

Article

Superior blow out fracture of orbital roof causing dural tear and frontal contusion

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Superior blow out fracture of orbital roof causing dural tear and frontal contusion

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Abstract: Superior orbital blow out fracture causing brain parenchymal injury is rare. We are describing here, a case of facial injury with superior blow out of orbit causing frontal contusion requiring surgical intervention.

Introduction

Orbit is almost closed compartment with few small openings. Any direct impact causes deformation of its content with increment in pressure which may decompress after bony disruption in any direction known as blow out⁶. Micheal et al described a case of superior blow out fracture with computed tomography scan study without intradural involvement⁴. We are presenting the case with superior blow out fracture with dural tear and frontal contusion. Superior Orbital roof blowout causing dural tear and brain contusion is a rarity. On multiple searches in Pubmed using different key words we could not find even a single case of this type. Though we found few relevant cases (2, 4).

This is probably the first case of this type reported till date.

Case presentation

Our patient a 34 year old gentleman

brought to the emergency department with the history of fall from bike over road, after an accident with head struck to the floor in a tilted manner with right eye facing floor and parallel to it. Patient had transient loss of consciousness with recovery within 30 minutes followed by multiple episodes of vomiting. When he came to emergency department he was conscious, oriented, obeying commands. Vitals stable. There is small abrasion over right upper eyelid on its lateral half. Vision and extraocular movements are unaffected. On imaging he was found to have right frontal contusion with hypodensity along with a free bone piece seen inside the contused brain. On detailed analysis of imaging it was evident that the free bone piece is nothing else than a fractured segment of orbital roof plate. The hypodensity was presumed to be a part of orbital fat.

Patient was subjected to surgery. Bicoronal scalp incision with rught frontal craniotomy was done. Intraoperatively there was a

basifrontal dural tear due to free bone piece from superior orbital roof causing brain parenchymal damage along with orbital fat seen. Removal of frontal contusion as well as free bone piece with repair of anterior skull base Dura enhanced with pedicled pericranial patch done.

Post-operative period was uneventful. Patient discharged on fifth post-operative day.

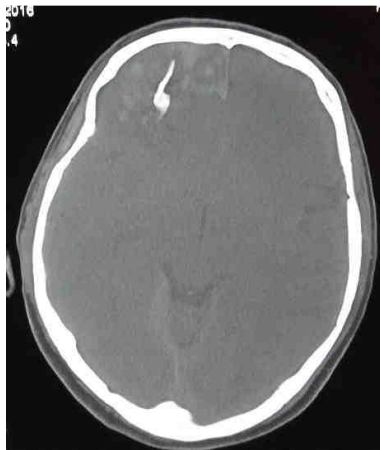


Figure 1 - Axial CT scan bone window shows fractured part of superior orbital wall and migrated inside cranial cavity. Frontal bone is intact



Figure 2 - Similar to figure 1 more rostral section

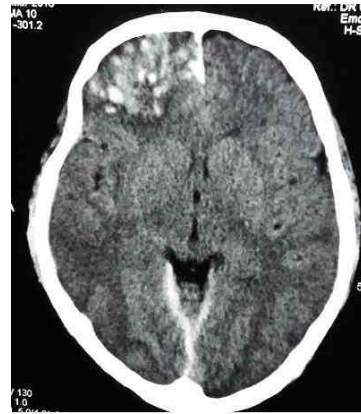


Figure 3 - Axial CT scan brain window showing frontal contusion

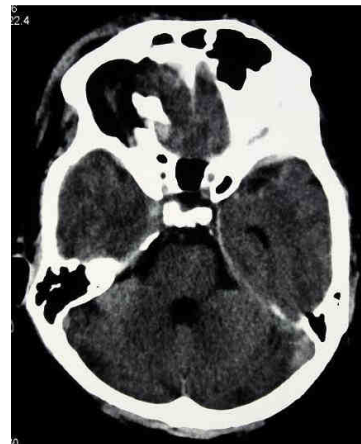


Figure 4 - Similar to figure 3, more rostral section

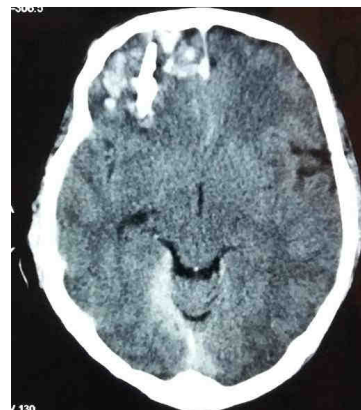


Figure 5

Discussion

The orbit is made up of four walls contributed by seven bones. Lateral by greater wing of the sphenoid apically and the frontal and zygomatic bones facially. Floor by sphenoid, the orbital process of the palatine bone, and the orbital process of the maxillary bone. Medial wall by lesser wing of the sphenoid, the ethmoid bone, the lacrimal bone, and the frontal process of the maxilla (7).

The fourth wall or orbital roof plate is a quadrilateral flat structure with convexity upward, made up of two parts. Anterior segment is made up of frontal bone and posterior segment is made up of sphenoid bone⁷. The anterior extent is covered up by supra orbital ridge, giving it extra strength. The impact required to cause this type of fracture is usually so severe that it also breaks or cracks other thin facial bones too. Another important factor is angle at which orbital roof plate lies. The almost horizontal orientation makes it less amenable to become a victim of direct trauma.

Various types of blowout fractures depending on the location of disruption have been described. The inferior being the most common and superior the least (1, 3, 5 and 8). Curtin et al reported two cases of superior orbital blow out fracture with conventional tomography (2).

If the injury occurred directly over the Orbit in medial and upward direction then the transient deformation of its content will cause upward movement of orbital roof plate, explaining its fracture and casing dural tear and frontal contusion.

Michael et al described a case of superior

blow out but no intradural pathology was described in that case. The most important factor for diagnosing a superior blow out fracture is high suspicion, as it is easily missed out in acute trauma case with limited study. Author recommends thin coronal cuts with three dimensional reconstruction is required for better detection and delineation. The operative approach may be combined with ophthalmic or plastic surgical specialist if required.

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