CASE REPORT

Blepharocoele After Head Injury

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ABSTRACT

Blepharocoele is a rare complication of skull base injury involving the orbital roof. We present a 23-year-old male who developed blepharocoele due to an orbital rim fracture and basal dural tear. His vision remained intact. The lesion resolved completely after surgical repair of the basal dura.

KEYWORDS: Blepharocoele, eye injury, head injury, skull base fracture, ocular encephalocoele

Periorbital ecchymosis is the most common manifestation of head injury involving the anterior skull base. Cerebral spinal fluid (CSF) rhinorrhea may occur in cases of anterior skull base fracture when the dura overlying the cribriform plate or frontal sinus has been breached. CSF collection or brain herniation into the upper eyelid ("blepharocoele") after fracture of the orbital roof is rare. Only four well-documented cases have been reported in the world literature.¹⁻⁴ We report one such case and review the relevant literature.

CASE REPORT

A 23-year-old male was admitted in a state of altered sensorium after he had sustained a head injury in a traffic collision. On examination he was normotensive and had a laceration over the right frontal scalp with periorbital ecchymosis. Glasgow coma scale (GCS) score was 12 of 15. No CSF rhinorrhea

was present. His pupils were normal and he had no focal motor deficit. Brain computed tomography (CT) showed a fracture of the right orbital roof that involved the orbital rim (Fig. 1). A small area of hemorrhagic contusion in the frontal lobe was without mass effect. Significantly, there was agenesis of the right frontal sinus. He was given osmotic and loop diuretics and antibiotics and was observed closely.

His sensorium improved gradually, and his GCS score improved to 15 after 72 hours. He was continent and was able to take oral fluids and semi-solids. Meanwhile, however, swelling of the eyelid became more apparent (Fig. 2). There was mild proptosis, but no pulsations of the globe were noticed. His vision was unimpaired, but he exhibited paresis of the lateral rectus muscle on the right side. Brain magnetic resonance imaging (MRI) showed that brain matter had herniated into the right upper eyelid with CSF collection and traction of the frontal horn of the right lateral ventricle (Figs. 3A and B). Post-head injury blepharocoele was diagnosed and the patient was taken to surgery.

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Figure 1 CT of the skull base showing a fracture of the right orbital rim and agenesis of the right frontal sinus.

The right frontobasal region was exposed through a right frontal craniotomy. Multiple dural tears with pulped brain matter were visible when the comminuted bone fragments were visible. The orbital rim was fractured and brain matter and CSF had herniated into the upper eyelid through the

fracture. Necrotic brain tissue was removed by suctioning, the orbital rim was wired together, and the basal dura was repaired with pericranium. Postoperatively, the patient took cerebral decongestants for 2 days and cefotaxime and amikacin for 10 days. Proptosis and blepharoptosis gradually resolved thereafter. When reviewed 1 year later, the patient was asymptomatic. The paresis of the lateral rectus had resolved and visual acuity had remained unaffected.

DISCUSSION

Anatomically, bony walls of the air sinuses are thinner and more fragile than the orbital walls and are more frequently fractured. Fracture of the anterior skull base may thus be associated with CSF rhinorrhea if a dural tear that communicates with the frontal or ethmoid sinuses is also present. Head injury associated with an orbital fracture and dural injury is seldom associated with leakage of CSF through the orbit (CSF orbitorrhea) and is often confused with lacrimation.⁵ In such situations CSF may remain trapped in the orbit (orbital encephalocele or orbitocele).⁶⁻⁹ Rarely, such commu-

Figure 2 Clinical photograph showing a blepharoptosis.

