Case Report

**Traumatic Displacement of the Globe into Brain**

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**ABSTRACT.**

We report a case where globe was dislocated into the brain following orbital wall fracture. Traumatic dislocation of the eye into the brain is rare and urgent management and surgical repair is indicated. To our knowledge, this is the first case of traumatic displacement of the globe into the brain with satisfactory removal of the globe and orbital wall repair. (Rawal Med J 2009;34:).

**Key words**

Head injury, orbit, orbital fracture.

**INTRODUCTION**

Complete dislocation of an eyeball into the brain after an extensive frontal fracture is a rare occurrence. Traumatic orbital roof fracture is seen quite rarely and it has not been reported that the globe was displaced into the brain following trauma. In this report, we describe a patient who sustained a frontal bone fracture of the orbital wall with his eyeball entrapped in the brain, exhibited clearly severed muscles, which was consistent with dysfunctions occurring in other supporting tissues.

**CASE PRESENTATION**

A 67-year-old male was referred to the Neurosurgery Department of Tabriz University, Shohada Hospital with history of refractory headache for one month. He had history of car accident two months ago. There was no evidence of the eyeball in the right eye and visual acuity was no light perception. Left eye was normal. On examination, right orbit was empty (Fig. 1A). Magnetic resonance imaging (MRI) revealed a mass on T1 (Fig. 1B) and T2-weighted image (Fig.1C).
Fig 1. A. Preoperative status, showing apparent traumatic anophthalmos of the right orbit. B. MRI showing a right frontal lobe mass on T1-weighted image. C. Same mass on T2-weighted image. D. CT scan showing frontal region fracture of the right orbit. The inner right orbit was delineated solely by conjunctival tissue, and the globe is not found within the right orbit.

A computed tomography (CT) scan revealed that the globe had become dislocated into the brain, and large fracture of the right frontal rim of the orbit was noted (Fig. 1D). MRI showed a mass within the right frontal lobe on both coronal T1-weighted images (Fig. 2 A) and Fluid–attenuated inversion recovery (FLAIR) axial image (Fig. 2 B).
He underwent a right frontal craniotomy and blunt dissection was performed until the entire eyeball was clearly visible (Fig. 3A), the globe was then gently removed (Fig. 3B). Figure 3C demonstrates the brain tissue after the globe was removed. The orbital wall fracture was repaired while preserving other orbital tissues. Postoperatively, the patient recovered well.

**DISCUSSION**

To our knowledge, this is the first case of traumatic displacement of the globe into the brain with satisfactory removal of the globe and orbital wall repair. The complete traumatic dislocation of the globe into the brain after orbital roof fracture is a very rare event. Orbital fractures most often occur following blunt trauma to periorbital region.\(^1\) If the force is severe enough, the eyeball may be forced out of the orbit, usually resulting in the rupture of the globe. However, there has not been a report where an eyeball was forced out of the orbit through the frontal orbital wall and entrapped within the brain tissue.
Fig 3. Photograph demonstrating the intraoperative status of the globe in the brain (A), size of the eyeball excision (B), and the brain tissue after the globe was gently removed (C).

The physical mechanism of orbital wall fractures has been debated for years. Three main theories including the hydraulic theory, the contact of globe-to-orbital wall theory, and the bone buckling theory have been considered. One might anticipate a strong association of fractures and traumatically induced ocular injuries with the hydraulic and globe-to-wall theories because in both, the force is delivered directly to the ocular globe. Traumatic displacement of the globe falls into three operational categories: luxation, dislocation, and avulsion. Luxation is the anterior protrusion of the globe out of its orbit, dislocation is the migration of the globe into either the paranasal sinuses, nasal cavities or other places and avulsion is anterior protrusion of the globe, coupled with laceration of extraocular muscles or the optic nerve. Orbital fractures most often occur following blunt trauma to the periorbital region. According to the above classifications, our patient was an exception because suffering from displacement of the Globe into brain with laceration of extraocular and optic nerve.

Several investigators have examined the association between ocular findings and facial fractures. To date, we have found only 10 cases reported about displacement of the globe into
the sinus in the literature and have reviewed these in addition to our own case to delineate the clinical implications of this rare case report. Our study showed that all 10 cases of traumatic displacement of the globe most common occurred in the male with mean age was 59.70± 7.31 years.

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Received: January 1, 2009 Accepted: August 8, 2009

REFERENCES
