

Case report on combined approach for delayed orbital floor repair

ABSTRACT

“White-eyed blowout” fractures in pediatric patients can be presented with fewer clinical symptoms; therefore, immediate diagnosis and surgery is essential. In cases where early surgery was performed, rapid recovery and better postoperative outcomes were noted regardless of the configuration of fracture. In pediatric patients, due to changes in the orbital volume, autograft is recommended. Although there are different approaches to orbital floor, transantral approach provides enhanced illumination and accessibility to orbital floor. This case report portrays a pediatric case of white-eyed blow out fracture which went unnoticed for about 1 month and was managed at a later date. Combined mid-tarsal and transantral approaches using iliac crest graft was used to repair the orbital blow-out fracture.

Keywords: Iliac crest, maxillofacial trauma, oculocardiac reflex, orbital blow-out fracture, pediatric surgery

INTRODUCTION

White-eyed blow-out fractures (WEBOFs) or linear trapdoor fractures are a common cause of injury in pediatric population. Smith and Regan defined blow-out fractures as indirect fractures of orbital floor and medial wall with an intact orbital rim. In pediatric patients, as the bone is less calcified and flexible green stick-like fracture of orbital floor is known as WEBOF.^[1] Due to fewer clinical symptoms and minimum radiological evidence, blow-out fractures often go unnoticed. The orbital floor and medial wall fracture in adults occur with clinical manifestations such as enophthalmos, ocular pain, vertical diplopia, hypoglobus or globe displacement, eyelid ecchymosis, subcutaneous emphysema, ptosis, or epistaxis.^[2] The entrapment of extraocular muscles or orbital fat herniation occurs in association with blowout fractures.

If surgical intervention is not performed, fibrosis of entrapped muscles or fat necrosis occur, leading to persistent diplopia and enophthalmos.^[3] Hence, surgical intervention within 48 h of trauma is recommended. This case report portrays a case of white-eyed blow-out fracture which went unnoticed for about 1 month and was managed by iliac crest bone graft at

a later date. Unlike the common approaches to orbital floor, a combined mid-tarsal trans-antral approach is used in the presented case.

CASE REPORT

A 9-year-old female reported to the Department of Maxillofacial Surgery with a complaint of double vision in upward and downward gaze. The patient had a history of trauma to her right eye (hit on the edge of a school desk). She had episodes of vomiting and loss of consciousness and was immediately taken to an emergency department in a nearby hospital. The primary care was

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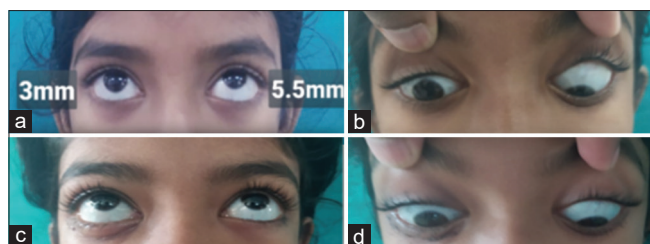


Figure 1:(a and b) Shows preoperative pictures showing restriction of upward and downward movement respectively. (c and d) Depicts the post-operative pictures

given, and computed tomography (CT) brain was taken. No intracranial injuries were detected. As she had intermittent episodes of bradycardia, she was kept under observation and discharged after 24 h. About 3 weeks after the incident, the patient consulted an ophthalmologist due to some changes in her eyesight. The ophthalmologist detected the restriction of right eye movement with diplopia in upward and downward gaze [Figure 1a and b]. Considering the fact that there had been an injury to the right orbit, a blowout fracture was suspected. The patient was referred to our institution where she underwent CT evaluation of the orbit, which revealed right orbital floor fracture of size 2 mm with herniation of orbital fat and elongation of right inferior rectus muscle suggestive of its entrapment [Figure 2a].

Surgical approach

Mid tarsal incision followed by blunt dissection was performed along the orbital floor exposing the medial wall and orbital floor. Defect on the orbital floor and entrapped muscle were exposed. A bony window was created on the lateral wall of right maxillary antrum 5 mm below the infraorbital rim to elevate the orbital fat and entrapped muscles. This also enabled proper visualization of posterior part of orbit. 5 mm of bone was removed from the orbital floor to release herniated soft tissue. Release and repositioning of entrapped muscles were performed. Forced duction test was performed at the beginning and end of the surgery to confirm the release of entrapped muscle and restoration of normal eye movements.

