

Orbital Floor Reconstruction Following Orbitalblow-Out Fracture- A Case Report

Khadar.S¹, Vinay.S², Haripriya³, Vijay. B⁴

¹Assistant professor Dept. of oral and maxillofacial surgery, MNR Dental college and Hospital, Sangareddy, Medak Dist. Telangana.

²Assistant professor Dept. of oral and maxillofacial surgery, Sri Sai College of Dental Surgery, Vikarabad, Telangana.

³Assistant professor Dept. of oral and maxillofacial surgery, Kamineni institute of Dental Sciences, Narketpally, Telangana.

⁴Associate professor Dept. of oral and maxillofacial surgery, MNR Dental college and Hospital, Sangareddy, Medak Dist. Telangana.

Abstract: Blow-out fractures are fractures of the orbital floor or medial wall that occur as a consequence of blunt trauma. Impact increases the intraorbital pressure, forcing the non-distensible orbital contents through the orbital floor. A blowout fracture usually occurs when a sudden blow to the eye pushes the intact globe back into the orbit. There is an associated momentary increase in intraorbital pressure resulting in a fracture or blowout through the thin portion of the orbital floor. The characteristic clinical findings include double vision, a sunken globe, and numbness in the distribution of the infraorbital nerve. Sometimes, the only sign of a blow-out fracture is the abrupt inflation of periorbital tissue with air when the patient blows his nose. Standard evaluation of these fractures includes history, physical examination and radiographs. Some patients benefit from computed tomography (CT), which can be both diagnostic and prognostic. Blow-out fractures do not often produce serious sequelae, and the current trend is toward immediate treatment. However, it is imperative to rule out any serious injury to the eye itself that would require emergency treatment.

I. Introduction

Orbital floor fractures were first described by MacKenzie in Paris in 1884¹. Blow-out fractures of the orbit occur during blunt trauma to the periorbital region. The classic features of this type of injury, viz. enophthalmos, limitation of eye movement (commonly limited elevation), diplopia and infra-orbital nerve anaesthesia were described as early as 1889 by William Lang². Experimental work by Smith and Regan³ suggested that an increase in the intra-orbital pressure after a blow to the orbit causes a fracture of one of the orbital walls. This has been termed the 'hydraulic theory'. Later work by Fujino⁴ showed that trauma to the inferior orbital rim results in its temporary distortion; this is transmitted to the orbital floor causing a fracture. This proposed mechanism has been termed the 'buckling force theory'. The literature of the past 20 years or so is replete with reports of the diagnosis and treatment of blowout fractures of the orbit. The simplest and most benign surgical approach involves direct exposure of the floor of the orbit and replacement of the blown-out orbital floor with a piece of inert material which is fashioned to fit over the defect at the time of surgery. A variety of materials has been advocated to cover the orbital floor defect, including alloplastics (polyethylene, silicone, Supramid, cranioplast, teflon), tantalum mesh and cable, processed bovine bone, and so forth⁵.

II. Case report

A 35 years old male patient was admitted in our hospital with a history of an injury on fall due to epileptic attack and history of loss of consciousness. On physical examination the findings observed in the patient (in order of frequency):

- Periorbital ecchymosis (Fig. 1)
- Enophthalmos. (Fig. 1)
- Vertical diplopia
- Inability to elevate the globe (Fig. 1)
- Hypoaesthesia over the distribution of the infraorbital nerve
- Depression of the globe (Fig. 1)

Radiological examination was also carried out for the patient suspected of having a blowout fracture. These include a Waters projection and tomograms. The radiological findings included Periorbital oedema, as evidenced by a more radiopaque orbit and thickening of the soft tissue shadow over the inferior orbital rim. Partial to complete opacification of the maxillary antrum. The hanging-drop opacity into the

maxillary antrum (Fig.2) due to herniation of the orbital contents through the fractured floor (Fig. 3). Fragmentation and irregularity of the orbital floor thus confirming a blowout fracture. The decision to manage the patient surgically was based on one or more of the following criteria, as outlined by Dulley and Fells⁶ (i) persistent troublesome diplopia; (ii) limitation of ocular movement with positive forced duction test; (iii) a large fracture with evidence of tissue prolapse (Fig. 3); and (iv) enophthalmos greater than 3 mm. Surgery was performed under general anesthesia following uneventful oral intubation. First, a forced duction test (FDT) was performed under general anaesthesia. As the test was positive, thus confirming restriction of eye movements, surgery was undertaken. A sub-ciliary approach to the orbital floor was used with elevation of the periosteum and identification of the fracture. The entrapped tissues were then delivered from the maxillary antrum and carefully separated from the infraorbital nerve by gentle manipulation. Some loose bony fragments were removed and a custom made titanium reconstruction mesh shaped to fit over the defect was placed over the floor of the orbit. The mesh was checked for proper fit in the subperiosteal position of the orbital floor and fixed to the infra orbital rim using titanium screws (Fig. 4). Post operatively Diplopia, enophthalmos and restricted eye movements were not seen.

