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Grand Rounds

5-year-old girl with left upper eyelid swelling

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History

A 5-year-old girl presented to the ophthalmology clinic of Queen Elizabeth Hospital, Kota Kinabalu, Malaysia, with a complaint of swelling of the left upper eyelid (Figure 1). The girl's mother, who accompanied her, claimed that the girl had fallen on the ground a few hours previously. The child had a sudden onset of the lid swelling following the fall, associated with pain around the eyeball. Both mother and daughter denied any penetrating injury. No other significant history was elucidated.

Figure 1. A 5-year-old girl with upper eyelid edema, at presentation.

Examination

At presentation, the patient did not have any neurological deficits. She was fully conscious, oriented, and her Glasgow Coma Scale was 15. On examination, the right eye was found to be normal. The left eye showed an edematous upper eyelid and a small laceration near the upper eyelid just below the superior orbital rim. There was chemosis and congestion of the conjunctiva superiorly. Examination of the anterior and posterior segments was otherwise normal. The extraocular movements were restricted only on upgaze. There was a firm, palpable mass below the wound surface.

Ancillary Testing

Computed tomography (CT) revealed an intraorbital foreign body. The hospital neurosurgeon was consulted and a magnetic resonance imaging (MRI) scan was requested. The MRI revealed a long, linear orbital foreign body extending from the left orbit through the medial part of the temporal lobe up to the brain stem (Figure 2). When confronted with the MRI report, the patient's mother continued to deny any injury with a sharp object. Based on the general condition of the patient, absence of neurological deficits and radiological findings, the neurosurgeon did not recommend an angiography.

Treatment

A team of ophthalmologists, a neurosurgeon, and anesthetists planned for extraction of the foreign body under general anesthesia. The laceration in the upper eyelid was extended and probed. On extending the entry wound, the proximal end of the foreign body became visible. The neurosurgeon then grasped the foreign body with forceps and with a slight twisting movement was able to bring the foreign body out of the orbit (Figure 3). On removal, it was found to be a lead pencil (Figure 4).

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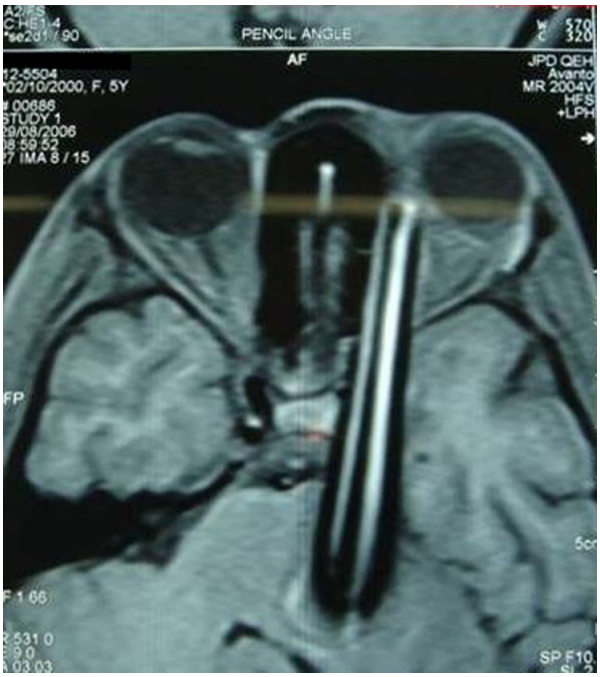

Figure 2. Magnetic resonance imaging showing the intraorbital foreign body extending to the brainstem.

Differential Diagnosis

Orbitocranial foreign bodies may result from occupational accidents, gunshot injuries, motor vehicle accidents, or be self-inflicted. Most foreign bodies are metallic, wooden, or glass. Occasionally, they might be missed on conventional imaging techniques such as plain X-ray or ultrasound. Thus a high index of suspicion and proper radiological studies such as CT scan or MRI should be performed in these cases.

Diagnosis and Discussion

It is generally assumed that orbitocranial penetrating injuries are rare in civilian practice in general and in children in particular. Some case reports highlight the danger posed to children from lead pencils.A retrospective study performed at a large urban pediatric hospital on non-missile, non-bite injuries in their trauma registry revealed that of the 14 injuries from pens and pencils, 9 involved the head and neck. As a result, 11 children were admitted in the hospital and 8 required surgical intervention.[1] Another retrospective case review of orbital injuries managed at the Wills Eye Institute and Massachusetts Eye and Ear Infirmary found 23 patients with intraorbital foreign bodies, the most common being wood pencils (39% of subjects).[2] Most patients had normal or near normal best-corrected visual acuity (20/20–20/40) on examination. Pencil injuries in children have also been reported by Elgin et al,[3] Ozer et al,[4] and Shriwas and Kinzha.[5]