Corticocancellous graft was harvested from the right iliac crest [Figure 2b], recontoured, and placed over the right orbital floor which was stabilized over the infraorbital rim with two titanium screws [Figure 2c]. 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-up consultations. The visual acuity was restored by the end of 3 weeks postoperatively [Figure 1c and d].

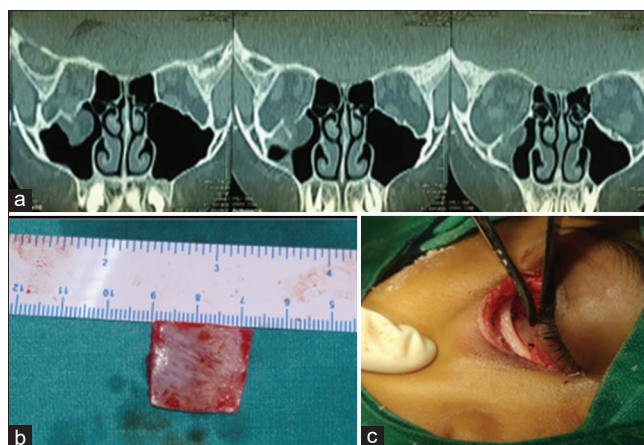


Figure 2: (a) CT-axial view with hanging drop appearance, (b) The harvested iliac crest graft, (c) Fixation of the autologous graft to orbital floor

DISCUSSION

The fracture of the orbital walls can often result in ophthalmic complications. WEBOFs are often known for its lack of external signs, thereby reducing its suspicions of underlying traumatic injury. Linear trapdoor fractures are common in children and often accompanied by oculocardiac reflex. Oculocardiac reflex or Ashner phenomenon is the occurrence of bradycardia during trauma to extraocular muscles or rapid compression of eyeball.^[4] It is mediated by vagus nerve causing reduced sinoatrial activity manifested as asystole, arrhythmia, and bradycardia.^[5] This explains the episodes of bradycardia in the patient following trauma. The presence of nausea and vomiting following head trauma often leads to various differentials, and the evaluation of ocular motility is often missed.

Various approaches have been used in the management of orbital floor fractures. External access such as midtarsal, transconjunctival, or subciliary approaches helps in direct access to orbit and for the placement of implants.^[6] These approaches are commonly used in the anterior orbital fractures. In this case, transantral window was created through the same midtarsal incision to lift and release the entrapped tissues. Transantral approach also allows visualization and accessibility to posterior part of orbital floor.^[7] In intraoral transantral approach, there are chances of surgical site infection by oral microbes. In the present case, a combination of these techniques was performed through a single incision to avoid two site morbidities and to reduce postoperative infections.

There are various schools of thought regarding the ideal time and the type of implant used for surgical intervention. As per past literature, immediate surgical intervention was advised for patients of blow-out fractures with muscle entrapment [Table 1].^[8] Here, the surgical intervention was performed 3 weeks following trauma.

Table 1: Indications for immediate surgical repair

Persistent diplopia on primary gaze or orbital restriction
Positive forced duction tests with no improvement with resolution of edema
CT evidence of herniation of soft tissue through a small orbital floor defect
Large orbital floor fracture (>50% orbital floor)
Significant globe dystopia-hypoglobus or enophthalmos
Significant increase in orbital volume in which enophthalmos is predicted
Associated orbital rim or facial fractures
Occurrence of oculocardiac reflex

CT: Computed tomography

Surgical intervention is highly technique sensitive. Orbital reconstruction can be done using alloplastic materials or autologous bone grafts.^[9] Autologous or bioresorbable implants are advantageous in pediatric WBOF patients due to growth-related changes in orbital volume.

CONCLUSION

Pediatric blow-out fractures can be presented with fewer clinical signs, and therefore, awareness regarding the potential underlying injury is essential. WBOF should be recognized early to ensure timely management and a successful outcome.

Declaration of patient consent

The authors certify that they have obtained all appropriate consent forms. In the form, patient's parent has given his consent for the clinical information to be published in the

journal. Patient and her parents understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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Conflicts of interest

There are no conflicts of interest.

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