III. Discussion

A true blowout fracture of the orbit can occur as a specific syndrome without any other associated facial fractures or it can be found in association with multiple facial injuries as is frequently the case in automobile accidents. The excellent results obtained with early diagnosis and treatment of blowout fractures of the orbit demonstrate the importance of carefully evaluating every patient who presents with a "black eye". The importance of taking a full ophthalmological history and performing a full examination cannot be over-emphasised. Eye injuries associated with blow-out fractures have been well documented⁸⁻¹⁰. The presence of one or more of the characteristic signs of a blowout fracture should indicate the possibility that such a condition is present. A decision to explore the injury site should be based on clinical grounds which may or may not be supported by radiological evidence. If FDT is negative, surgery may not be performed unless the fracture was large enough, with significant prolapse of orbital tissue to warrant repair, or there was significant enophthalmos. If clinical signs are equivocal, it is best to defer a decision for 24 to 48 hours after which time the patient should be re-evaluated. A definite increase in the vertical muscle imbalance warrants exploration. The surgical procedure is simple and benign and the prognosis is excellent⁵. However, all cases do not warrant exploration. Only those in which the initial or follow-up examination shows positive evidence of blowout fracture with diplopia, enophthalmos, etc., and a positive radiograph should be subjected to surgical exploration. Those patients who present with equivocal signs, that is, a minor degree of vertical muscle imbalance only or equivocal radiographic evidence or slight enophthalmos, should be followed at daily intervals.

References

- [1]. Ng P, Chu C, Young N, Soo M. Imaging of orbital floor fractures. *Australas Radiol.* Aug 1996;40(3):264-8
- [2]. Lang W. Traumatic enophthalmos with retention of perfect acuity of vision. *Eye* 1989; 9: 41-45.
- [3]. Smith B, Regan WF. Blow-out fracture of the orbit: mechanism and correction of intimal orbital fracture. *Am J Ophthol* 1957; 44: 733-739
- [4]. Fujino T. Experimental 'blow-out' fracture of the orbit. *Plast Reconstr Surg* 1974; 54: 81-82.
- [5]. Sidney Ierman, Blowout fracture of the orbit *Brit. J. Ophthal.* (1970) 54, 90
- [6]. Dulley B, Fells P. Orbital blow-out fractures: to operate or not to operate, that is the question. *Br J Ophthol* 1974; 31: 47-54.
- [7]. Emery JM, Von Noorden GK, Schiernitzaner DA. Orbital floor fractures: long-term follow-up of cases with and without surgical repair. *Trans Am Acad Ophthol/mol Ocolaryngol* 1971; 75: 802-811.
- [8]. Fradkin AH. Orbital floor fractures and ocular complications. *Am J Ophthalmol* 1971; 72: 699-700.
- [9]. Milauskas AT, Fueger GF. Serious ocular complications associated with blow-out fractures of the orbit. *Am J Ophthol* 1966; 62: 670-672



FIG. 1 Blowout fracture of left orbit, showing oedema, ecchymosis, and inability to elevate the globe.



FIG. 2. Waters projection, showing "hangingdrop" opacity (arrow) in a patient with a blowout fracture of the left orbit

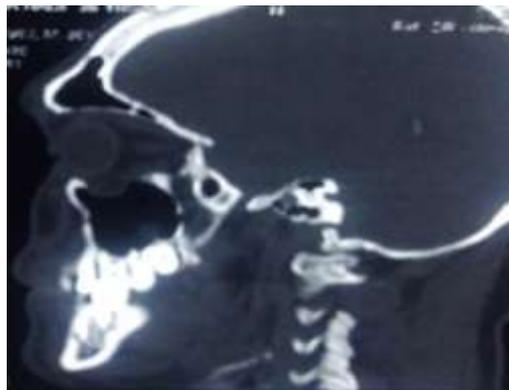


FIG. 3. CT image, showing "hangingdrop" opacity in a patient with a blowout fracture of the left orbit.



FIG. 4. Image showing reconstruction of defect in the orbital floor using titanium mesh.