Figure 3 (A) Sagittal T2-weighted MRI showing a hyperintense signal in the upper eyelid and communication with the brain. (B) Axial T2-weighted MRI showing communication between the blepharocoele and brain and traction on the ipsilateral frontal horn.

nication of brain or CSF involves the upper eyelid (blepharocoele).^{1-4,10}

Blunt injuries of the superior orbital ridge and facial bones as in a Le Forte type II fracture also can cause CSF to collect within the orbit. CSF tracks along the fracture of the cribriform plate through the paranasal sinuses and across the broken lamina papyracea into the orbit, producing periorbital swelling with or without proptosis. Such swelling should be differentiated from an intraorbital hematoma, mucocoele, foreign body mucocoele, and orbital abscess.⁵

When an anterior skull base fracture involves the orbital rim with a dural tear and eyelid injury, CSF and pulped brain matter may track into the upper eyelid causing blepharocoele. The rare configuration of this injury can be explained by the direct impact to the orbital rim. If the content is only CSF, the eyelid swelling may be transilluminant⁴; transillumination may not be demonstrable in the presence of pulped and necrotic brain matter. If the orbital roof is injured extensively, the lateral ventricle may be in direct communication with the orbit.¹¹

Most orbital injuries associated with an orbitocoele or blepharocoele have been reported in children^{1,6,7,9}; adults are rarely affected.⁴ Awareness of the lesion is essential to diagnose the condition, which should be suspected when palpebral swelling fails to resolve. No sequential changes of resorption

of hematoma in the eyelid follow periorbital ecchymosis.⁴ Proptosis may be seen in patients with a fractured orbital roof associated with orbitocoele. The patient reported by Galzio et al.² had unilateral agenesis of the frontal sinus, and the authors concluded that fracture of the frontal bone over this region allowed direct egress of CSF into the upper eyelid after a head injury. Our patient also had agenesis of the right frontal sinus although the orbital rim fractured laterally. Garza-Mercado et al.³ found no dural breach in their patient, who underwent surgery 3 months after of injury because of persistent palpebral swelling.

Traumatic CSF collections within the orbit have been evaluated by CT, which has shown fractures involving the orbital roof and rim, frontal and sphenoid regions, and intraorbital collection of CSF with forward extrusion of the eyeball.^{4,9} Although MRI evaluation of traumatic blepharocoele has not been reported, MRI appears to be the investigation of choice and should be supplemented by high-resolution CT to study the fracture. MRI shows the communication of the brain with the eyelid, especially T2-weighted sequences. In our patient, MRI detected traction of the anterior horn of the lateral ventricle.

Periorbital swelling after head injury should never be aspirated or incised. After diagnosis, ble-

pharocoele usually requires surgical correction. After the anterior skull base is exposed by an appropriately placed craniotomy, pulped and necrotic brain matter is suctioned away to define the torn dural margins and basal fracture. The orbital rim is wired together, and the dura is repaired either primarily or by using a dural substitute. Cerebral decongestants and antibiotics are administered postoperatively. The swelling gradually resolves and the cosmetic outcome is satisfactory.

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Commentary

The authors describe an interesting case of a 23-year-old man who sustained cranial trauma with a resultant blepharocoele. The authors' use of the term "blepharocoele" encompasses a collection of cerebrospinal fluid (CSF) as well as necrotic brain within the upper eyelid. The patient was managed successfully via surgical repair of the basal dura and fractures.

This case represents a variation of a known entity after orbital trauma involving the cranial base, which is frequently referred to as a CSF blepharocoele or an orbital encephalocele or orbitocoele. The unique character of this case is the presence of brain matter within the eyelid tissues in addition to the CSF. The term blepharocoele can be misleading; the term blepharoenophalocele or the more general term, orbital encephalocele, is preferable.

Although a rare entity, orbital encephalocele or blepharoenophalocele should be considered in patients with persistent proptosis and eye swelling after trauma involving the cranial base. In such cases, fractures in and around the orbital rim and orbital roof associated with dural tears are usually the cause. The treatment of choice is to identify the source of the CSF leak and brain herniation, which often is a tear along the frontal basal dura. If feasible, the fracture should be repaired. When the dural tear cannot be identified, the separation between the dura and periorbital tissues should be maintained either by muscle plugging or placing a layer of fascia between the orbital roof and dura. This strategy prevents further dissection of CSF or brain matter into the orbit and associated eyelid.

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