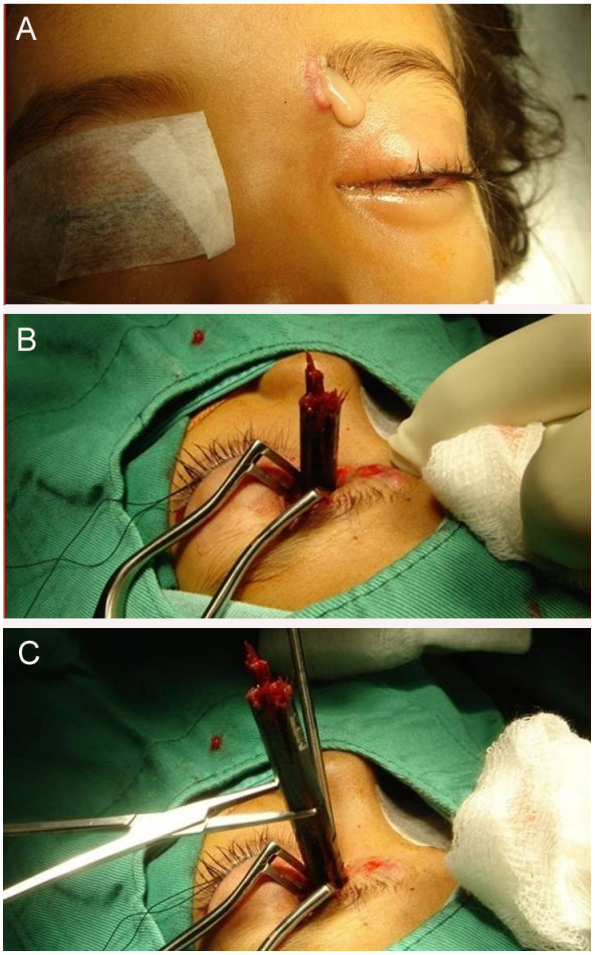

Figure 3. Three stages in the extraction of the foreign body.

Figure 4. The pencil after extraction.

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In civilian life, intraorbital foreign bodies are usually occupational in nature. Orbital roof fractures are also reportedly common. This is assumed to be due to the reflex extension of the patient's head backward, exposing the orbital roof. The thin bony plate of the roof offers little resistance to the foreign body. However, the Wills Eye Institute study[2] found the medial wall to be the most common site for foreign bodies to become lodged.

It is important to assess the actual extent of injury so that appropriate management can be planned. Globe perforations and orbitocranial fractures are other injuries that must also be ruled out. The shocking feature seen in some cases of apparently trivial trauma is that patients may not be aware of any penetrating injury.[6] Occult foreign bodies which penetrate the orbit are only detected with secondary complications, including visual loss, severe orbital inflammation, meningitis, orbital cellulitis, osteomyelitis, ptosis, and brain abscess.[7–9]

Orbitocranial injuries can prove fatal. Death in a child from transhemispheric brain injury after intraorbital penetration with a pencil has been reported[1]; in another incident, a schizophrenic patient committed suicide by piercing his orbit with a plastic ballpoint pen, which entered the cerebellum.[10]

Orbitocranial injuries with foreign bodies can be silent at presentation. Thus even a minor injury should be assessed properly to rule-out severe comorbidities. These cases require imaging studies including CT and MRI; however, MRI should only be performed after a metallic foreign body has been ruled out. If vascular injury is suspected, angiography may be required.

Trauma to the cerebrovascular system (both penetrating and nonpenetrating) can cause injuries such as arterial dissection, pseudo-aneurysm, arterial or venous rupture or thrombosis, and arteriovenous fistula. A vascular injury should be suspected from frank hemorrhage or neurological deficits such as numbness, weakness, and paralysis of the face, upper or lower extremity, or entire side of the body. There may also be a loss of consciousness, facial drooping, slurred speech, aphasia, confusion, blurred vision, and impaired breathing or swallowing. Nausea and vomiting may also occur. If a vascular injury is detected on angiography, measures must be taken preoperatively to control any intraoperative bleeding.

Orbital injuries can lead to enophthalmos or proptosis, ecchymosis, restricted ocular movements, diplopia, chemosis, and crepitus. The presence of such symptoms and signs warrants detailed radiological investigations to assess the severity of the injury.

Resolution of orbitocranial penetrating injury usually requires a multidisciplinary approach, involving neurosurgical and vascular specialists; postoperatively psychiatric evaluation and counseling may be advisable. In children it is also essential to rule out abuse.

Removing a long foreign body through an anterior approach appears to be a simple procedure; however, there is a risk of orbital hemorrhage and lethal intracranial bleeding. Craniotomy and/or an endovascular approach needs to be performed for those presenting with symptoms of vascular involvement or if the foreign body has no extracranial extension. Such cases should be undertaken with neurosurgical and vascular surgical support.

In conclusion, a case of "trivial" eyelid trauma might be associated with a more serious occult problem. In cases involving children, where history taking can be especially challenging, a high index of suspicion, thorough evaluation of the patient, and proper imaging studies can prevent clinical catastrophes.

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