures involving the medial wall, without significant orbital content herniation. Accordingly, this case report would be related to the “hydraulic” theory, as the orbital floor was extensively damaged and the herniation of the soft tissue was present.

The material used for reconstruction should be the one that allows for optimal stability, support, and the lowest risk of complications. Autografts were used more frequently in the past before alloplastics improved in biocompatibility andconstitution[7], Autografts were golden standard for re-construction due to their strength, vascularization, minimal inflammation and reactivity, and biocompatibility, but have an increased risk of complications due to inadequate malleability, unavailability, and unknown resorption[8]. The size of an implant should not largely overextend the fracture area since it can cause the restriction in globe motility and position. However, it is important that the implant lay on bonyledges all around the fracture to reduce the risk of tissue herniation around the implant, which can lead to restrictive strabismus. There are several types of implants commonly in use, including metals (titanium and cobalt) and polymers. Titanium mesh is inert, corrosion resistant, tissue tolerant, and appropriate for large defects[8]. According to a manuscript published in 2003[9], the ability of titanium mesh to conform to the contours of the orbit makes it a better material for reconstructing not only isolated floor fractures but also those defects that involve both the floor and medial wall and this is partially based on the finding that many of the bone grafts used are too thick: decreasing orbital volume compared with the uninjured side and also elevating the floor in the anterior orbit creates an adverse effect elevating the globe. Finally, the titanium mesh has good biocompatibility and is easily adjustable. It is easy to trim and shape exactly to the orbital contour. Moreover, with this mesh structure, connective tissue can grow around and through the implant, preventing its migration and it can be reliably fixed with screws in areas such as the infraorbital border.[10]

In order to prevent and lessen edema, post-operative therapy may involve topical and systemic antibiotics, cold packs, and a raised head posture. In order to look for indications of a retrobulbar hematoma, visual acuity, pupil size, and response to globe movement should all be routinely assessed. Restoring orbital volume, globe position, and motility as well as reducing the herniating soft tissue are the primary objectives of orbital floor fracture repair.

CONCLUSION

The timing of orbital floor repair is always a matter of discussion. But in case of delayed orbital floor repair, surgical intervention is the gold standard.

REFERENCES

1. Converse JM, Smith B. Enophthalmos and diplopian fractures of the orbital floor. Br J Plast Surg. 1957;9:265-74.

2. Damgaard OE, Larsen CG, Felding UA, Toft PB, von BuchwaldC. Surgical timing of the orbital “Blow-out” fracture: A systematic review and meta-analysis.Otolaryngol Head Neck Surg2016; 155:387-90.

3. Boyette J, Pemberton J, Bonilla-Velez J. Management of orbital fractures: challenges and solutions. Clin Ophthalmol2015;9:2127-37.

4. Tang DT, Lalonde JF, Lalonde DH. Delayed

immediate surgery for orbital floor fractures: Less can be more. Can J Plast Surg2011;19:125-8.

5. Lee J, Tahiri Y, Roy AA, Lessard L. Delayed repair of lateral orbital wall and orbital floor fracture. J Craniofac Surg 2013;24:34-7.

6. Waterhouse N, Lyne J, Urdang M, Garey L. An investigation into the mechanism of orbital blowout fractures. Br J PlastSurg. 1999;52:607-12.

7. Boyette J, Pemberton J, Bonilla-Velez J. Management of orbital fractures: challenges and solutions. Clin Ophthalmol2015;9:2127-37.

8. Ye LX, Sun XM, Zhang YG, Zhang Y. Materials to facilitate orbital reconstruction and soft tissue filling in posttraumatic orbital deformaties. Plast Aesthet Res 2016;3:86-91.

9. Ellis E 3rd, Tan Y. Assessment of internal orbital reconstructions for pure blowout fractures: cranial bone grafts versus titanium mesh. J Oral Maxillofac Surg. 2003;61:442-53.

10. Uygur S, Cukurluoglu O, Ozmen S, Guclu TH, Sezgin B. Resorbable mesh plate in the treatment of blowout fracture might cause gaze restriction. J Craniofac Surg. 2009;20:71-2.

